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AFAM  
Course subjects are listed by three- or four-letter abbreviations in capitals. See the complete list of Subject Abbreviations.

MATH 112a or b  
The letters “a” and “b” after a course number denote fall- and spring-term courses, respectively. A course designated “a or b” is the same course given in both terms.

Staff  
Staff is listed when an instructor has yet to be assigned to a course. Refer to Yale Course Search (https://courses.yale.edu) for individual section instructors.

Prerequisite:  
MATH 120  
Prerequisites and recommendations are listed at the end of the course description.

L5, HU  
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 “Distributional Requirements” under “Requirements for the B.A. or B.S. Degree” (http://next.catalog.yale.edu/ycps/academic-regulations/requirements-for-ba-bs-degree/) in the Academic Regulations.

0.5 Course cr  
Most courses earn one course credit per term; variations are noted.

RP  
A course designated “RP” meets during the reading period. See “Reading Period and Final Examination Period” (http://next.catalog.yale.edu/ycps/academic-regulations/reading-period-final-examination-period/) in the Academic Regulations.

[ASTR 320]  
Courses in brackets are not offered during the current year but are expected to be given in the succeeding academic year.

*HIST 012  
All seminars are starred and enrollment is limited. The instructor’s permission may be required.

ITAL 310/LITR 183  
A course with multiple titles, i.e., with two or more departments in the title line, counts toward the major in each department where it appears.

TR  
The abbreviation “TR” denotes a literature course with readings in translation.

YC English: 18th/19th Century  
Courses with department-specific designations are applied toward the requirements of certain majors. See the program descriptions of the relevant majors.

HIST 130J, MCDB 201L  
A capital J or L following the course number denotes a History departmental seminar or a science laboratory, respectively.
### BUILDING ABBREVIATIONS

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>AKW</td>
<td>Arthur K. Watson Hall</td>
</tr>
<tr>
<td>BASS</td>
<td>Bass Center for Molecular and Structural Biology</td>
</tr>
<tr>
<td>BASSLB</td>
<td>Bass Library</td>
</tr>
<tr>
<td>BATTEL</td>
<td>Battell Chapel</td>
</tr>
<tr>
<td>BCMM</td>
<td>Boyer Center for Molecular Medicine</td>
</tr>
<tr>
<td>BCT</td>
<td>Becton Engineering and Applied Science Center</td>
</tr>
<tr>
<td>BF</td>
<td>Benjamin Franklin College</td>
</tr>
<tr>
<td>BK</td>
<td>Berkeley College</td>
</tr>
<tr>
<td>BM</td>
<td>Charles W. Bingham Hall</td>
</tr>
<tr>
<td>BML</td>
<td>Brady Memorial Laboratory</td>
</tr>
<tr>
<td>BR</td>
<td>Branford College</td>
</tr>
<tr>
<td>BRBL</td>
<td>Beinecke Rare Book and Manuscript Library</td>
</tr>
<tr>
<td>BRW35</td>
<td>35 Broadway</td>
</tr>
<tr>
<td>C</td>
<td>Connecticut Hall</td>
</tr>
<tr>
<td>CCAM</td>
<td>Center for Collaborative Arts and Media</td>
</tr>
<tr>
<td>CO451</td>
<td>451 College Street</td>
</tr>
<tr>
<td>CO493</td>
<td>493 College Street</td>
</tr>
<tr>
<td>CRB</td>
<td>Class of 1954 Chemistry Research Building</td>
</tr>
<tr>
<td>CSC</td>
<td>Child Study Center</td>
</tr>
<tr>
<td>D</td>
<td>Durfee Hall</td>
</tr>
<tr>
<td>DAVIES</td>
<td>Davies Auditorium, Becton Center</td>
</tr>
<tr>
<td>DC</td>
<td>Davenport College</td>
</tr>
<tr>
<td>DL</td>
<td>Dunham Laboratory</td>
</tr>
<tr>
<td>DOW</td>
<td>Dow Hall</td>
</tr>
<tr>
<td>EM</td>
<td>Edwin Mc Clellan Hall</td>
</tr>
<tr>
<td>ES</td>
<td>Ezra Stiles College</td>
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<td>ESC</td>
<td>Class of 1954 Environmental Science Center</td>
</tr>
<tr>
<td>EVANS</td>
<td>Edward P. Evans Hall</td>
</tr>
<tr>
<td>F</td>
<td>Farnam Hall</td>
</tr>
<tr>
<td>GH</td>
<td>Grace Hopper College</td>
</tr>
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<td>GML</td>
<td>Greeley Memorial Laboratory</td>
</tr>
<tr>
<td>GRN</td>
<td>Holcombe T. Green, Jr., Hall</td>
</tr>
<tr>
<td>HEN</td>
<td>Hendrie Hall</td>
</tr>
<tr>
<td>HLH17</td>
<td>17 Hillhouse Avenue</td>
</tr>
<tr>
<td>HLH28</td>
<td>28 Hillhouse Avenue</td>
</tr>
<tr>
<td>HQ</td>
<td>Humanities Quadrangle</td>
</tr>
<tr>
<td>JE</td>
<td>Jonathan Edwards College</td>
</tr>
<tr>
<td>K</td>
<td>Kirtland Hall</td>
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<td>KCL</td>
<td>Kline Chemistry Laboratory</td>
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<td>KGL</td>
<td>Kline Geology Laboratory</td>
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<td>KRN</td>
<td>Kroon Hall</td>
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<tr>
<td>L</td>
<td>Lawrance Hall</td>
</tr>
<tr>
<td>LC</td>
<td>Linsly-Chittenden Hall</td>
</tr>
<tr>
<td>LEPH</td>
<td>Laboratory of Epidemiology and Public Health</td>
</tr>
<tr>
<td>LFOP</td>
<td>Leitner Family Observatory and Planetarium</td>
</tr>
<tr>
<td>LGH</td>
<td>Abby and Mitch Leigh Hall</td>
</tr>
<tr>
<td>LOM</td>
<td>Leet Oliver Memorial Hall</td>
</tr>
<tr>
<td>LORIA</td>
<td>Jeffrey H. Loria Center</td>
</tr>
<tr>
<td>LUCE</td>
<td>Henry R. Luce Hall</td>
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<tr>
<td>LWR</td>
<td>Lanman-Wright Memorial Hall</td>
</tr>
<tr>
<td>MC</td>
<td>Morse College</td>
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<tr>
<td>MEC</td>
<td>Malone Engineering Center</td>
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<td>ML</td>
<td>Mason Laboratory</td>
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<tr>
<td>MY</td>
<td>Pauli Murray College</td>
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<tr>
<td>OML</td>
<td>Osborn Memorial Laboratories</td>
</tr>
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<td>PC</td>
<td>Pierson College</td>
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<tr>
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<td>Phelps Hall</td>
</tr>
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</tr>
<tr>
<td>PWG</td>
<td>Payne Whitney Gymnasium</td>
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<tr>
<td>RDH</td>
<td>Rudolph Hall</td>
</tr>
<tr>
<td>RKZ</td>
<td>Rosenkranz Hall</td>
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<tr>
<td>S</td>
<td>Sage Hall</td>
</tr>
<tr>
<td>SA10</td>
<td>10 Sachem Street</td>
</tr>
<tr>
<td>SCL</td>
<td>Sterling Chemistry Laboratory</td>
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<tr>
<td>SDQ</td>
<td>Sterling Divinity Quadrangle</td>
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<td>SHM</td>
<td>Sterling Hall of Medicine</td>
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<td>SLB</td>
<td>Sterling Law Building</td>
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<td>SM</td>
<td>Silliman College</td>
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<tr>
<td>SMH</td>
<td>Sprague Memorial Hall</td>
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<tr>
<td>SML</td>
<td>Sterling Memorial Library</td>
</tr>
<tr>
<td>SPL</td>
<td>Sloane Physics Laboratory</td>
</tr>
<tr>
<td>SSS</td>
<td>Sheffield-Sterling-Strathcona Hall</td>
</tr>
<tr>
<td>STOECK</td>
<td>Stockel Hall</td>
</tr>
<tr>
<td>SY</td>
<td>Saybrook College</td>
</tr>
<tr>
<td>TAC</td>
<td>The Anlyan Center</td>
</tr>
<tr>
<td>TC</td>
<td>Trumbull College</td>
</tr>
<tr>
<td>TD</td>
<td>Timothy Dwight College</td>
</tr>
<tr>
<td>TM432</td>
<td>432 Temple Street</td>
</tr>
<tr>
<td>UT</td>
<td>University Theatre</td>
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<tr>
<td>V</td>
<td>Vanderbilt Hall</td>
</tr>
<tr>
<td>W</td>
<td>Welch Hall</td>
</tr>
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<td>WALL53</td>
<td>53 Wall Street</td>
</tr>
<tr>
<td>WALL81</td>
<td>81 Wall Street</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Building Name</td>
</tr>
<tr>
<td>--------------</td>
<td>--------------------------------</td>
</tr>
<tr>
<td>WH55</td>
<td>55 Whitney Avenue</td>
</tr>
<tr>
<td>WL</td>
<td>Wright Laboratory</td>
</tr>
<tr>
<td>WL-W</td>
<td>Wright Laboratory West</td>
</tr>
<tr>
<td>WLH</td>
<td>William L. Harkness Hall</td>
</tr>
<tr>
<td>WTS</td>
<td>Watson Center</td>
</tr>
<tr>
<td>YCBA</td>
<td>Yale Center for British Art</td>
</tr>
<tr>
<td>YK212</td>
<td>212 York Street</td>
</tr>
<tr>
<td>YK220</td>
<td>220 York Street</td>
</tr>
<tr>
<td>YSB</td>
<td>Yale Science Building</td>
</tr>
<tr>
<td>YUAG</td>
<td>Yale University Art Gallery</td>
</tr>
</tbody>
</table>
YALE COLLEGE CALENDAR WITH PERTINENT DEADLINES

This calendar includes a partial summary of deadlines given in the Academic Regulations and in the Yale College online publication Undergraduate Regulations. Unless otherwise specified, references are to sections in the Academic Regulations, and deadlines fall at 5 p.m. (EST). Dates are subject to change.

SPRING 2022

<table>
<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>Deadline Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apr. 1</td>
<td>F</td>
<td>Yale Course Search opens.</td>
</tr>
<tr>
<td>Apr. 1</td>
<td>F</td>
<td>Deadline to apply for Non-Yale Summer Abroad.</td>
</tr>
<tr>
<td>Apr. 7</td>
<td>Th</td>
<td>Last day to withdraw from a spring second-half course without the course appearing on the transcript.</td>
</tr>
<tr>
<td>Apr. 13</td>
<td>W</td>
<td>Fall term registration opens, 8:00 a.m.</td>
</tr>
<tr>
<td>Apr. 29</td>
<td>F</td>
<td>Classes end; reading period begins.</td>
</tr>
<tr>
<td>Apr. 29</td>
<td>F</td>
<td>Last day to convert from a letter grade to Cr/D/F option for a full-term course and/or a course offered in the second half of the spring term.</td>
</tr>
<tr>
<td>Apr. 29</td>
<td>F</td>
<td>Last day to withdraw from a full-term course and/or a course offered in the second half of the spring term.</td>
</tr>
<tr>
<td>May 1</td>
<td>Su</td>
<td>Applications for fall-term Leaves of Absence due.</td>
</tr>
<tr>
<td>May 1</td>
<td>Su</td>
<td>Deadline to apply for a fall-term 2022 Term Abroad or a 2022–2023 Year Abroad.</td>
</tr>
<tr>
<td>May 4</td>
<td>W</td>
<td>Fall term registration closes, 5:00 p.m.</td>
</tr>
<tr>
<td>May 5</td>
<td>Th</td>
<td>Reading period ends, 5:00 p.m.</td>
</tr>
<tr>
<td>May 5</td>
<td>Th</td>
<td>Final examinations begin, 7:00 p.m.</td>
</tr>
<tr>
<td>May 5</td>
<td>Th</td>
<td>Deadline for all course assignments, other than term papers and term projects. This deadline can be extended only by a Temporary Incomplete authorized by the student's residential college dean.</td>
</tr>
<tr>
<td>May 11</td>
<td>W</td>
<td>Examinations end, 5:30 p.m.</td>
</tr>
<tr>
<td>May 11</td>
<td>W</td>
<td>Deadline for all term papers and term projects. This deadline can be extended only by a Temporary Incomplete authorized by the student's residential college dean.</td>
</tr>
<tr>
<td>May 12</td>
<td>Th</td>
<td>Residences close for underclass students, 12 noon.</td>
</tr>
<tr>
<td>May 13</td>
<td>F</td>
<td>Final grades due for graduating seniors.</td>
</tr>
<tr>
<td>May 18</td>
<td>W</td>
<td>Final grades due for continuing students.</td>
</tr>
<tr>
<td>May 23</td>
<td>M</td>
<td>University Commencement.</td>
</tr>
<tr>
<td>May 24</td>
<td>T</td>
<td>Residences close for seniors, 12 noon.</td>
</tr>
</tbody>
</table>

FALL 2022

<table>
<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>Deadline Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aug. 22</td>
<td>M</td>
<td>Registration opens for new and reinstated students, time TBA.</td>
</tr>
<tr>
<td>Aug. 29</td>
<td>M</td>
<td>Add/Drop period begins, 8:30 a.m.</td>
</tr>
<tr>
<td>Aug. 31</td>
<td>W</td>
<td>Fall classes begin, 8:20 a.m.</td>
</tr>
<tr>
<td>Sept. 2</td>
<td>F</td>
<td>Friday classes do not meet; Monday classes meet instead.</td>
</tr>
<tr>
<td>Sept. 5</td>
<td>M</td>
<td>Labor Day; classes do not meet.</td>
</tr>
<tr>
<td>Sept. 7</td>
<td>W</td>
<td>Add/Drop period ends, 5:00 p.m.</td>
</tr>
</tbody>
</table>
All students planning to complete degree requirements at the end of the fall term must file a petition by this date.

Withdrawal from Yale College on or before this date entitles a student to a full rebate of fall-term tuition. See Undergraduate Regulations.

Final deadline to apply for fall-term Leave of Absence. See Leave of Absence, Deferral, Withdrawal, and Reinstatement.

Last day to withdraw from a course offered in the first half of the fall term without the course appearing on the transcript.

Withdrawal from Yale College on or before this date entitles a student to a rebate of one-half of fall-term tuition. See Undergraduate Regulations.

Deadline to complete applications for financial aid for the 2023 spring term, for students not enrolled in the 2022 fall term.

Last day of courses offered in the first half of the fall term.

Last day to withdraw from a course offered in the first half of the fall term.

Last day to convert from a letter grade to the Cr/D/F option in a course offered in the first half of the fall term.

Applications to study abroad during spring term 2023 are due.

Fall second half-term classes begin.

October recess begins after last class.

Classes resume, 8:20 a.m.

Midterm.

Last day to withdraw from a fall full-term course without the course appearing on the transcript.

Deadline to apply for double credit in a single-credit course.

Withdrawal from Yale College on or before this date entitles a student to a rebate of one-quarter of the term’s tuition.

Last day to withdraw from a fall second half-term course without the course appearing on the transcript.

Registration for spring 2023 opens, 8:00 a.m.

November recess begins after last class.

Classes resume; 8:20 a.m.

Classes end; reading period begins.

Last day to convert from a letter grade to the Cr/D/F option for a full-term course and/or a course offered in the second half of the fall term.

Last day to withdraw from a full-term course and/or a course offered in the second half of the fall term.

Registration for spring 2023 closes, 5:00 p.m.

Reading period ends, 5:00 p.m.

Final examinations begin, 7:00 p.m.

Deadline for all course assignments, other than term papers and term projects. This deadline can be extended only by a Temporary Incomplete authorized by the student’s residential college dean.

Final examinations end, 5:30 p.m.; winter recess begins.

Deadline for all term papers and term projects. This deadline can be extended only by a Temporary Incomplete authorized by the student’s residential college dean.
SPRING 2023

Jan. 3 T Fall-term final grades due.
Jan. 12 Th Add/drop period opens, 8:30 a.m.
Jan. 16 M Martin Luther King Jr. Day; classes do not meet.
Jan. 17 T Spring-term classes begin, 8:20 a.m.
Jan. 20 F Friday classes do not meet; Monday classes meet instead.
Jan. 23 M Add/drop period closes, 5:00 p.m.
Jan. 27 F Last day for students in the Class of 2023 to petition for permission to complete the requirements of two majors.
Jan. 31 T Final deadline to apply for a spring-term Leave of Absence (section J).
Jan. 31 T Withdrawal from Yale College on or before this date entitles the student to a full rebate of spring-term tuition (Undergraduate Regulations).
Feb. 7 T Last day to withdraw from a course offered in the first half of the spring term without the course appearing on the transcript.
Feb. 10 F Withdrawal from Yale College on or before this date entitles a student to a rebate of one-half of spring-term tuition (Undergraduate Regulations).
Feb. 15 T Deadline to apply for Yale Summer Session Programs abroad.
Mar. 1 W Last day to withdraw from a course offered in the first half of the spring term.
Mar. 1 W Last day to convert from a letter grade to Cr/D/F option for a course offered in the first half of the spring term.
Mar. 2 Th Courses offered in the second half of the spring term begin.
Mar. 10 F Midterm.
Mar. 10 F Spring recess begins, 5:30 p.m.
Mar. 10 F Last day to withdraw from a spring full-term course without the course appearing on the transcript.
Mar. 10 F Deadline to apply for double credit in a single-credit course.
Mar. 10 F Withdrawal from Yale College on or before this date entitles a student to a rebate of one-quarter of the term’s tuition (Undergraduate Regulations).
Mar. 27 M Classes resume, 8:20 a.m.
Apr. 1 S Deadline to apply for Non-Yale Summer Abroad.
Apr. 6 Th Last day to withdraw from a spring second-half course without the course appearing on the transcript.
Apr. 28 F Classes end; reading period begins.
Apr. 28 F Last day to convert from a letter grade to Cr/D/F option for a full-term course and/or a course offered in the second half of the spring term.
Apr. 28 F Last day to withdraw from a full-term course and/or a course offered in the second half of the spring term.
May 1 M Applications for fall-term Leaves of Absence due.
May 1 M Deadline to apply for a fall-term 2023 Term Abroad or a 2023–2024 Year Abroad.
May 4 Th Reading period ends, 5:00 p.m.
May 4 Th Final examinations begin, 7:00 p.m.
May 4 Th Deadline for all course assignments, other than term papers and term projects. This deadline can be extended only by a Temporary Incomplete authorized by the student’s residential college dean.
May 10 W Examinations end, 5:30 p.m.
<table>
<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>May 10</td>
<td>W</td>
<td>Deadline for all term papers and term projects. This deadline can be extended only by a Temporary Incomplete authorized by the student’s residential college dean.</td>
</tr>
<tr>
<td>May 11</td>
<td>Th</td>
<td>Residences close for underclassmen, 12 noon.</td>
</tr>
<tr>
<td>May 12</td>
<td>F</td>
<td>Final grades due for graduating seniors.</td>
</tr>
<tr>
<td>May 17</td>
<td>W</td>
<td>Final grades due for continuing students.</td>
</tr>
<tr>
<td>May 22</td>
<td>M</td>
<td>University Commencement.</td>
</tr>
<tr>
<td>May 23</td>
<td>T</td>
<td>Residences close for seniors, 12 noon.</td>
</tr>
</tbody>
</table>

**SUMMER SESSION 2023**

Courses offered during the summer are offered through Yale Summer Session. Further information is available from the Yale Summer Session office or on the website.
YALE COLLEGE ADMINISTRATIVE OFFICERS

ADMINISTRATIVE OFFICERS
Peter Salovey, Ph.D., President of the University
Scott Strobel, Ph.D., Provost of the University
Marvin Chun, Ph.D., Dean of Yale College [Spring 2022]
Tamar S. Gendler, Ph.D., Dean of the Faculty of Arts and Sciences
Melanie Boyd, Ph.D., Senior Associate Dean; Dean of Student Affairs
Alison Cole, M.B.A., Senior Associate Dean for Development, External Affairs, and Special Projects; Director, Development
Jane Edwards, Ph.D., Senior Associate Dean; Dean of International and Professional Experience
Burgwell Howard, M.Ed., Senior Associate Dean; Associate Vice President of Student Engagement
Paul McKinley, M.F.A, Senior Associate Dean of Strategic Initiatives and Communications
Mark J. Schenker, Ph.D., Senior Associate Dean; Dean of Academic Affairs
Pamela Schirmeister, Ph.D., Senior Associate Dean; Dean of Undergraduate Education
Sandy Chang, M.D., Ph.D., Associate Dean for Science and QR Education
Jeanine Dames, J.D., Associate Dean; Director, Office of Career Strategy
Jeanne Follansbee, Ph.D., Associate Dean; Dean of Yale Summer Session
Kathryn Krier, M.F.A, Associate Dean for the Arts
George G. Levesque, Ph.D., Associate Dean; Dean of Academic Programs
Petronella Van Deusen-Scholl, Ph.D., Associate Dean for Foreign Language Education; Director of the Center for Language Study
Eileen M. Galvez, M.Ed., Assistant Dean; Director of La Casa Cultural
Janay M. Garrett, M.A., Assistant Dean of Student Affairs
Alfred E. Guy, Jr., Ph.D., Assistant Dean; Director of the Yale College Writing Center
Matthew Makomenaw, Ph.D., Assistant Dean; Director of the Native American Cultural Center
Kelly McLaughlin, M.A., Assistant Dean of Assessment; Deputy Director and Director of Study Abroad
Hannah Peck, M.Div., Assistant Dean of Student Affairs
Rachel Russell, M.Ed., Assistant Dean of Student Affairs
Risa Sodi, Ph.D., Assistant Dean; Director of Advising and Special Programs
Joliana Yee, Ph.D., Assistant Dean; Director of Asian American Cultural Center
Joel Silverman, Ph.D., Director of Academic and Educational Affairs
Katie Shirley, J.D., Deputy Title IX Coordinator
Emily Shandley, B.A., University Registrar
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Berkeley College, Brianne Bilsky, Ph.D.
Branford College, Sarah E. Insley, Ph.D.
Davenport College, Ryan A. Brasseaux, Ph.D.
Timothy Dwight College, Sarah Mahurin, Ph.D.
Jonathan Edwards College, Christina Ferando, Ph.D.
Benjamin Franklin College, Jessie Royce Hill, M.S.
Grace Hopper College, David Francis, Ph.D.
Morse College, Angela Gleason, Ph.D.
Pauli Murray College, Alexander Rosas, J.D., Ph.D.
Pierson College, Jorge Torres, J.D.
Saybrook College, Ferentz Lafargue, Ph.D.
Silliman College, Leanna Barlow, Ph.D.
Ezra Stiles College, Murphy Temple, Ph.D.
Trumbull College, Surjit Chandhoke, Ph.D.

ADMISSIONS AND FINANCIAL AID OFFICERS
Jeremiah Quinlan, M.B.A., Dean of Undergraduate Admissions and Financial Aid
Margit A. Dahl, B.A., Director of Undergraduate Admissions
Scott Wallace-Juedes, B.A., Director of Undergraduate Financial Aid
Kerry Worsencroft, B.S., Deputy University Director of Financial Aid
### FINAL EXAMINATION SCHEDULES

Rules governing the conduct of final examinations are given in Academic Regulations, section G, Reading Period and Final Examination Period.

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.
- **(33)** M, W, or F, 10:30 a.m.
- **(34)** M, W, or F, 11:35 a.m.
- **(36)** M, W, or F, 1 or 1:30 p.m.
- **(37)** M, W, or F, after 2 p.m.
- **(22)** T or Th, 9 or 9:25 a.m.
- **(23)** T or Th, 10:30 a.m.
- **(24)** T or Th, 11:35 a.m.
- **(26)** T or Th, 1 or 1:30 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; (65) physics; (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. The time slots of 2 p.m. during the last day of the reading period and 7 p.m. on the last day of the final exam period are available for makeup final exams only.

**Final examination dates and times for Spring 2022 are:**

<table>
<thead>
<tr>
<th>Fall</th>
<th>9 a.m.</th>
<th>2 p.m.</th>
<th>7 p.m.</th>
<th>Spring</th>
<th>9 a.m.</th>
<th>2 p.m.</th>
<th>7 p.m.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall 2021</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
<td>May 5</td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<td>May 6</td>
<td>(22)</td>
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<td></td>
<td>May 7</td>
<td>(64)</td>
<td>(34)</td>
<td>(37)</td>
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<td></td>
<td></td>
<td>May 8</td>
<td>(32)</td>
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<td>(31)</td>
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<td></td>
<td></td>
<td></td>
<td>May 9</td>
<td>(63)</td>
<td>(33)</td>
<td>(23)</td>
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<td></td>
<td></td>
<td></td>
<td>May 10</td>
<td>(27)</td>
<td>(69)</td>
<td>(36)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>May 11</td>
<td>(65)</td>
<td>(24)</td>
<td></td>
</tr>
</tbody>
</table>
Final examination dates and times for Fall 2022 and Spring 2023 are:

<table>
<thead>
<tr>
<th>Fall</th>
<th>9 a.m.</th>
<th>2 p.m.</th>
<th>7 p.m.</th>
<th>Spring</th>
<th>9 a.m.</th>
<th>2 p.m.</th>
<th>7 p.m.</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 Dec. Th</td>
<td>*</td>
<td>(23)</td>
<td></td>
<td>4 May Th</td>
<td>*</td>
<td>(37)</td>
<td></td>
</tr>
<tr>
<td>16 Dec. F</td>
<td>(63)</td>
<td>(61)</td>
<td></td>
<td>5 May F</td>
<td>(61)</td>
<td>(33)</td>
<td></td>
</tr>
<tr>
<td>17 Dec. Sa</td>
<td>(36)</td>
<td>(69)</td>
<td>(65)</td>
<td>6 May Sa</td>
<td>(32)</td>
<td>(34)</td>
<td>(31)</td>
</tr>
<tr>
<td>18 Dec. Su</td>
<td>(24)</td>
<td>(27)</td>
<td></td>
<td>7 May Su</td>
<td>(26)</td>
<td>(64)</td>
<td></td>
</tr>
<tr>
<td>19 Dec. M</td>
<td>(37)</td>
<td>(26)</td>
<td>(22)</td>
<td>8 May M</td>
<td>(65)</td>
<td>(24)</td>
<td>(69)</td>
</tr>
<tr>
<td>20 Dec. Tu</td>
<td>(64)</td>
<td>(34)</td>
<td>(32)</td>
<td>9 May Tu</td>
<td>(36)</td>
<td>(22)</td>
<td>(63)</td>
</tr>
<tr>
<td>21 Dec. W</td>
<td>(31)</td>
<td>(33)</td>
<td>*</td>
<td>10 May W</td>
<td>(27)</td>
<td>(23)</td>
<td>*</td>
</tr>
</tbody>
</table>

* Makeup final exams only

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 Academic Regulations, section H, Completion of Course Work, “Postponement of Final Examinations.”)
SUBJECT ABBREVIATIONS

ACCT  Accounting
AFAM  African American Studies
AFST  African Studies
AKKD  Akkadian
AMST  American Studies
AMTH  Applied Mathematics
ANTH  Anthropology
APHY  Applied Physics
ARBC  Arabic
ARCG  Archaeological Studies
ARCH  Architecture
ARMN  Armenian
ART  Art
ASL   American Sign Language
ASTR  Astronomy
BENG  Biomedical Engineering
BIOL  Biology
BRST  British Studies
BURM  Burmese
CENG  Chemical Engineering
CGSC  Cognitive Science
CHEM  Chemistry
CHLD  Child Study Center
CHNS  Chinese
CLCV  Classical Civilization
CLSS  Classics
CPAR  Computing and the Arts
CPSC  Computer Science
CSEC  Computer Science and Economics
CSLI  Computing and Linguistics
CZEC  Czech
DEVN  DeVane Lecture Course
DRST  Directed Studies
DUTC  Dutch
E&EB  Ecology and Evolutionary Biology
EALL  East Asian Languages and Literatures
EAST  East Asian Studies
ECON  Economics
EDST  Education Studies
EENG  Electrical Engineering
EGYP  Egyptian
ENAS  Engineering and Applied Science
ENGL  English Language and Literature
ENRG  Energy Studies
ENVE  Environmental Engineering
EP&E  Ethics, Politics, and Economics
EPS  Earth and Planetary Sciences
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Subject</th>
</tr>
</thead>
<tbody>
<tr>
<td>ER&amp;M</td>
<td>Ethnicity, Race, and Migration</td>
</tr>
<tr>
<td>EVST</td>
<td>Environmental Studies</td>
</tr>
<tr>
<td>F&amp;S</td>
<td>Forestry &amp; Environmental Studies</td>
</tr>
<tr>
<td>FILM</td>
<td>Film and Media Studies</td>
</tr>
<tr>
<td>FNSH</td>
<td>Finnish</td>
</tr>
<tr>
<td>FREN</td>
<td>French</td>
</tr>
<tr>
<td>GLBL</td>
<td>Global Affairs</td>
</tr>
<tr>
<td>GMAN</td>
<td>Germanic Languages and Literatures</td>
</tr>
<tr>
<td>GREK</td>
<td>Ancient Greek</td>
</tr>
<tr>
<td>HEBR</td>
<td>Hebrew</td>
</tr>
<tr>
<td>HGRN</td>
<td>Hungarian</td>
</tr>
<tr>
<td>HIST</td>
<td>History</td>
</tr>
<tr>
<td>HLTH</td>
<td>Global Health Studies</td>
</tr>
<tr>
<td>HMRT</td>
<td>Human Rights</td>
</tr>
<tr>
<td>HNDI</td>
<td>Hindi</td>
</tr>
<tr>
<td>HSAR</td>
<td>History of Art</td>
</tr>
<tr>
<td>HSHM</td>
<td>History of Science, Medicine, and Public Health</td>
</tr>
<tr>
<td>HUMS</td>
<td>Humanities</td>
</tr>
<tr>
<td>INDN</td>
<td>Indonesian</td>
</tr>
<tr>
<td>ITAL</td>
<td>Italian</td>
</tr>
<tr>
<td>JAPN</td>
<td>Japanese</td>
</tr>
<tr>
<td>JDST</td>
<td>Judaic Studies</td>
</tr>
<tr>
<td>KHMR</td>
<td>Khmer</td>
</tr>
<tr>
<td>KREN</td>
<td>Korean</td>
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<tr>
<td>LAST</td>
<td>Latin American Studies</td>
</tr>
<tr>
<td>LATN</td>
<td>Latin</td>
</tr>
<tr>
<td>LING</td>
<td>Linguistics</td>
</tr>
<tr>
<td>LITR</td>
<td>Comparative Literature</td>
</tr>
<tr>
<td>MATH</td>
<td>Mathematics</td>
</tr>
<tr>
<td>MB&amp;B</td>
<td>Molecular Biophysics and Biochemistry</td>
</tr>
<tr>
<td>MCDB</td>
<td>Molecular, Cellular, and Developmental Biology</td>
</tr>
<tr>
<td>MENG</td>
<td>Mechanical Engineering</td>
</tr>
<tr>
<td>MGRK</td>
<td>Modern Greek</td>
</tr>
<tr>
<td>MMES</td>
<td>Modern Middle East Studies</td>
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<tr>
<td>MTBT</td>
<td>Modern Tibetan</td>
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<tr>
<td>MUSI</td>
<td>Music</td>
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<tr>
<td>NAVY</td>
<td>Naval Science</td>
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<tr>
<td>NELC</td>
<td>Near Eastern Languages and Civilizations</td>
</tr>
<tr>
<td>NSCI</td>
<td>Neuroscience</td>
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<td>OTTM</td>
<td>Ottoman</td>
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<tr>
<td>PERS</td>
<td>Persian</td>
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<tr>
<td>PHIL</td>
<td>Philosophy</td>
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<tr>
<td>PHYS</td>
<td>Physics</td>
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<tr>
<td>PLSC</td>
<td>Political Science</td>
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<tr>
<td>PLSH</td>
<td>Polish</td>
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<tr>
<td>PNJB</td>
<td>Punjabi</td>
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<tr>
<td>PORT</td>
<td>Portuguese</td>
</tr>
<tr>
<td>PSYC</td>
<td>Psychology</td>
</tr>
<tr>
<td>RLST</td>
<td>Religious Studies</td>
</tr>
<tr>
<td>ROMN</td>
<td>Romanian</td>
</tr>
</tbody>
</table>
RSEE    Russian and East European Studies
RUSS    Russian
S&DS    Statistics and Data Science
SAST    South Asian Studies
SBCR    Bosnian-Croatian-Serbian
SCIE    Science
SKRT    Sanskrit
SLAV    Slavic Languages and Literatures
SNHL    Sinhala
SOCY    Sociology
SPAN    Spanish
SPEC    Special Divisional Major
STCY    Study of the City
SWAH    Kiswahili
TAML    Tamil
TBTN    Classical Tibetan
THST    Theater and Performance Studies
TKSH    Turkish
TWI     Twi
UKRN    Ukrainian
URBN    Urban Studies
USAF    Aerospace Studies
VIET    Vietnamese
WGSS    Women’s, Gender, and Sexuality Studies
WLOF    Wolof
YDSH    Yiddish
YORU    Yorùbá
ZULU    isiZulu
The table below shows how you gain and lose acceleration credit. In the left column are the criteria for granting acceleration credit based on AP scores. In the middle column are the courses whose successful completion—*in the first year with a grade of B, B+, A−, or A*—yields acceleration credit. In the right column are the courses resulting in the forfeit of acceleration credit.

Two is the maximum number of acceleration credits that can be earned in any subject. In general, acceleration credit in a subject is forfeited by completing any course (other than a laboratory) with a lower number than the lowest-numbered course earning acceleration credit in the subject. Courses in this table were offered in 2021–2022 or are expected to be offered in 2022–2023. Except where noted, one acceleration credit is forfeited for each course credit earned in courses listed in the third column.

The University reserves the right to modify this table to reflect current course offerings. Regardless of the availability of AP tests, only the departments listed below award acceleration credit. The information in this table pertains to the Class of 2026.

<table>
<thead>
<tr>
<th>Acceleration Credit Awarded for AP Scores</th>
<th>Acceleration Credit Awarded for First-Year Courses</th>
<th>Courses Resulting in the Forfeit of Acceleration Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemistry</td>
<td>None</td>
<td>2 credits for CHEM 174, CHEM 175, CHEM 220, CHEM 221, CHEM 230, CHEM 252, CHEM 332, or CHEM 333. If 2 acceleration credits awarded: 2 lost by CHEM 161, CHEM 163, or CHEM 165, or any course numbered CHEM 109 or lower.</td>
</tr>
<tr>
<td>Computer Science</td>
<td>None</td>
<td>1 credit for CPSC 201 or CPSC 223; 2 credits for CPSC 323. If 1 acceleration credit awarded: 1 lost by CPSC 112. If 2 awarded: 2 lost by CPSC 112, 1 lost by CPSC 201 or CPSC 223.</td>
</tr>
<tr>
<td>Economics</td>
<td>None</td>
<td>1 credit in microeconomics for ECON 121 or ECON 125; 1 credit in macroeconomics for ECON 122 or ECON 126. Microeconomics credit lost by ECON 108, ECON 110, or ECON 115; macroeconomics credit lost by ECON 111 or ECON 116.</td>
</tr>
<tr>
<td><strong>English</strong></td>
<td>1 credit for 5 on either AP English Lang and Comp or AP English Lit and Comp tests.</td>
<td>1 credit for ENGL 120 or ENGL 121; 1 credit for 1 term, 2 credits for 2 terms of ENGL 125, ENGL 126, ENGL 127, ENGL 128, ENGL 129, ENGL 130, or DRST 001, DRST 002.</td>
</tr>
<tr>
<td>------------------------------------</td>
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<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Languages</strong></td>
<td>Chinese, French, German, Japanese, Latin, and Spanish only: 2 credits for 5 on AP test. For Italian: 1 credit for 5 on AP test. No additional credit for multiple tests in a single language. All other languages: None.</td>
<td>All languages listed in first column, except Italian: 2 credits for a scheduled L5 course. For Italian: 1 credit for a scheduled L5 course.</td>
</tr>
<tr>
<td><strong>History of Art</strong></td>
<td>1 credit for 5 on AP test in Art History.</td>
<td>None</td>
</tr>
<tr>
<td><strong>Mathematics</strong></td>
<td>1 credit for 5 on AP Calculus AB test; 1 credit for 4 on Calculus BC test; 2 credits for 5 on Calculus BC test.</td>
<td>1 credit for MATH 115, MATH 116, or MATH 118; 2 credits for 120 or higher-numbered courses.</td>
</tr>
<tr>
<td><strong>Music</strong></td>
<td>1 credit for 5 on AP Music Theory test.</td>
<td>None</td>
</tr>
<tr>
<td>Subject</td>
<td>Acceleration Credit</td>
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</tr>
<tr>
<td>Physics</td>
<td>1 credit for 5 on either AP Physics C test, with 5 on AP Calculus AB test or 4 or 5 on Calculus BC test. 2 credits for 5 on both parts of Physics C test with requisite score on Calculus AB or BC test. No credit for AP Physics 1 or 2 tests.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 credits for PHYS 260, PHYS 261 or for course numbered PHYS 400 or higher.</td>
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<tr>
<td></td>
<td>If 1 acceleration credit awarded, 1 lost, and if 2 acceleration credits awarded, 2 lost, by any course numbered PHYS 201 or lower.</td>
<td></td>
</tr>
</tbody>
</table>
VETERANS AFFAIRS: BILL PAYMENT AND PENDING MILITARY BENEFITS

Yale will not impose any penalty, including the assessment of late fees, the denial of access to classes, libraries, or other facilities, or the requirement that a student borrow additional funds, on any student because of the student’s inability to meet their financial obligations to the institution, when the delay is due to the delayed disbursement of funding from VA under chapter 31 or 33.

Yale will permit a student to attend or participate in their course of education during the period beginning on the date on which the student provides to Yale a certificate of eligibility for entitlement to educational assistance under chapter 31 or 33 and ending on the earlier of the following dates: (1) the date on which payment from VA is made to Yale; (2) ninety days after the date Yale certifies tuition and fees following the receipt of the certificate of eligibility.
A MESSAGE FROM THE DEAN OF YALE COLLEGE

We officially call this publication the Yale College Programs of Study, but generations of students and faculty have known it simply as the blue book. A companion to the roughly 2,000 courses to be offered in Yale College in 2022–2023, the blue book is a resource to use as you learn about the curriculum, intended to complement the counsel of faculty and deans who can guide you. Here you will find the guiding principles of Yale College's liberal arts education, including its distributional and major requirements. Use it to explore old 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 the blue book 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. It 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.

Marvin M. Chun, Ph.D. [Spring 2022]
Dean of Yale College
Richard M. Colgate Professor of Psychology; Neuroscience; Cognitive Science

Dean of Yale College [beginning July 1, 2022] to be announced
I. YALE COLLEGE

The Undergraduate Curriculum

Yale College, founded in 1701, is a coeducational undergraduate institution offering instruction in the liberal arts and sciences to around 6,200 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.

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 that develop certain foundational skills—writing, quantitative reasoning, and language competency—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 so that each competence matures and deepens. The best high school writer is still not the writer he or she could be; students who do not use their quantitative or 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.
Distributional Requirements

The distributional requirements described below are intended to ensure 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. 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 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 how we chronicle and interpret the expression of human experience—cultivates an appreciation of the past and enriches our capacity to participate in the life of our times. By engaging other cultures and civilizations, both ancient and modern, students gain insight into the experiences of others while also obtaining an opportunity to critically examine their own. Through the study and practice of the arts, students analyze, create, and perform works allowing them to explore or experience firsthand the joy and discipline of artistic expression. Rigorous and systematic study of the humanities and the arts fosters tolerance for ambiguity and sophisticated analytic skills that provide essential preparation for careers in most areas of contemporary life. But independently of any specific application, study of these subjects teaches understanding of and delight in the highest achievements of humanity.

Area requirement in the sciences (two course credits) Science is the study of the principles of the physical and the natural world through observation and experimentation. The theoretical inquiry, experimental analysis, and firsthand problem solving inextricably linked to scientific inquiry give rise to new modes of thought. 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 to evaluate natural phenomena and the opinions of experts, and to make, understand, and evaluate arguments about them. Scientific literacy teaches students to appreciate the beauty of the natural and physical worlds often hidden from casual observation but which, once revealed, lend richness to everyday life.

Area requirement in the social sciences (two course credits) Broadly conceived, the social sciences study human social behavior and networks using a variety of methodologies and both qualitative and quantitative analysis. The disciplines in the social sciences teach us about who we are as social beings and help us appreciate the
perspective of the other as well as the particularities of society. Methods in the social sciences test for connections between the familiar and the foreign, the traditional and the contemporary, the individual and the group, the predicted result and the anomalous outcome. Their theories propose explanations for the entire range of human phenomena. Study of the social sciences prepares students for lives of civic engagement and develops a nuanced sense of the world around them.

Skills requirement in 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 language, regardless of the level of proficiency at the time of matriculation. Depending on their preparation, students take one, two, or three terms of 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 language distributional requirement are listed under Distributional Requirements in the Academic Regulations, section A, Requirements for the B.A. or the B.S. Degree.

Skills requirement in quantitative reasoning (two course credits) The application of quantitative methods is critical to many different disciplines. Mathematics and statistics are basic tools for the natural and the social sciences, and are 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 Data Science, Computer Science, Economics, and through undergraduate courses offered in the School of Engineering and Applied Science. Quantitative reasoning courses may also be found in a range of other programs.

Skills requirement in writing (two course credits) The ability to write well is one of the hallmarks of a liberally educated person 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. Hundreds of courses, spanning most academic programs, give special attention to writing. Such courses, designated WR, 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 a major program. The requirements for a major are described in general terms in the sections below, and in more detail under Subjects of Instruction. 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. Advising in the major is provided by the director of undergraduate studies (DUS) or an adviser designated by the department or program, and students should plan a schedule of courses in their major in consultation with them. In addition, after a student has declared a major, the DUS or the DUS’s designee is normally the person who reviews the student’s course schedule.

Students seeking the B.S. or the B.A. degree with a major in science or engineering 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 or engineering should discuss their major course of studies with the director of undergraduate studies or an adviser designated by the department or program. Students seeking the B.A. degree with a major in a field other than science or engineering are expected to declare their major by the end of the sophomore year and should do so no later than the beginning of the junior year. In the sophomore year, students should discuss their schedule with their chosen college adviser.

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 rewarding and energizing 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—a subject in which they will work more intensively than in any other. Yale College offers more than eighty possible majors. The department or program concerned sets the requirements for each major, which are detailed under Subjects of Instruction.

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 humanities, the social sciences, the natural sciences—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, 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 at least 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, usually taken in the first year or sophomore year.

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 under Subjects of Instruction. A Special Divisional Major may not be offered as one of two majors.

Multidisciplinary Academic Programs

Multidisciplinary Academic Programs provide opportunities for Yale College students to examine pressing social challenges from a variety of disciplinary perspectives among a community of students and faculty who have shared interests. Students from any major can apply to these programs, and faculty from across the University participate in them. Each program focuses centrally on a distinct and different set of issues, but they all share common features, including a core curriculum and opportunities for practical experience that allow students to combine theory and practice, applying what they have learned in the classroom and in their research. Students may apply to more than one program, but they may enroll in only one.

EDUCATION STUDIES

The Education Studies Program comprises an interdisciplinary cohort of scholars who are interested in education practice, policy, and/or research. Each scholar completes electives within the Education Studies curriculum, a summer or academic-year field experience, and a senior capstone seminar and thesis-equivalent project. Education Studies Scholars also explore educational topics through symposia led by Yale faculty and advising relationships with mentors. Students may apply to the Education Studies Undergraduate Scholars program in their sophomore year. The prerequisite for applying is EDST 110. For more information, see the program website.
ENERGY STUDIES

The Energy Studies Program is designed to provide select undergraduates with the broad knowledge and skills needed for advanced studies, leadership, and success in energy-related fields. The curriculum is divided in three tracks – Energy Science and Technology, Energy and Environment, and Energy and Society – and requires the completion of six term courses covering the three tracks, plus a senior capstone project. Admission to the Energy Studies Undergraduate Scholars program is by application in the fall term of sophomore year. For more information, see the program website.

GLOBAL HEALTH STUDIES

The Global Health Studies Program prepares students to critically engage with global health and its multifaceted issues in present-day societies. Global health is an interdisciplinary field, and as such, students develop a sophisticated understanding of the roles of politics, history, and economics, engage with the insights of anthropology, ethics, law, and sociology, and relate this knowledge to public health and the biomedical sciences. Students who apply to the program, typically in the fall of their sophomore year, become Global Health Scholars. They complete interdisciplinary course work across six global health competency areas to gain a broad understanding of global health research, practice, and leadership. In the summer after their junior year, Scholars can apply for funding support to pursue optional experiential learning projects (such as internships, archival work, or field-based research). During their senior year, they enroll in a colloquium course in order to meaningfully integrate the skills and knowledge acquired throughout the program. To fulfill the requirements of the program, students must complete the global health introductory lecture course (HLTH 230), senior research colloquium (HLTH 490), and four electives that fulfill four of the global health competency areas. For more information, see the program website.

HUMAN RIGHTS STUDIES

The Human Rights Studies Program seeks to equip students with an academic foundation from which to engage meaningfully with human rights scholarship and practice. The program is based on an understanding that human rights constitutes a rich and interdisciplinary field of study, drawing on bodies of work in history, literature, economics, political science, philosophy, anthropology, law, and area studies. The program provides students with relevant analytical, conceptual, and practical skills; connects students to affiliated faculty and peers; supports student research projects and internship opportunities; and offers career guidance on post-college opportunities related to human rights. Students interested in admission to the Human Rights Studies Program must apply in the fall semester of their sophomore year. To fulfill the requirements of the program, students must complete a gateway course (HMRT 100), four electives, and a capstone seminar (HMRT 400). For more information, see the program website.

Certificate Programs

Central to the mission of Yale College is ensuring a broad education rooted in the liberal arts. That education should provide both breadth and depth across a wide array of disciplines, and it should be responsive to the shifting landscape of those disciplines.
and their interrelationships. To encourage students to engage within and across
departmental and disciplinary boundaries, Yale College offers both disciplines-based
and skills-based certificates. A certificate is not a smaller version of a major; instead, it
offers opportunities for students to deepen a skill or to bring disparate elements into
focus. There are three types of certificates offered in Yale College: Advanced Language
Certificates, Skills-Based Certificates, and Interdisciplinary Certificates.

International Experience

Experience abroad is an invaluable complement to the on-campus experience. Such
experience may include course work at foreign universities, intensive language study,
directed research, independent projects, internships, laboratory work, and volunteer
service. To augment students’ education in a globalizing world, 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 financially support students
abroad. Students can visit the Center for International and Professional Experience to
explore options for study abroad, search for international internships and careers, and
seek funding for study, research, and work experiences off campus.

SUMMER ABROAD

Summer courses abroad are offered through Yale Summer Session Programs Abroad
and Yale in London. Students may also apply through Yale Study Abroad to earn credit
from eligible outside summer study abroad programs. Students receiving financial aid
are eligible for summer funding (one summer) through the International Study Award
(ISA) program.

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. Students apply to Yale Study Abroad for approval of a program
of study abroad. The pertinent application procedures and regulations are listed in the
Academic Regulations, section K, Special Academic Programs. Additional information
is available from the Yale Study Abroad office.

YALE IN LONDON

The Yale in London program offers spring-term courses in British humanities and
social sciences, including history, history of art, architecture, sociology, literature,
and drama at the Paul Mellon Centre for Studies in British Art, located in central
London. The program is open to all undergraduates, including seniors, 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 on the program website, or from the Yale in London office at the Yale Center
for British Art, or by email 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 in central London, each lasting six weeks. There are two courses in each session, which vary from year to year and cover topics in humanities and social sciences, including history, history of art, architecture, sociology, literature, and drama. The courses are open to all undergraduates, including seniors, and carry full Yale course credit, although enrollment in a Yale in London summer session does not count as a term of enrollment in Yale College. As with the spring program, the summer sessions take advantage of the cultural resources of London and its environs, and include overnight field trips. Accommodations are provided. Course descriptions and further information are available on the program website, or from the Yale in London office at the Yale Center for British Art, or by email to yaleinlondon@yale.edu.

THE MACMILLAN CENTER

The Whitney and Betty MacMillan Center for International and Area Studies at Yale is the University’s focal point for promoting teaching and research on all aspects of international affairs, 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 oversees six undergraduate majors: African Studies, East Asian Studies, Latin American Studies, Modern Middle East Studies, Russian and East European Studies, and South Asian Studies. Language training is integral to each of the majors.

Further information about the MacMillan Center is available on the Yale MacMillan Center website.

Experiential Learning

Yale College recognizes that experiential learning is a valued and integral part of the Yale College academic experience, enabling students to make the transition from the classroom into their postgraduate professional careers. This experience can be acquired through a variety of means, including but not limited to summer internships, volunteer opportunities, independent projects, and research opportunities. Yale College has a number of resources available to help students identify the experiential opportunity that best complements and enhances their academic goals. The Office of Career Strategy and the Office of Fellowships are two helpful portals, available to all Yale College students. Students receiving financial aid may also be eligible for summer funding through the Summer Experience Award (formerly known as the DSA) and the International Study Award (ISA).

Yale Summer Session

Yale Summer Session offers courses in the arts, engineering, humanities, mathematics, biological and physical sciences, and the social sciences. While many Summer Session courses are offered on campus in New Haven, an increasing number are offered online, and several others are offered as part of programs abroad. Courses in Summer Session are equivalent in credit and satisfy the same distributional requirements as their academic year counterparts, but are offered in a more concentrated and intensive form.
Yale College students 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 on the Summer Session website.

Advising and Academic Resources

ADVISING

What students ultimately take away from their four years at Yale largely depends on the careful planning they apply to their programs of study. It would be premature—and unrealistic—for beginning students to map out a fixed schedule of courses for the subsequent four years, yet it is advisable that they think ahead and make plans for the terms to come. There will be time and opportunity for students to revise such plans as their academic ideas develop.

Yale College does not prescribe a set program of study, in the belief that students who select their own courses are inevitably more engaged with them. As students shape their educational goals, it is important that they seek informed advice. For incoming students who have not yet developed relationships with academic advisers on campus, Yale College furnishes a constellation of advising linked to the residential colleges. As students progress in their studies, usually by sophomore year, they select as their adviser a member of the faculty in an intended or potential major to guide their course selection.

In addition to these advisers, students often seek advice about academic matters, internship and research opportunities, student life, study abroad, and post-graduation options from other offices on campus. Staff at the University Libraries, the Yale College Dean’s Office, and the cultural centers are ready to support students in a variety of endeavors, as is the staff at the Center for International and Professional Experience (CIPE), whose divisions—Study Abroad, Fellowship Programs, the Office of Career Strategy (including the Health Professions Advisory Program), and Yale Summer Session—provide focused advising.

Residential Colleges

There are fourteen residential colleges: Berkeley, Branford, Davenport, Timothy Dwight, Jonathan Edwards, Benjamin Franklin, Grace Hopper, Morse, Pauli Murray, Pierson, Saybrook, Silliman, Ezra Stiles, and Trumbull. Leading each one is a resident head of college, and in each college a resident dean advises students on both academic and nonacademic matters. Associated with the head and the dean as fellows of the college are about fifty additional members of the University drawn from different departments and schools, many of whom serve as advisers to first-year students and sophomores in the college. In addition, a group of seniors in each residential college, known as first-year counselors, serve as peer advisers to first-year students. Additional information about advising resources in the residential colleges can be found on each college website and the Advising Resources website.
Academic Departments

In each academic department and for every undergraduate major, a director of undergraduate studies (DUS) oversees the curriculum, placement matters, and advising resources for the major. In small majors, the DUS also typically serves as the primary adviser for all students in the major; in large majors, other members of the faculty often assist the DUS in providing advice to students. Much information about course placement and prerequisites, as well as requirements for each major, can be found in Chapter III. Additional information about advising resources and faculty in a department or program can be found on the relevant department website.

ACADEMIC RESOURCES

Yale Poorvu Center for Teaching and Learning

The Yale Poorvu Center for Teaching and Learning (the Poorvu Center) provides an array of teaching, tutoring, writing, and technology-enabled learning programs distributed across the University. The center supports student learning and provides opportunities for students to develop as teachers, mentors, and leaders. Additionally, the center houses the Academic Strategies program, which provides information, workshops, and individual mentoring to Yale College students on the skills central to active, empowered learning. Located in Sterling Memorial Library, the Poorvu Center includes community study space and a media studio. More information is available on the Poorvu Center website.

Writing Tutors and Writing Partners

The Poorvu Center provides several ways for students to get help with writing. Each residential college has its own dedicated writing tutor. Tutors meet with students to discuss rough drafts of work in progress, research techniques, revision strategies, or other matters relevant to effective writing. Tutors offer free one-on-one help with any writing project: senior essays, course papers, applications, or anything intended for publication. The Writing Partners, another resource, are undergraduate and graduate students who offer a student's-eye view of writing and revision. Operating out of the Poorvu Center in Sterling Library, Writing Partners offer in-person, drop-in writing support daily. Students can also meet with Writing Partners online in the evenings. Finally, the Poorvu Center website offers writing handouts, model papers, a list of student publications, a guide to writing with Turnitin, and information on using sources effectively.

STEM Tutoring & Programs

The Poorvu Center provides quantitative reasoning (QR) and science tutoring (Sc) for most relevant fields in Yale College. Several courses provide their own Course-Based Peer Tutors (CBPTs) and Undergraduate Learning Assistants (ULAs) who can help students as they work on problem sets or study for exams, who can review returned assignments, and who are there to provide more support for students with difficulties. Information about CBPTs and ULAs is available on individual course syllabi and the Canvas website. If a particular course does not have a CBPT/ULA, or if a student requires more help, the Residential College Math/Science Tutors offer drop-in hours that cover most science and QR topics. Finally, students who need more individual
attention, in courses without CBPTs or ULAs, can apply for small-group tutoring. More information on all of these programs can be found on the Poorvu Center website.

Center for Language Study

The Center for Language Study (CLS), provides resources for language study at Yale. The CLS also provides support for speakers of other languages through its English Language Program. For undergraduates enrolled in a language course, the CLS offers peer tutoring in the target language. Students who seek to demonstrate advanced- or native-level proficiency in a language not taught at Yale may contact the CLS for a proficiency assessment. 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 language study at advanced levels. 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, distance facilities, and flexible learning spaces. For more information, including hours, a list of resources, and information about Yale’s foreign language requirement and placement testing, see the Center website.

Student Accessibility Services

To ensure that all students have an equal opportunity to make the most of their Yale education, the Student Accessibility Services Office (SAS) facilitates individual accommodations for students with disabilities and works to remove physical and attitudinal barriers to their full participation in the University community. Services include, but are not limited to, reasonable academic, classroom and housing accommodations, alternate format materials, and assistive technology loans. The required first step for a student with a disability is to register with SAS to initiate the process of obtaining disability-related accommodations. Supporting documentation ought to be attached to the registration. Registration with SAS is private. Generally, a student requiring reasonable accommodations needs to renew accommodations with SAS at the start of each term and should complete this step as soon as their schedule is known. At any time during a term, students with a newly diagnosed disability or recently sustained injury requiring accommodations should contact SAS. SAS can be reached at sas@yale.edu or by phone at 432-2324.

Special Programs

DIRECTED STUDIES

Directed Studies (DS), a selective program for first-year students, is an interdisciplinary introduction to influential texts that have shaped many Western traditions, spanning from ancient cultures in Greece and the Near East to the present. Consisting of three integrated full-year courses in literature, philosophy, and historical and political thought, Directed Studies provides a coherent program of study that encourages students to put rich and complex texts into conversation with one another across time and disciplinary boundaries. From day one to the end of their first year, students in Directed Studies engage in critical thinking through learning to analyze challenging and urgent texts, participate meaningfully in seminar discussions, and write clear
and persuasive analytic essays. Directed Studies has no prerequisites and provides a strong foundation for any major. Approximately ten percent of the first-year class is admitted each year to the program, which also satisfies Yale College distribution requirements in Humanities and Arts (HU), Social Sciences (SO), and Writing (WR). Students entering the program must enroll in all three courses and are expected to enroll for both semesters. Students participating in DS become members of a close-knit and supportive intellectual cohort that endures well beyond the end of the first year. Additional information is available on the program website.

THE DEVANE LECTURES
The DeVane Lectures are a 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. Details of the course are listed under DeVane Lecture Course in Subjects of Instruction. Supplementary meetings will be held for those students taking the lectures for credit.

FIRST-YEAR SEMINAR PROGRAM
The First-Year Seminar program offers a diverse array of courses open only to first-year students and designed with first-year students 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. Roughly eighty first-year seminars across a wide range of subjects are offered every year, in both fall and spring terms. Students must apply for these seminars before the beginning of each term. A description of the program and application procedures can be viewed on the program website.

FRANCIS WRITER-IN-RESIDENCE
The Francis Writer-in-Residence in Yale College is a distinguished writer of nonfiction who teaches either one or two 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 2022–2023 is Anne Fadiman.

ISEMAN SEMINAR IN POETRY
The Frederick Iseman Professor of Poetry is a distinguished poet or a scholar who teaches poetry or dramatic poetry of any era. The Iseman Professor teaches the Iseman Seminar in Poetry and is actively engaged with undergraduate life, serving as an academic and literary mentor through readings, meetings, and other extracurricular activities. The Iseman Professor for 2022–2023 is Louise Glück.

RESERVE OFFICERS TRAINING CORPS (ROTC)
Yale hosts Naval and Air Force ROTC programs, 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, Space Force, Navy, or Marine Corps. Regardless of financial need, participating students may receive significant help in meeting the costs of a Yale education through national scholarships offered by each branch of ROTC. While most ROTC students in Yale College earned a scholarship while in high school, any student may enroll in ROTC courses and apply
to join ROTC during their first year or sophomore year. Further information about
the Air Force ROTC program can be found on the Yale AFROTC website or under
Aerospace Studies in Subjects of Instruction. Further information about the Naval
ROTC program (including the Marine Corps program) can be found on the Yale
NROTC website or under Naval Science in Subjects of Instruction. Yale College
students can participate in Army ROTC through a crosstown arrangement at the
University of New Haven. Students not matriculated at Yale who are participating in
the Air Force ROTC program as part of a crosstown arrangement are subject to Yale
College's Undergraduate Regulations.

RESIDENTIAL COLLEGE SEMINARS
The Residential College Seminar program, instituted in 1968, is devoted to the
development of innovative courses that fall outside traditional departmental structures.
The instructors for the seminar program are drawn from the University community
and from the region, including writers, journalists, artists, legal scholars, public health
experts, and participants in government and the public sector. The Residential College
Seminar program encourages innovative courses, and student committees in the
residential colleges play a significant role in selecting seminars, 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 on the program website.

STUDIES IN GRAND STRATEGY
Studies in Grand Strategy is a two-semester, calendar-year interdisciplinary seminar.
The class investigates methods and materials for teaching and understanding grand
strategy as a historical concept and as an active approach to geopolitics, statecraft, and
social change. Each course, worth one credit, emphasizes connections between history
and strategy, scholarship and real-world practice, leadership and citizenship. The two-
term seminar aims to educate students intending to pursue careers in a wide variety
of fields and is part of the Brady-Johnson Program in Grand Strategy. Additional
information can be found on the program website.

YALE JOURNALISM INITIATIVE
The Yale Journalism Initiative brings a distinguished writer to campus each semester
to teach an advanced journalism seminar, ENGL 467. The seminar is open to
undergraduates and select graduate and professional students; application is required
through the English department’s selection process for creative writing classes. Students
who complete the seminar may apply to become a Yale Journalism Scholar, a distinction
that provides access to summer support for internships, career counseling with a
journalism specialist, and invitations to meet professional journalists at events both on
and off campus. For more information on the initiative or on becoming a Journalism
Scholar, see the Journalism Initiative website.
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:

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<th>Letter Grade</th>
<th>GPA</th>
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<tr>
<td>A–</td>
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<tr>
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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, which carry no course credit, and marks of P, for Pass, 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. Marks of CR in courses taken Credit/D/Fail are counted as non-A grades. Marks of P in courses that are graded only on a Pass/Fail basis, such as independent study courses, are not included in the calculations. 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, are also not included in the calculation. Further information about the criteria for election and about the Yale chapter can be found on the Yale Phi Beta Kappa website.

PRIZES

For a list of the numerous prizes open annually to students in Yale College, consult the Yale Prizes website.
INTERRUPTION OR TEMPORARY SUSPENSION OF UNIVERSITY SERVICES OR PROGRAMS

Certain events that are beyond the University’s control may cause or require the interruption or temporary suspension of some or all services and programs customarily furnished by the University. These events include, but are not limited to, epidemics or other public health emergencies; storms, floods, earthquakes, or other natural disasters; war, terrorism, rioting, or other acts of violence; loss of power, water, or other utility services; and strikes, work stoppages, or job actions. In the face of such events, the University may, at its sole discretion, provide substitute services and programs, suspend services and programs and/or issue appropriate refunds. Such decisions shall be made at the sole discretion of the University.
II. ACADEMIC REGULATIONS

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.

Yale College expects regular classroom attendance of all students. Accordingly, during terms in which undergraduates are enrolled and instruction is provided in-person, they may not be away from campus for a period exceeding two continuous weeks (14 calendar days) of class time without receiving advance permission from the Committee on Honors and Academic Standing. Students considering such a period of absence should contact their residential college dean at the earliest opportunity.

During the terms that students are enrolled and in residence in Yale College, they cannot be simultaneously enrolled, either full-time or part-time, in any other school or college at any other institution, with the exception of other Yale University schools that permit currently enrolled undergraduates to be admitted to programs that have been established within Yale College. Examples of such programs include the simultaneous award of the bachelor’s and master’s degree and the five-year B.A.-B.S/M.P.H. degree program in Public Health. Exceptions will also be made for Yale College students whose participation in the Reserve Officers Training Corps program requires enrollment in courses offered outside of Yale.

Students enrolled in the Eli Whitney Students program should consult section N, 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 The Undergraduate Curriculum.
1. **Distributional requirements for the first, sophomore, and junior years** Students must partially fulfill the distributional requirements during the first, sophomore, and junior years in order to be eligible for promotion.

   **Distributional requirements for the first 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.

   Note that credit from outside Yale may not be applied toward the distributional requirements for the first year; accordingly, students who are permitted by the Committee on Honors and Academic Standing to repair a deficiency in these requirements over the summer following their first year must do so by means of enrollment in Yale Summer Session.

   **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, and must have earned at least one course credit in each of the three disciplinary areas, by the end of the sixth term of enrollment in order to be eligible for promotion to senior standing.

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 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 University Registrar’s Office optimizes the use of each student’s completed courses toward fulfillment of the distributional requirements.

3. **Language distributional requirement** All students are required to engage in the study of a language while enrolled in Yale College. The most common paths to fulfillment of the language distributional requirement are illustrated in the chart at the end of this section.

   Students who matriculate at Yale with no previous language training must complete three terms of instruction in a single language. This requirement is fulfilled by the completion of courses designated L1, L2, and L3.

   Students who have taken the Advanced Placement examination in French, German, Italian, Latin, or Spanish, and who present scores of 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. Alternatively,
they may successfully complete one or more courses in a different language at least
through the level designated L2.

Students who have studied a language before matriculating at Yale but who have
not achieved a score of 5 on the Advanced Placement test in French, German,
Italian, Latin, or Spanish 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 (DUS). Dates
and times of placement tests are given in the Calendar for the Opening Days of College
and on the Center for Language Study website. 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), or whether they qualify for language
courses beyond the fourth term of study (L5).

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

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

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

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

Students who matriculate at Yale able to place into the fifth term of a language must
successfully complete one course in that language, designated L5 or a comparable
course at the DUS’s discretion. Alternatively, they may successfully complete one or
more courses in a different language at least through the level designated L2.

Students whose secondary school transcript shows that the language of instruction
was other than English, or who otherwise can demonstrate native proficiency
in a language other than English through an assessment at the Center for
Language Study, may fulfill the language requirement by successfully completing
ENGL 114, 115, 120, 121, or 450. Alternatively, students in this category may fulfill
the requirement by successfully completing one course in their native language
designated L5 or a comparable course at the DUS’s discretion, or 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 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. 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 Q, 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. Study abroad opportunities are described under International Experience in The Undergraduate Curriculum.

Intensive language courses provide the equivalent of a full year of instruction in a single term. A course designated L1–L2 fulfills both the L1 and the L2 levels of the 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, American Sign Language, Arabic, Armenian, Bosnian-Croatian-Serbian, Burmese, Chinese, Czech, Dutch, hieroglyphic Egyptian, Finnish, French, German, ancient Greek, modern Greek, biblical Hebrew, modern Hebrew, Hindi, Hungarian, Indonesian, isiZulu, Italian, Japanese, Khmer, Kiswahili, Korean, Latin, Persian, Polish, Portuguese, Punjabi, Romanian, Russian, Sanskrit, Sinhala, Spanish, Tamil, classical Tibetan, modern Tibetan, Turkish, Twi, Ukrainian, Vietnamese, Wolof, Yiddish, and Yorùbá. Students wishing to fulfill the language requirement in a less commonly taught language should consult the DUS 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 should consult the appropriate DUS 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 partial 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 first, 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 Non-degree 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 first 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 first year. See section Q. 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 first, 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 first year** If, with the permission of the residential college dean, a first-year student 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 each of two skills categories (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 will 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 DUS 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 will 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 under the heading for each department or program. 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, 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 R, 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 DUS and residential college dean. When the request is being made in whole or in part on medical grounds, documentation must be provided by a treating physician or therapist, by Student Accessibility Services, or by both. 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 eligible for scholarship assistance from Yale as in the student's previous terms. See “Financial Services” under “Regulations” in the Yale College online publication Undergraduate Regulations.
Graduation in fewer than eight terms of enrollment is possible: see section R, 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 M, Transfer Students. Eli Whitney students should consult section N, Eli Whitney Students Program.
Did you study or speak this language before coming to Yale?

Yes

Did you get a score of 5 on the AP test in French, German, Italian, Latin, or Spanish?

Yes

Take a placement test at Yale or, for languages in which no placement test is offered, consult the appropriate director of undergraduate studies.

No

Take three courses, designated L1, L2, and L3.

Place into L1

Take three courses, designated L2, L3, and L4, or take a different language through L3.

Place into L2

Take two courses, designated L3 and L4, or take a different language through L3.

Place into L3

Take one course, designated L4, or take a different language through L3.

Place into L4

Take one course, designated L5, or take a different language through L2.

Place into L5

No
B. Grades

**LETTER GRADES**

The letter grades in Yale College are:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Excellent</td>
</tr>
<tr>
<td>A–</td>
<td>B+</td>
</tr>
<tr>
<td>B</td>
<td>Good</td>
</tr>
<tr>
<td>B–</td>
<td>C+</td>
</tr>
<tr>
<td>C</td>
<td>Satisfactory</td>
</tr>
<tr>
<td>C–</td>
<td>D+</td>
</tr>
<tr>
<td>D</td>
<td>Passing</td>
</tr>
<tr>
<td>D–</td>
<td></td>
</tr>
</tbody>
</table>

**CREDIT/D/FAIL OPTION**

The opportunity to elect courses on a Credit/D/Fail basis has been provided by the Yale College Faculty in order to encourage academic exploration and to promote diversity in students' programs.

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, other than independent study courses, that are offered in Yale College during the fall and spring terms are available for election under the Credit/D/Fail option. (See “Independent Study Courses,” below, for information on the grading of such courses.)

3. **Total number of course credits** A student has up to six opportunities to convert a course credit to the Credit/D/Fail option, with two of these opportunities expiring if unused during their first two terms of enrollment.

4. **Number of courses and course credits in a term** As many as two course 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 course 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 or the mark of Pass, in any combination.

   For students enrolled in the Eli Whitney Students program, who are permitted to enroll in as few as three course credits in a calendar year and thus sometimes enroll in only one course credit in a term, different limits apply. An Eli Whitney student who is enrolled in fewer than two course credits in a term may elect no course credits that term under the Credit/D/Fail option. An Eli Whitney student who is enrolled in two or more but fewer than four course credits in a term may elect no more than one course credit that term under the Credit/D/Fail option.

   An Eli Whitney student who is enrolled in four or more course credits in a term is bound by the limits given in the paragraph immediately above.

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, or toward satisfaction of the distributional requirements for the bachelor's degree.
6. **Requirements of the major** The program description of each major specifies whether or not courses taken on the Credit/D/Fail basis count toward the requirements of that major.

7. **Credit/year course sequences** A credit/year 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 credit/year 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 credit/year 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 enroll in all courses without selecting any for the Credit/D/Fail option. They may subsequently select that option in any Yale College course—other than those independent study courses graded on a Pass/Fail basis—by the last day of classes, as published in the Yale College Calendar with Pertinent Deadlines. After the last day of classes, election of the Credit/D/Fail option is not permitted. 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 must elect at least two courses, representing at least two course credits, for letter grades or the mark of Pass, in any combination.

9. **Conversion back to a letter grade** Once a student converts a course to the Credit/D/Fail mode, this change cannot be reversed.

10. **Acceleration credit** Work completed under the Credit/D/Fail option cannot yield acceleration credit.

11. **Prizes and honors** Marks of CR are included as non-A grades in the calculations for some prizes, for Distinction in the Major, and for election to Phi Beta Kappa, but marks of CR are not included in the calculation for General Honors. See Honors in The Undergraduate Curriculum.

12. **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” under Honors in The Undergraduate Curriculum.

**INDEPENDENT STUDY COURSES**

Independent study courses, other than senior essays or projects and other exempted courses as explained below, are graded on a Pass (“P”)/Fail (“F”) basis, with the additional requirement that the instructor of record submit a substantive report
II. Academic Regulations

that both describes the nature of the independent study and evaluates the student’s performance in it. These reports will be shared with the student and the director of undergraduate studies (DUS) in the department or program in which the course is offered, and kept in the office of the student’s residential college dean.

Senior projects and courses deemed by a department or program to be a constituent of the senior requirement are evaluated with a letter grade. Additionally, the department or program offering a particular independent study course may deem that such a course should be exempted from Pass/Fail grading for a particular student because the course meets an important requirement in the major. In such a case, the DUS in the department or program that will be applying the course toward its major requirements may petition the Committee on Honors and Academic Standing to permit the student’s work in the course to be evaluated with a letter grade. Such a petition should be filed by 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. In no case will such a petition be accepted later than the date of midterm in the term in which the course is being taken.

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 credit/year 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 (Withdrew) appears on the transcript in association with the course. See paragraph 4 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. Deadlines for withdrawal from courses  If a student has elected a full-term course on the course schedule but formally withdraws from it before midterm, as published in the Yale College Calendar with Pertinent Deadlines, the student’s transcript will contain no indication of that course after the withdrawal has been recorded by the registrar. If a student has elected a half-term course on the course schedule but formally withdraws from it by the relevant deadline published in the Yale College Calendar with Pertinent Deadlines, the student’s transcript will contain
no indication of that course after the withdrawal has been recorded by the registrar. See section F, Withdrawal from Courses.

If a student enrolled in a full-term 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. In credit/year course sequences in which a student receives the mark of SAT or NSAT for the first term and a letter grade for the second, a student who completes the first term but does not subsequently enroll in the second term, or who subsequently withdraws from the second term before the second term is completed, will have the designation W (Withdrawn) recorded for the first term of the sequence.

If a student enrolled in a half-term course formally withdraws from it after the deadline for the course to be removed from the transcript, but by the last date a withdrawal is permitted from the course, the student’s transcript will record the neutral designation W (Withdrawn) for the course. See the Yale College Calendar with Pertinent Deadlines for both dates in each term.

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 last day of classes, as published in the Yale College Calendar with Pertinent Deadlines, is not possible. See section F, Withdrawal from Courses.

5. 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 section H, Completion of Course Work, “Postponement of Final Examinations” and “Work Incomplete at the End of Term.”

6. Withdrawal from Yale College Whether a student withdraws from Yale College for personal, medical, academic, or financial reasons, the entry placed in each case on the student’s transcript is the word “Withdrew” together with the date of the withdrawal. When a student is withdrawn for disciplinary reasons, the entry placed on the student’s transcript is the word “Suspended” together with the date of the suspension.

7. Majors, concentrations, and certificates A transcript may show as a student’s major subject only a designation approved for that purpose by the Yale College Faculty. Major designations are listed under Majors in Yale College. Additionally, transcripts show clearly defined concentrations or tracks of majors. Certificates and Multidisciplinary Academic Programs are also listed on transcripts after degrees have been conferred. Certificates and programs are listed under Programs and Certificates in Yale College.

8. Access to grades Access to recorded grades is available online 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 Student Information
II. Academic Regulations

System (SIS). Students have the opportunity to grant online access to their grades to certain other parties through the Proxy Management menu in the Student Information System. The Registrar’s Office will provide paper grade reports only upon the specific written request of the student.

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** Certain 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 some 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 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 where noted otherwise in the course listing.

   The completion of the first term only of an introductory modern language earns credit whether or not a subsequent term of that language is completed. Neither instructors nor departments have the authority to make an exception to this rule.

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 credit/year 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, and may not drop below three course credits prior to midterm. 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 (Withdrew) 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 and a W 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 six or more
course credits does not intend to drop any of them. Permission for a program of six course credits will normally not be given to a student who is not in academic good standing.

3. Seven course credits in a term Students must petition the Yale College Committee on Honors and Academic Standing through their dean’s office 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, and students may not enroll in independent study courses in the graduate or professional schools. Students may not receive academic course credit for paid research assignments; they may not be paid for any work performed to meet academic requirements or that carries academic course credit.

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.

Students admitted to the Program for the Simultaneous Award of the Bachelor’s and Master’s Degrees are not required to seek permission of the Committee on Honors and Academic Standing to enroll in independent study courses when that enrollment exceeds the limits above and such work is required for the completion of that program.

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 first 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 section I, Academic Penalties and Restrictions, “Dismissal for Academic Reasons” and “Makeup of Course Deficiencies for Promotion or Academic Good Standing.”

E. Course Enrollment

Students may enroll in courses only by entering courses onto their registration worksheet in Yale Course Search during the registration period, or during the add/drop period, according to the dates listed in the Yale College Calendar with Pertinent Deadlines. Class attendance does not constitute enrollment. The course schedule is an important record of a student’s enrollment plans, and students are responsible for the timely and accurate entering and maintaining of course schedule information during the registration and add/drop periods. The course elections that a student indicates on a course schedule or course change notice will appear on the student’s transcript unless the student formally withdraws from a course before the relevant deadline, as listed in the Yale College Calendar with Pertinent Deadlines. 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. **Registration period** For both fall and spring terms, all students must enroll in at least three course credits before the published deadline listed in the Yale College
Calendar with Pertinent Deadlines. Continuing students will enroll in the prior term; new and reinstated students will be notified of their registration dates for the fall term and will enroll for the spring term with continuing students. Students who fail to enroll in at least three course credits by the deadline will be charged a late-registration fee of $50.

2. **Add/drop period** At, or near, the beginning of each term, the registration system opens for all students to adjust their course enrollment. Final course selections and adjustments must be completed by the published deadline listed in the Yale College Calendar with Pertinent Deadlines. It is the student’s responsibility to obtain all necessary permissions before the deadline.

3. **Addition of a new course after the add/drop period** The addition of a new course after the add/drop period will not be permitted save by exceptional action of the Committee on Honors and Academic Standing. Students who seek an exception should consult immediately with their residential college dean. Permission to elect a new course after the add/drop period 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 by the end of the add/drop 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, as published in the Yale College Calendar with Pertinent Deadlines, 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.

4. **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.

5. **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 which overlap in meeting times, the student must supply the residential college dean at the beginning of the term with the written permission of both instructors, along with confirmation that the scheduled final exams as given in Yale Course Search do not themselves overlap. The student must also petition the Committee on Honors and Academic Standing, through their college dean’s office, 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. No more than two courses may overlap, and the length of the overlap permitted depends on the course format as described below:

   (a) Two synchronous courses may have a small and insignificant overlap in meeting times (i.e., no more than 15 minutes once per week, including travel time), with
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Permission from the instructors of both courses, via petition to the residential college dean, so long as the final exams do not overlap.

(b) One asynchronous course may overlap with one synchronous course, including for the full class meeting time, with the permission of both instructors, via petition to the residential college dean, so long as the final exams do not overlap.

(c) Two asynchronous courses may overlap with each other, including for the full class meeting time, with the permission of both instructors, via petition to the residential college dean, so long as the final exams do not overlap.

Failure to file a complete and timely petition may result in the loss of credit for both courses.

6. Courses requiring permission Some courses require permission of the instructor to enroll; others require permission of the director of undergraduate studies. It is the responsibility of the student to secure the appropriate permission before they can be registered in a course.

7. Courses that do not require permission Courses that do not require permission for enrollment may nevertheless 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.

8. Prerequisites Students are expected to have met the prerequisites published in course descriptions. 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.

9. Teaching evaluations For the advancement of teaching in Yale College, anonymous teaching evaluations are made available through the Yale Student Information System (SIS). 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.

10. Selection of a less advanced course in the same subject In certain subjects, such as mathematics, 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 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.

11. 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 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.

12. Academic credit and paid positions Students may not receive academic course credit for paid research assignments; they may not be paid for any work performed to meet academic requirements or that carries academic course credit.

13. Placement in language courses Students placed by a language program or by their score on the Advanced Placement examination into a particular level of a 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 language earns no course credit for the completion of an L1 or L2 course in that language. Should a student complete a 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 the Yale College Academic Field Trip Policies website.

16. Fieldwork If a student is conducting fieldwork away from the Yale campus, under the supervision of a faculty member, he or she should discuss the inherent risks of such work and pre-departure guidelines with the supervising faculty member or director of undergraduate studies.

F. Withdrawal from Courses

Students are permitted to withdraw from courses for which they have enrolled in a term until 5 p.m. (ET) 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 through 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 in section I, Academic Penalties and Restrictions, “Academic Warning” and “Dismissal for Academic Reasons.”

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. **Deadlines for withdrawal from courses** If a student formally withdraws from a full-term course by midterm, as published in the Yale College Calendar with Pertinent Deadlines, then after the registrar has recorded the withdrawal, the transcript will contain no indication of that course. If a student formally withdraws from a half-term course by the relevant deadline published in the Yale College Calendar with Pertinent Deadlines, then after the registrar has recorded the withdrawal, the transcript will contain no indication of that course.

If a student formally withdraws from a full-term course after midterm but before 5 p.m. (ET) 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. If a student enrolled in a half-term course formally withdraws from it after the deadline for the course to be removed from the transcript, but by the last date a withdrawal is permitted from the course, the student’s transcript will record the neutral designation W (Withdrawn) for the course. See the Yale College Calendar with Pertinent Deadlines for both dates in each 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 languages or in mathematics, is not considered a course withdrawal and does not result in the recording of a W (Withdraw). 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 Yale Health 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 (Withdraw).

4. **Withdrawal from a credit/year sequence** For those credit/year course sequences in which a student receives the mark of SAT or NSAT for the first term and a letter grade for the second, withdrawal from the sequence after the first term is completed but before the second term is completed will result in the recording of a mark of W (Withdraw) for the first term.

5. **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 section B, Grades, “General Regulations Concerning Grades and Transcripts.” See also section H, Completion of Course Work, “Work Incomplete at the End of Term” and “Postponement of Final Examinations.”

6. **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.

7. **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. (ET) 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 3, above.

G. Reading Period and Final Examination Period

1. **Due dates for course work** It is expected that instructors will require all course assignments, other than term papers and term projects, to be submitted at the latest by the last day of reading period. Term papers and term projects are to be submitted at the latest by the last day of the final examination period. For the dates of the reading period and final examination period, consult the Yale College Calendar with Pertinent Deadlines. Instructors do not have the authority to give permission for these deadlines to be extended; only the residential college dean has this authority. See section H, Completion of Course Work, “Work Incomplete at the End of Term.” 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 the course listings by the abbreviation “RP” at the end of the course description or by a phrase such as “Meets RP” or “Meets during reading period.”

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. An instructor may, however, set the due date for a term paper or project 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, 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 University 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. The schedule of final examinations may be found in General Information under the heading Final Examination Schedules.

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 at a regular examination starting time 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. 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. For due dates, consult the Yale College Calendar with Pertinent Deadlines.

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 University 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. In-person submission, either to the instructor or to someone explicitly designated by the instructor, such as a teaching fellow or an administrative assistant, is always the best way to ensure that the work has been received. Students who submit course work in a manner other than in person and directly to an appropriate individual (e.g., place it under a door or in a box in a hallway or send it via electronic means), should—even when that is the method directed by the course instructor—confirm as soon as possible after the submission that the work has been received. 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 email account unless they have explicitly authorized such electronic submission in the course syllabus 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 in “Work Missed During the Term” and in “Postponement of Final Examinations” below, 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 rests with the instructor. 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 or incapacitating condition of any kind, 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 or incapacitating condition of any kind, 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 that was originally due in the closing weeks of the term, and not to assignments (such as lab reports, problem
sets, reading responses, etc.) originally due prior to the last day of classes. Note also that the mark of Temporary Incomplete does not refer 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 section B, Grades, “General Regulations Concerning Grades and Transcripts,” and section F, Withdrawal from Courses.

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 backing up data in multiple locations and 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 or incapacitating condition of any kind, 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 full 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 and section G, Reading Period and Final Examination Period, paragraph 4.

* 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. Occasionally an instructor may arrange an option for an alternative final examination in addition to the regularly scheduled examination. See section G, Reading Period and Final Examination Period, paragraph 5. 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.

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 Yale Health or the residential college dean as soon as possible thereafter.

Instructors generally administer makeup final exams. Makeup examinations for the fall term should be scheduled by the end of the second week of classes in the spring term. Makeup examinations for underclass students who miss final examinations in the spring term should be scheduled by the end of the second week of classes in the following fall term. 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 contact their residential dean’s office in advance of the second week of classes about alternative arrangements. 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.

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 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 authorize 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 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 the recommendation of 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 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. See section D, Promotion and Good Standing, “Requirements for Academic Good Standing.” 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. While Yale Summer Session grades are recorded on the Yale College transcript, they are not counted towards this total, because attendance at Yale Summer Session does not constitute a term of enrollment in Yale College.
II. Academic Regulations

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, or a student who has failed to meet the minimum standards for promotion, may be dismissed unless permitted by the Committee on Honors and Academic Standing to repair the deficiency. See section D, Promotion and Good Standing, and “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. **Reinstated students** A student reinstated to Yale College who does not, in the first or second term following reinstatement, pass all the courses completed in that term will be dismissed for academic reasons. See section J, Leave of Absence, Withdrawal, and Reinstatement, “Reinstatement.” 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 Q, 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, Deferral, Withdrawal, and Reinstatement**

**LEAVE OF ABSENCE AND DEFERRAL**

A 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 to four 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. Such permission will not be granted to first-year students during their first term of enrollment, who instead may request permission to defer for one year and enter the following fall term. See section D, Promotion and Good Standing, “Requirements for Academic Good Standing.” 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 fifteenth day
of the term in the fall. First-year students may not request a leave during their first
term of enrollment, and instead may request to defer for a year.

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 fifteenth day of the term in the spring.

3. **Petition for a fall-term deferral** For a fall-term deferral by a first-year student in
their first term of enrollment, a student’s petition must be received on or before the
fifteenth day of that term.

4. **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” under “Financial Services” in the Yale College online
publication *Undergraduate Regulations*.

5. **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. Given
this deadline, a student who requests a leave during the first fifteen days of the term
may not subsequently cancel that request. However, the deadlines for payment of
the term bill and the penalties for late payment apply in such cases. See “Payment
of Fees” under “Financial Services” in the Yale online publication *Undergraduate
Regulations*.

6. **Total terms of leave** A student is eligible for a total of four terms of leave of
absence. These terms need not be taken consecutively.

7. **Accelerated students** A student taking an accelerated degree by use of acceleration
credits who has had four terms of leave of absence may receive a fifth term of leave
if the fifth 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 Q, Acceleration Policies.

8. **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. Such clearance may
also be required for a student who had sought and had been granted, on medical
grounds, a waiver of the fee for the late relinquishment of housing at the time the
leave of absence was requested.
II. Academic Regulations

9. **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 Student Financial Services before leaving Yale; see “Rebates of Undergraduate Charges” under “Financial Services” in the Yale online publication *Undergraduate Regulations*.

10. **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” under “Health Services” in the Yale online publication *Undergraduate Regulations*. Application forms and details about medical coverage while on a leave of absence may be obtained from the Member Services Department of Yale Health.

**WITHDRAWAL**

There are five types of withdrawal, three of which – academic, medical, and personal – are discussed below. For information on disciplinary and financial withdrawals, consult the Yale online publication *Undergraduate Regulations*.

The period of withdrawal for disciplinary reasons is imposed by the Yale College Executive Committee or recommended by the University-Wide Committee on Sexual Misconduct at the time the student’s enrollment is suspended. A student who withdraws from Yale College rather than face disciplinary charges that are pending against that student will not be eligible for Yale College reinstatement, re-enrollment, or a Yale College degree until the student’s case has been adjudicated by the Yale College Executive Committee or the University-Wide Committee on Sexual Misconduct. When disciplinary charges are brought against a student after their withdrawal and remain pending with the Yale College Executive Committee or the University-Wide Committee on Sexual Misconduct, the student must participate in the resolution of those charges before a reinstatement application can be considered.

Regardless of the type of withdrawal, students who have been withdrawn may not stay in residences on campus, attend classes, participate in organized extracurricular activities, or make use of the University library in person or athletic and other facilities. They may come to campus only upon receiving prior permission from their residential college dean or the Dean of Student Affairs.

Students should direct their questions about withdrawal to their residential college dean.

**ACADEMIC WITHDRAWAL**

Students may be dismissed for academic reasons on a variety of grounds; see section I, Academic Penalties and Restrictions, “Dismissal for Academic Reasons.” Students whose withdrawal was for academic 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. A student planning to return to Yale after an academic withdrawal should discuss the requirements for reinstatement with the student's residential college dean.
MEDICAL WITHDRAWAL

A withdrawal for medical reasons must be authorized by the director of Student Health or the chief of Mental Health and Counseling, or by their official designees. If a student under the care of a non–Yale Health clinician wishes to withdraw for medical reasons, that clinician should submit sufficient medical history to the director of Student Health or the chief of Mental Health and Counseling for a final decision. After consulting with the residential college dean, a student wishing to withdraw for medical reasons should submit a withdrawal request to the college dean. In consulting with the college dean, a student planning to return to Yale should also discuss the requirements for reinstatement.

Yale College reserves the right to withdraw a student for medical reasons when, on recommendation of the director of Student Health or the chief of Mental Health and Counseling, the dean of Yale College determines that, because of a medical condition, the student is a danger to self or others, the student has seriously disrupted others in the student’s residential or academic communities, or the student has refused to cooperate with efforts deemed necessary by Yale Health and the dean of Yale College to make such determinations. Each case is assessed individually based on all relevant factors, including, but not limited to, the level of risk presented and the availability of reasonable modifications. Reasonable modifications do not include fundamental alterations to the student’s academic, residential, or other relevant communities or programs; in addition, reasonable modifications do not include those that unduly burden university resources. An appeal of such a withdrawal must be made in writing to the dean of Yale College no later than seven days from the effective date of withdrawal. An incident that gives rise to voluntary or mandatory withdrawal may also result in subsequent disciplinary action.

Students whose withdrawal has been authorized as medical by the director of Student Health or the chief of Mental Health and Counseling must normally remain away at least one full term before a return to Yale College, not including the term in which the withdrawal occurred.

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 for personal reasons should submit a withdrawal request to the college dean. In consulting with the college dean, a student planning to return to Yale should also discuss the requirements of reinstatement.

Students in academic good standing who fail to register in a term will be withdrawn for personal reasons.

Students whose withdrawal was for personal reasons normally 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. A student who withdraws from Yale College for personal reasons rather than face disciplinary charges that are pending against that student will not be eligible for Yale College reinstatement, re-enrollment, or a Yale College degree until the student’s case has been adjudicated by the Yale College Executive Committee or the University-Wide Committee on Sexual Misconduct.
REBATES OF UNDERGRADUATE CHARGES

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

REINSTATEMENT

The Committee on Reinstatement expects withdrawn students to be constructively occupied and to maintain a satisfactory standard of conduct during the time that they are away from Yale College. Examples of constructive occupation include coursework, paid employment, and volunteer activities.

Further requirements depend on the duration or circumstances of the withdrawal. Any student who has been away from full-time academic work for more than four terms, whether or not they were in academic good standing at the time of their departure, must ordinarily complete the equivalent of at least two term courses, either in Yale Summer Session or at another accredited, four-year, Bachelor’s degree-granting college or university, and earning grades of A or B, to demonstrate that upon return they can satisfactorily complete their academic program. In some circumstances, and as specified at the time of a student’s withdrawal, the Committee on Reinstatement may require coursework as a condition of reinstatement.

Courses themselves, as well as the institution at which they are taken, should be cleared in advance with the Committee on Reinstatement by emailing reinstatement@yale.edu. All such coursework must be completed no later than the opening of the term to which the student has applied to be reinstated, but no earlier than two years before the date that term begins. Courses completed in fulfillment for reinstatement that are eligible for graduation credit must be applied to the student’s Yale College transcript.

While the great majority of students who apply for reinstatement do return to Yale College, reinstatement is not guaranteed to any applicant. Since the committee seeks to reinstate 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 applicants to defer their return until a time later than the one originally proposed.

At the conclusion of each of the two terms following their reinstatement, students are expected to complete and pass all of the courses in which they remain enrolled. Students who fail to meet this condition are ordinarily required to withdraw after their record has been reviewed by the Committee on Honors and Academic Standing.

Students who have been reinstated from a first withdrawal for academic, medical, or personal reasons are allowed a second reinstatement after a subsequent withdrawal for medical or personal reasons. Students who have been reinstated from a first withdrawal for medical or personal reasons are allowed a second reinstatement after a subsequent withdrawal for academic, medical, or personal reasons. However, students who have been reinstated from a first withdrawal for academic reasons become ineligible for reinstatement after a second withdrawal for academic reasons.
For reinstatement to a fall term, applications must be submitted by 5 p.m. (EST) on June 1. For reinstatement to a spring term, applications must be submitted by 5 p.m. (EST) on November 1. These deadlines are strictly enforced.

Frequently Asked Questions are available online to provide additional information about reinstatement procedures. Reinstatement inquiries should be directed to reinstatement@yale.edu.

FINANCIAL WAIVERS, FINANCIAL AID, AND REINSTatement

Students on financial aid who are required to complete coursework to be eligible for reinstatement will have their Student Share waived for the year in which they are reinstated. Some students require, upon reinstatement in Yale College, enrollment beyond eight terms to complete their bachelor’s degree. Such students will be granted at the time of their reinstatement any such required additional terms of enrollment. Additionally, if such students receive financial aid, they should apply for aid for those additional terms of enrollment as they did for their previous terms.

REINSTatement INTERVIEWS

Students seeking reinstatement after a medical withdrawal must obtain a recommendation from the director of Student Health or the chief of Mental Health and Counseling, or their official designees, normally by means of an interview conducted in person or by video teleconference. No such recommendation may be made in the absence of documentation provided to Yale Health that the student has had successful treatment from an appropriate health clinician.

At the discretion of the Yale College Executive Committee or the University-Wide Committee on Sexual Misconduct, an interview with the chair of the Committee on Reinstatement or the chair’s designee may be required of students seeking reinstatement after a disciplinary withdrawal.

An interview is not required of students seeking reinstatement from an academic or personal withdrawal.

U.S. MILITARY SERVICE REINSTatement POLICY

Students who interrupt their studies to perform U.S. military service are subject to a separate U.S. military leave reinstatement policy.

In the event that 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 reinstatement under the following conditions:

1. Students must have served in the U.S. Armed Forces for a period of more than thirty consecutive days.
2. Students must give advance written or verbal notice of such service to their residential college dean. In providing the advance notice students do not need to indicate whether they intend 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 reinstatement, by submitting an attestation that the student performed the service.

3. Students 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, such students should contact their residential college dean to determine if they remain eligible for guaranteed reinstatement.

4. Students must notify Yale within three years of the end of the U.S. military service of their intention to return. However, students who are hospitalized or recovering from an illness or injury incurred in or aggravated during the U.S. military service have up until two years after recovering from the illness or injury to notify Yale of their intent to return.

5. Students may not 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 reinstated for the following term unless the student requests, in writing, a later date of reinstatement. Any student who fails to meet one of these requirements may still be eligible for reinstatement under Yale’s general reinstatement policy but is not guaranteed reinstatement. Upon returning to Yale, such students will resume their education without repeating completed course work for courses interrupted by U.S. military service. They will have the same enrolled status last held and will be in the same academic standing. For the first academic year in which such students return, they will be charged the tuition and fees that would have been assessed for the academic year in which they left the institution. Yale may charge up to the amount of tuition and fees that 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 students who are not prepared to resume their studies with the same enrollment status and academic standing as when they left or who will not be able to complete the program of study, Yale will undertake reasonable efforts to help such students 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 reinstatement.

K. Special Academic Programs

YEAR OR TERM ABROAD

In recognition of the value of international study, Yale College encourages students to spend an academic year or a term studying on an approved program abroad. In order to participate in a Year or Term Abroad, students must have secured both approval from the Yale College Committee on the Year or Term Abroad and admission from an accredited study abroad program.

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; students may combine any two of
these three terms for a year abroad. By special exception due to COVID-19 travel restrictions, first-term seniors are eligible to study abroad during the following terms: fall 2022 and spring 2023 (note that first-term seniors were also able to study abroad during fall 2021 and spring 2022). Students must enroll in Yale courses for the final term of enrollment. Therefore, students may only enroll abroad as a second-term senior if attending the Yale in London program.* Students are not eligible to participate in a Year or Term Abroad when on disciplinary probation or during a leave of absence. Students are limited to a maximum of two terms abroad for Yale graduation credit transfer and financial aid transfer.

Students in any major may apply. Students must be in academic good standing at the start of an approved year or term abroad and be able to return to enrollment at Yale in academic good standing. See section D, Promotion and Good Standing, “Requirements for Academic Good Standing.” Students must have at least a B average at the time of their application. Applicants with a cumulative GPA below 3.0 are asked to submit an additional short essay that addresses their academic performance at Yale and outlines specific strategies for maintaining academic good standing abroad. The transcript should demonstrate progress toward raising the GPA in the terms before the intended year or term abroad. Applicants should ensure that they also meet the GPA requirement of their intended study abroad program(s).

Students seeking to study abroad in a country where the primary language is French, German, Italian, Portuguese, Russian, or Spanish are generally expected to take all of their courses in the language of the host country and should have enrolled in the relevant intermediate-level foreign language course (typically a course numbered 140 with an L4 designation) or have demonstrated the equivalent proficiency by examination. Students seeking to study abroad in a country where the primary language is Chinese, Japanese, or Korean should have enrolled in, at minimum, the relevant beginning-level foreign language course (typically a course numbered 120 with an L2 designation) or have demonstrated the equivalent proficiency by examination. Students seeking to study abroad in any other country where the primary language is not English are generally expected to take at least one course studying the language of the host country. Applicants may petition Yale Study Abroad for an exception to the language eligibility requirements if the program’s theme and core courses align with their major.

The credit application for a Year or Term Abroad is available on the Yale Study Abroad website of the Center for International and Professional Experience. A complete application includes all of the following: the application for credit, including a statement concerning the proposed course of study; a recommendation form from the student’s director(s) of undergraduate studies; and a recommendation form from the student’s residential college dean. Students on Yale financial aid must also submit a Year or Term Abroad Budget for Financial Aid application to Student Financial Services. Approval from Yale Study Abroad is contingent upon the Yale Travel Policy and the student’s acceptance into a program or university abroad. Students must complete additional pre-departure requirements before arrival in the host country.

Application deadlines are listed in the Yale College Calendar with Pertinent Deadlines and on the Study Abroad website.
Applications for programs or universities abroad are available directly from the sponsoring institutions. Information about specific programs and contact information for past Yale participants are available on the Yale Study Abroad website. Note that application deadlines differ from program to program and usually also differ from the Yale Study Abroad 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 Study Abroad deadline.

At a minimum, programs must involve full-time work at the university level and must be undertaken during the host program’s regular academic year. Students should note that programs in the Southern Hemisphere are subject to a different academic calendar, one which may include the months of June, July, and August. Students should choose from the list of designated programs available on the Yale Study Abroad website. Students applying to enroll in programs not on the designated list must meet with a study abroad adviser to discuss the program and submit a petition application by the stated deadline. Yale Study Abroad evaluates programs primarily on the quality and structure of their academic offerings as well as the host country's eligibility under the Yale Travel Policy. Study abroad advisers are available to assist students in selecting an appropriate program.

1. **Course credit from a Year or Term Abroad** 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 and a half course credits (with the exception of Cambridge or Oxford, for which students earn five credits for attending during Yale’s spring term). What Yale Study Abroad considers a full program of study varies from program to program due to differences in academic credit systems. Students should consult with a study abroad adviser to ensure that they are enrolled in a full program abroad.

2. **Other course credit from outside Yale** Approved Year or Term Abroad enrollment is the only arrangement by which students may apply 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. Because the maximum number of outside credits allowed is nine, students who have previously transferred one or two outside credits are normally eligible only for one term abroad. Students who wish to take a year abroad, but who are ineligible by virtue of having already transferred one or two outside credits may, with the exception noted below†, request that the University Registrar remove such credit from the transcript by petitioning the Committee on Honors and Academic Standing through their dean’s office. If that petition is approved, the Registrar will remove the relevant outside course credit, but the course title will remain on the transcript. Accordingly, this course work may also continue to be applied toward major and distributional requirements.

3. **Evidence of course work** The approved study abroad program or university must submit to Yale Study Abroad such evidence of the student’s achievement as transcripts or other official academic records.
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. Instructions on applying such credit toward the distributional requirements are available on the Filling Requirements While Away page; petitions for credit toward major requirements should be directed to the relevant director of undergraduate studies. Students interested in fulfilling requirements through study abroad course work should be prepared to provide on their return to Yale copies of all course work and syllabi.

6. **Academic regulations** Because a year or term abroad counts as the equivalent of two or one 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 Yale Study Abroad and 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 Reinstatement. In some cases, such students will have to withdraw from Yale College if the deadline for requesting a leave has passed, or if they have already taken two terms of leave, or if 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 R, Acceleration Policies.

9. **Financial aid** Students who have been approved to study abroad and who receive financial aid from Yale are eligible for aid while abroad. Information about financial aid support can be found on the Student Financial Services website.

* Study during the spring term at the Paul Mellon Centre for Studies in British Art 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 the British Studies program description.

† Students on promotion hold who employ outside course credits to repair a credit deficiency cannot subsequently have those credits removed from their transcript for any reason and are thus ineligible to take a year abroad.
II. Academic Regulations

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 one 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 YALE SUMMER SESSION

There is no limit on the number of on-campus or online courses in Yale Summer Session that a Yale College student may offer toward the requirements for the bachelor’s degree. Yale Summer Session courses selected as Credit/D/Fail will count toward the four-course-credit limit on Credit/D/Fail courses 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 for a grade in Yale Summer Session toward such acceleration. Work completed under the Credit/D/Fail option cannot yield acceleration credit. See section R, Acceleration Policies, “Acceleration by the Early Accumulation of Thirty-Six Course Credits All Earned at Yale.”

Courses outside a student’s major, 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. Summer Session courses within the student’s major automatically count toward the major. Courses taken for a grade may also be counted toward fulfilling distributional requirements. Courses taken on a Credit/D/Fail basis may not be counted toward fulfilling distributional requirements for the junior year nor toward satisfaction of the distributional requirements for the bachelor’s degree. There are no auditing privileges in Yale Summer Session.

All courses completed in Yale Summer Session will be entered on the Yale College record and those taken for a grade will be included in the calculation of the student’s eligibility for General Honors and Distinction in the Major. 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. For further information about Summer Session courses and transcripts, refer to the Yale Summer Session website.

During Summer 2020 and Summer 2021, credits earned in online courses did not count against the previous limit of four online course credits that could be applied to the Yale College degree. In addition, the previous limit of two online courses per summer were suspended.

YALE IN LONDON SUMMER PROGRAM

Courses in the summer program at the Paul Mellon Centre for Studies in British Art 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 Paul 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 section R, Acceleration Policies, “Acceleration by the Early Accumulation of Thirty-Six Course Credits All Earned at Yale.”

FIELDS & DIRECTED INDEPENDENT LANGUAGE STUDY

Through the Center for Language Study, students may apply to two special language programs: (1) Directed Independent Language Study (DILS), to study a language not taught in a department at Yale; and (2) the Fields program, for discipline-specific language study at advanced levels. For both programs, the selection process is competitive; students submit an application to the committee, which considers the strength of the applicant’s academic or professional reasons for their proposed course of study. Students are expected to be self-motivated and to spend significant time on their DILS or Fields study. During the program, students meet with an educated native speaker—a language partner—for two hours per week of conversation, while also studying the language on their own. In consultation with their language partner and the program manager, students devise their own plan of study and locate study materials, including conventional textbooks and web-based language materials. Students are tested at the end of their program using a nationally recognized oral proficiency examination. In Fields, students are also tested at entrance to confirm advanced proficiency. Both programs are open to undergraduates, graduate students, and professional school students. Language study through DILS and Fields is not eligible for course credit, does not satisfy the Yale College language requirement, does not appear on transcripts, and cannot be applied toward the Advanced Language Certificate. Interested students should apply at cls.yale.edu/dils and cls.yale.edu/fields.

AUDITING

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

Category 1. Students enrolled full time in Yale College or in one of the graduate or professional schools of the University. In this case, students should contact the instructor directly for permission; with approval of the instructor, no form or additional permission is needed.

Category 2. Current members of the Yale faculty and emeritus faculty. In this case, the permission of the instructor is the only requirement; no form or additional permission is needed.

Category 3. Spouses of full-time Yale faculty members, or of emeritus faculty, or of students enrolled full time in the University. In these cases, the permission of both the instructor and the Director of Academic and Educational Affairs (joel.silverman@yale.edu) is required.
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Category 4. Employees of the University and their spouses, in accordance with applicable personnel policies. In these cases, the permission of the instructor, the employee’s supervisor, and the Director of Academic and Educational Affairs (joel.silverman@yale.edu) is required.

Category 5. Spouses of postdoctoral associates and fellows. In these cases, permission of both the instructor and the Director of Academic and Educational Affairs (joel.silverman@yale.edu) is required.

Category 6. Yale University alumni and their spouses. In these cases, permission of both the instructor and the Director of Academic and Educational Affairs (joel.silverman@yale.edu) is required, and an auditing fee will be charged.

Those in Categories 1 and 2 should contact the instructor of the course directly; only those in Categories 3, 4, 5, and 6 must complete an auditing form. The form for Categories 3, 4, and 5 (affiliate auditing) is available at the Yale Affiliate Auditing Program website; the form for Category 6 (alumni) is available at the Yale Alumni Auditing Program website.

No other persons are permitted to audit courses in Yale College, except for alumni eligible for the Alumni Auditing program. The Alumni Auditing program is administered separately from the general auditing program, and different rules may apply.

Yale NetIDs cannot be assigned to auditors. Alumni auditors pay a fee, which allows access to classroom sessions and to the Canvas class website, but only to course materials that are published to Canvas and available without Yale NetID access. Accordingly, many course resources (e.g., streaming video, library databases, "Zoo" computer labs, etc.) are not available to auditors. Before paying their auditing fee, and in order to make an informed decision about auditing a course, alumni auditors are encouraged to ask instructors whether such NetID-based resources will be used. More information is available at the Yale Alumni Auditing Program website.

All auditors are responsible for any additional course-based fees; those fees are paid directly to the sponsoring school, and not to the Yale College Auditing Program Office. Course fees can be found in the course description via Yale Course Search.

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 University 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.

The Yale College Auditing Program Office oversees only the auditing of undergraduate courses. To audit courses in Yale Graduate or Professional schools, contact those school registrars directly.

Persons interested in auditing an undergraduate course should review the Yale Alumni Auditing Program website or the Yale Affiliate Auditing Program website.

L. Special Academic Arrangements

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 Environmental Management or Environmental Science, Global Affairs, Music, or Public Health after one additional year of graduate study at Yale. For more information see the respective program descriptions in Subjects of Instruction or on the respective websites.

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 R, Acceleration Policies. The following rules apply to students of these three kinds.

1. Notification by the student Students must, by the last day of the Add/Drop period, in their final term of enrollment, notify the Committee on Honors and Academic Standing through their residential college dean’s office that the fall term will be that 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 students 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 head and dean. Such might be the case, for example, for students who because of a leave of absence did not qualify for graduation with the class in Yale College with which they entered as a first-year. 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 section J, Leave of Absence, Withdrawal, and Reinstatement, “Leave of Absence.”

**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 may enroll under either number, but courses in the graduate and professional schools are not available on the Yale College Credit/D/Fail option; see section B, Grades, “Credit/D/Fail Option.”

A student may request to elect a graduate or professional school course, other than those designated independent study, by entering the course on the Course Schedule Selection Form. Students who wish to elect a professional school course must also complete an additional form downloaded from the University Registrar’s Office website. This latter form must be completed by the student, signed by the course instructor, and attached to a copy of the syllabus, and must also be signed by the appropriate agent of the dean or the registrar of the school in which the course is offered.

Requests should be made as early as possible in the term in which enrollment is sought and not later than three weeks after the first day of Yale College classes of the term. In recognition of the need to have a student’s schedule of courses finalized promptly, forms that are submitted after this date or that are incomplete will normally not be approved. Exceptions require action of the Committee on Honors and Academic Standing, in response to a petition from the student, and will be subject to a fine of at least $50, with increases of $5 daily according to lateness.

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. Once all materials for a request to elect a professional school course are received by the Office of the University Registrar, a review will be made and the student will be informed as to whether the course will earn Yale College course credit and, if so, how much. Courses that earn no Yale College credit will normally not be entered on the Yale College transcript.

Note also 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, unless already accepted into the program for the simultaneous award of the bachelor’s and master’s degrees.

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. Courses
taken in the Graduate School of Arts and Sciences are not included in this four-credit restriction.

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, and work incomplete at the end of term. 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.

CURRICULAR COMBINATIONS AND COURSE OVERLAP ALLOWANCES

Specific combinations of majors, two majors, multidisciplinary academic programs, skills-based and interdisciplinary certificates, and simultaneous degrees enable students to configure combinations that will best serve the purposes of a liberal arts education. By establishing limits comprised of three combinations of curricular options, students are better able to organize their interests into coherent sets of courses.

The following combinations of three are allowed without special permissions: one major and two certificates; one major, one multidisciplinary academic program, and one certificate; two majors and one certificate or one multidisciplinary academic program; a simultaneous Bachelor’s and Master’s Degree (B.A./M.S. or B.A./M.M.) and one certificate or multidisciplinary academic program or a second major. Students may, in special circumstances, petition the Committee on Honors and Academic Standing for permission to earn an additional combination.

Additionally, no more than two course credits may overlap in the fulfillment of the requirements of a major, two majors, a multidisciplinary academic program, a certificate, or a simultaneous degree. Students may not apply the same course credit toward the requirements of more than two curricular programs. For example, the same course credit may not be used to fulfill the requirements of two certificates and a major.

DOUBLE CREDIT FOR A SINGLE-CREDIT COURSE

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

1. **Deadline** Permission must be requested by midterm, as published in the Yale College Calendar with Pertinent Deadlines.

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, and no more than once or twice.

**SIMULTANEOUS AWARD OF THE BACHELOR’S AND MASTER’S DEGREES**

Students of distinguished ability in a limited number of departments 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. The simultaneous degree can be conferred only in a single department or program and only in departments or programs that confer both degrees. For example, a student may not complete a bachelor’s degree in Economics and a master’s degree in Political Science, nor may a student combine a bachelor’s degree in a multi-departmental major (e.g., Ethics, Politics, and Economics) with a master’s degree in one of its constituent departments. A student pursuing a simultaneous degree may, however, complete two separate undergraduate majors as long as one of the undergraduate majors is in the same department as the master’s degree. Currently, the following departments offer the simultaneous degree option: American Studies; Biomedical Engineering; Chemistry; Classics; Computer Science; East Asian Studies; Earth and Planetary Sciences; History; Italian; Linguistics; Mathematics; Molecular Biophysics and Biochemistry; Molecular, Cellular, and Developmental Biology; Music; Political Science; and Statistics and Data Science. For more information about this program, contact the Director of Academic and Educational Affairs, Joel Silverman (joel.silverman@yale.edu).

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. Some participating departments have additional eligibility requirements, and students should consult the relevant director of undergraduate studies for this information. Because 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 that program are ineligible for the simultaneous award of the bachelor’s and master’s degrees.

   Prior to admission to the program, students enrolling in a course that carries both an undergraduate and a graduate number should do so under the graduate number if they wish to apply that course toward the graduate school requirements.

2. **Application** Students must apply to their department for admission to the program through their director of undergraduate studies no later than the last day of classes in their fifth term of enrollment in Yale College. The proposal should provide evidence of eligibility, reasons for pursuing the simultaneous degree, and plans for completing the program requirements. 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 Director of Academic and Educational Affairs (joel.silverman@yale.edu) in 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.

3. **Program requirements** 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 course credits 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 must take at least two of those six 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. While some participating departments may allow up to two overlapping term courses to apply to the requirements of both the major and the master's degree, and while students are not prohibited from additionally completing a second major, students may not apply two overlapping term courses toward the completion of both the simultaneous degree and toward completion of the two majors; only one such overlap is permitted.

4. **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 or 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.

5. **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 should have their course schedules approved each term both by the director of undergraduate studies and by the director of graduate studies.

6. **Independent Study** Students who have been admitted into the program may enroll in independent study courses in the graduate or professional school if the director of graduate studies verifies that such courses are applicable to the degree requirements for the master's degree.

**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 University curriculum. If the subject can be pursued through independent study in an existing tutorial course in a department (e.g., AMST 471 or CGSC 473), 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, 25 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.

TWO MAJORS

A student must petition the Committee on Honors and Academic Standing for permission to complete the requirements of two major programs. A Petition to Complete the Requirements of Two Majors is available on the University Registrar’s Forms & Petitions site. 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 petitioners should consult 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.

M. 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. Once accepted for admission, transfer students should consult with the director of the transfer program in order to ascertain their status with regard to the distributional requirements, especially the 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 or earn fewer than eighteen course credits at Yale. Transfer students are not eligible for the award of acceleration credit or for acceleration by 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 determination 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 determination of transfer credits must petition the 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, Requirements for the B.A. or B.S. Degree, “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 up to two course credits for work completed outside Yale after matriculation and may receive credit
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for a Year or Term Abroad according to the guidelines of section Q, Credit from Other Universities, and section L, Special Academic Arrangements, “Year or Term Abroad,” provided that they enroll in Yale College 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 first year, sophomore year, or junior year, but they must fulfill the distributional requirements for the bachelor’s degree. See paragraph 1 above.

8. **Credit/D/Fail** Transfer students have up to four opportunities to convert a course credit to the Credit/D/Fail option.

9. **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 non-degree student before his or her first term of enrollment at Yale.

N. 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. Students are eligible to enroll in the program if they do not already hold a bachelor’s degree and if they have a five-year gap at least in their post-secondary school education or have been out of high school for five or more years by the time of their matriculation at Yale.

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.

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 course credits 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.

2. **Academic Warning, and dismissal for academic reasons** Academic Warning is an indication that a student’s scholastic record is unsatisfactory. Academic Warning will be automatic for Eli Whitney students who do not complete three course credits in any calendar year, as well as in the following cases: (a) failure in one term to earn at least one course credit; (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. A record that shows a grade of F for an Eli Whitney student who is on Academic Warning in that term will result in that student’s dismissal for academic reasons.

3. **Degree requirements** To qualify for the bachelor’s degree through the Eli Whitney Students program, Eli Whitney 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. Eli Whitney students must enroll in Yale College for at least four terms, earning by attendance in the Eli Whitney Students program at least eighteen of the required thirty-six credits. As many as eighteen course credits earned at another college or university or in the Non-degree Students program at Yale may be transferred toward the requirements for the bachelor's degree.
Such transfer credit will be awarded for academic courses that were taken at an accredited institution and that were similar in content to Yale 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. Eli Whitney students also must complete the requirements of a major program in Yale College and fulfill the distributional requirements for the bachelor’s degree. See Majors in Yale College and The Undergraduate Curriculum under Major Programs.

4. **Distributional requirements** Eli Whitney students are not bound by the distributional requirements for the first year, sophomore year, or junior year, but must nonetheless fulfill the distributional requirements for the bachelor’s degree. Once accepted for admission, Eli Whitney students should consult with the director of the Eli Whitney Students program in order to ascertain their status with regard to the distributional requirements, especially the language requirement.

5. **Credit/D/Fail** Eli Whitney students have up to four opportunities to convert a course to the Credit/D/Fail option. 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. Because Eli Whitney students are permitted to enroll in as few as three course credits in a calendar year, and thus sometimes enroll in only one course credit in a term, special limits apply. An Eli Whitney student enrolled in four or more course credits in a term may elect up to two course credits that term under the Credit/D/Fail option. An Eli Whitney student enrolled in two or more, but fewer than four, course credits in a term may elect no more than one course credit that term under the Credit/D/Fail option. An Eli Whitney student enrolled in fewer than two course credits in a term may not elect any course credits that term under the Credit/D/Fail option.

6. **Registration and enrollment** Eli Whitney students enroll in courses as described in section E, Course Enrollment, and according to the deadline stipulated in the Yale College Calendar with Pertinent Deadlines. Students 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 section C, Course Credits and Course Loads, “Normal Program of Study.” Eli Whitney students are eligible to enroll in Directed Studies or First-Year Seminars only in certain limited conditions. Students should consult with the director of the Eli Whitney Students program in order to ascertain their eligibility.

7. **Tuition and financial aid** Tuition for the 2022–2023 academic year for Eli Whitney students is $6,875 per course credit, and Eli Whitney students are not to be charged in excess of the maximum full tuition rate of $31,125 per term. 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. Eli Whitney students are eligible to apply for financial aid.

8. **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 the Office of Career Strategy and for fellowships through the Center for International and Professional Experience. Eli Whitney students are entitled to purchase gymnasium memberships and
Yale Health coverage. Students in the Eli Whitney program are not eligible for undergraduate housing and they may not serve as first-year counselors.

9. Regulations  Eli Whitney students are governed by the academic regulations of Yale College, wherever appropriate, and by the rules contained in the Yale online publication Undergraduate Regulations. In disciplinary matters, Eli Whitney students are subject to the jurisdiction of the Yale College Executive Committee.

10. Leave of absence and withdrawal  See section J, Leave of Absence, Withdrawal, and Reinstatement. All regular deadlines and policies apply.

11. Transcripts  An Eli Whitney 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 student’s previous colleges or universities. An Eli Whitney student who needs a record of studies completed before admission to Yale must secure a transcript from the previous institutions.

12. Course credit from outside Yale  Students enrolled in the Eli Whitney Students program may receive up to two course credits for work completed outside Yale after matriculation, according to the guidelines of section Q, Credit from Other Universities, provided that they enroll in Yale College for at least four terms, earning by attendance at Yale a minimum of eighteen course credits.

13. Year or Term Abroad  With the approval of the director of the Eli Whitney Students program 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 Year or Term Abroad. An Eli Whitney student must comply with all deadlines and requirements of the Committee on the Year or Term Abroad. See section L, Special Academic Arrangements, “Year or Term Abroad.” To be eligible to apply, an Eli Whitney student must have accumulated, before enrolling abroad, at least twelve course credits but no more than twenty-two course credits toward the 36-course-credit requirement. 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.

14. 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 may 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 from the Undergraduate Admissions Office’s Eli Whitney Students Program website.
O. Non-degree Students Program

The Non-degree 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. Normally, students are admitted for a period of one to two terms; students wishing to extend their enrollment must reapply through the Admissions Office.

The Non-degree Students program offers nonresident students who are unable to attend college full time the opportunity to enroll in Yale College courses for credit. The Non-degree 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 Yale College students, students in this program are required to comply with the academic regulations. Students not matriculated at Yale but participating in one of Yale’s Reserve Officers Training Corps (ROTC) programs under a cross-town arrangement are registered as non-degree students. As such, they are subject to Yale College undergraduate regulations as a condition of their participation in Yale’s ROTC program.

Non-degree 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 Non-degree Students program.

1. **Academic requirements** Non-degree 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 non-degree 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 fifteenth day of the term in question. A leave of absence may 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. **Enrollment and registration** Non-degree enrollment may begin in either the fall or the spring term. All non-degree students register for courses with the Director of Academic and Educational Affairs. In general, admission to limited-enrollment courses is not available to non-degree students. Auditing is not permitted in the Non-degree Students program. Non-degree 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 of Arts and Sciences or to the particular professional school in whose courses they wish to enroll.

3. **Credit/D/Fail option** Non-degree 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 the Director of Academic and Educational Affairs at least one week prior to the
Credit/D/Fail conversion deadline. Non-degree 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 Non-degree Students program.

4. Tuition The tuition for non-degree students during 2022-2023 is $6,875 per course credit. Yale employees and their spouses are entitled to a tuition reduction; questions about this employee benefit should be directed to the Office of Human Resources, 432-5552. Tuition must be paid in full to the Office of Student Financial Services before registration. Yale provides no financial assistance for non-degree 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: (1) 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; (2) a student who drops a course for any reason after the course selection period but on or before the day of midterm will be refunded one-half the tuition paid for that course; (3) 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, Course Enrollment. Late tuition payments will be accepted no later than the course schedule deadline date (see the Yale College Calendar with Pertinent Deadlines). Any student who has not completed payment in full for courses by this deadline will not be permitted to enroll for that term.

5. Facilities and services Non-degree 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 memberships and Yale Health coverage. Non-degree students are not eligible for undergraduate housing and they may not serve as first-year counselors.

6. Regulations Non-degree students are governed by the academic regulations of Yale College and by the rules contained in the Yale online publication Undergraduate Regulations. In disciplinary matters, non-degree 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 non-degree 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 Non-degree 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 non-degree 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 non-degree 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 non-degree student, but may be a part-time non-degree 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 non-degree 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 non-degree 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 Non-degree 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 non-degree students before their first term of enrollment at Yale.

10. **Yale employees** Yale employees require permission of their supervisors to apply.

Further information and application forms are available at the Non-degree Students Program website.

**P. Visiting International Student Program**

The Yale Visiting International Student program (Y-VISP) invites selected undergraduate students from Y-VISP partner institutions to pursue full-time study in Yale College during one term or one academic year. Y-VISP students maintain a full course load, live in the residential colleges alongside Yale College students, and are fully integrated members of Yale College’s academic, residential, and extracurricular communities. Y-VISP oversight and governance is managed by the program’s director and the Y-VISP Steering Committee. Additional information is available on the Yale Visiting International Student Program website.

**Q. 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, university, or academic program toward the 36 course credit graduation requirement for graduation from Yale College. 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.

Credits earned on a Year or Term Abroad count toward the 36 course credit graduation requirement and appear on the Yale transcript with the mark TR (“transfer credit”). 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 section K, Special Academic Programs, “Courses in Yale Summer Session.” Similarly, courses taken in the Yale College program at the Paul Mellon Centre in London are Yale courses and do not count as outside credit. Students who wish to receive credit for summer study abroad with outside programs must meet the eligibility requirements and apply for approval through Yale Study Abroad. No more than two credits earned at another institution may be applied toward the 36 course credit graduation requirement. While Year or Term Abroad courses are not bound by this limit, any graduation credit earned through approved non-Yale summer abroad programs count toward this two course credit limit.
II. Academic Regulations

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 Academic and Educational Affairs 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. Extension schools usually do not meet these requirements, and so courses taken at extension schools normally do not qualify for credit. 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, or 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 Director of Academic and Educational Affairs.
As a regular exception to this rule, students who earned credits while still enrolled in secondary school as members of the Non-degree 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, or in cases where a student is thereby fulfilling the language requirement in a language not offered at Yale (see paragraph 6, “The language requirement and courses taken elsewhere,” below). In no case may a student bring in more than three outside graduation course credits, with the exception of an approved Year or Term Abroad.

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; instructions on applying such credit toward the distributional requirements are available on the Fulfilling Requirements While Away on the Yale Study Abroad website. Credit from outside Yale may not be applied toward the distributional requirements for the first year. Yale also does not award credit toward distributional requirements for courses completed at another college or university before the student graduated from secondary school, nor for online courses completed outside Yale, except in cases where a student is fulfilling the foreign language requirement in a language not offered at Yale (see paragraph 13, “Online courses,” below).

6. **The language requirement and courses taken elsewhere** Students who have taken a course in a 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 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. For languages not offered at Yale, students should seek guidance from the Center for Language Study about the possibility of fulfilling the language requirement in that language through outside credit.

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** Yale Study Abroad oversees credit transfer from approved Year or Term Abroad programs. For more information, see section K, Special Academic Programs, "Year or Term Abroad."

9. **Non-Yale Summer Abroad** Students who wish to receive credit for summer study abroad with non-Yale programs must apply for approval through Yale Study Abroad. The Non-Yale Summer Abroad credit application deadline for 2022 is April 1, 2022. Students should note that the application process for Yale Summer Session Programs Abroad differs and often has an earlier deadline than the Non-Yale Summer Abroad credit application. Information about the application process, including a list of designated programs, is available on the Yale Study Abroad website. Students receiving credit for summer study abroad may also apply such credit toward the distributional requirements for the bachelor’s degree or toward a requirement of the student’s major program (see paragraph 5, “Distributional requirements,” and paragraph 7, “Major requirements,” above).

10. **Transfer students and Eli Whitney Program students** Transfer students and students in the Eli Whitney Program may receive up to two course credits for work completed outside Yale after matriculation and may receive credit for a Year or Term Abroad according to the guidelines of section M, Transfer Students, section N, Eli Whitney Students Program, and section K, Special Academic Programs, “Year or Term Abroad,” provided that they enroll in Yale College for at least four terms, earning by attendance at Yale a minimum of eighteen course credits.

11. **Internships, field studies, and the like** Course credit cannot be given for such programs as internships, field studies, or workshops, but these experiences may be included as a component of a full, regular, academic course of instruction, certified by a transcript from an accredited four-year institution granting a bachelor’s degree.

12. **Independent study** Course credit cannot be given for independent study courses taken at another university except for independent study courses taken as part of a designated study abroad program with the approval of Yale Study Abroad.

13. **Online courses** Online courses from other universities may be eligible for Yale credit under limited conditions. The course must include regular, synchronous interaction with the instructor, as well as regular feedback. For online courses offered during the summer, such courses may not be comparable to a course offered online through Yale Summer Session. Online courses may not be used by students to repair a deficiency for promotion (see section I, Academic Penalties and Restrictions, “Makeup of Course Deficiencies for Promotion or Academic Good Standing”) or for purposes of reinstatement, and may not be applied toward a distributional requirement, with the exception that online courses in a language not offered at Yale may be applied toward the language requirement (see paragraph 6, “The language requirement and courses taken elsewhere,” above).

14. **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, and/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 and students in the Eli Whitney Students Program — on which see section M, Transfer Students, or section N, Eli Whitney Students Program — 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 only toward the distributional requirements are listed without grades and with the designation “for distributional credit only.” Courses that are applied only toward the requirements of a major program 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 reinstatement, the entry may not subsequently be removed at the student’s request.

15. **Acceleration** See section Q, Acceleration Policies.

† Students on promotion hold who employ outside course credits to repair a credit deficiency cannot subsequently have those credits removed from their transcript for any reason and are thus ineligible to take a year abroad.

**R. 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 is, in fact, a term of enrollment in Yale College, and credits earned in that 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 section K, Special Academic Programs, “Courses in Yale Summer Session” and “Yale in London Summer Program.”

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 “Acceleration by Use of Acceleration Credits,” paragraph 4, 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 of that intention by the last day of the Add/Drop period in the student’s final term of enrollment. Such notification is made by submission of the required form to the office of the residential college dean and must include written certification from the student’s director of undergraduate
studies (DUS) 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 by the conclusion of that term. Failure to do so will result in the student 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 the Table of Acceleration Credit. 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 the University Registrar’s Office, 246 Church Street, 203-432-2330.

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:

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

<table>
<thead>
<tr>
<th>Acceleration by Two Terms</th>
<th>Minimum Total Credits</th>
<th>Minimum Yale Course Credits</th>
<th>Activated Acceleration Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>In the third term</td>
<td>17</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>In the fourth term</td>
<td>21</td>
<td>12</td>
<td>9</td>
</tr>
<tr>
<td>In the fifth term</td>
<td>26</td>
<td>17</td>
<td>9</td>
</tr>
</tbody>
</table>

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 prior to the start of classes in the seventh term of enrollment. The absolute and final deadline for applying for acceleration by two terms is on the last day prior to the start of classes in the sixth 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. Two-term accelerants who choose to decelerate in their sixth term, thereby requiring a reinstatement of their original class year, will be assessed a fee of $50. 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 paragraphs 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 University 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 University 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 section J, Leave of Absence, Withdrawal, and Reinstatement, “Leave of Absence”; a student who has received long-term loans through Yale or who is receiving financial aid from Yale should particularly note “Leave of Absence,” paragraph 8.

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 section K, Special Academic Programs, “Courses in Yale Summer Session” and “Yale in London Summer Program.”

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 first year. See section Q, 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. Attendance at the Paul Mellon Centre during the summer, however, does not count as a term of enrollment. See section K, Special Academic Programs, “Yale in London Summer Program.”

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 section K, Special Academic Programs, “Year or Term Abroad.” 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:

<table>
<thead>
<tr>
<th>Terms of Acceleration</th>
<th>Total Terms at Yale</th>
<th>Total Terms on YA/TA</th>
<th>Acceleration Credits</th>
<th>Minimum Course Credits Earned at Yale</th>
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8. **Distributional requirements** Acceleration credits may not be employed to meet the distributional requirements for the first, 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 DUS, 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 non-degree 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 non-degree students. Because such students will have graduated, they will not be eligible for financial aid. See section O, Non-degree Students Program.

12. **Transfer students and students in the Eli Whitney Students Program** Students admitted by transfer from other colleges and universities are not eligible for acceleration by the use of acceleration credits.
S. 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.)
Astrophysics (B.S.)
Biomedical Engineering (B.S.)
Chemical Engineering (B.S.)
Chemistry (B.A. or B.S.)
Classical Civilization (B.A.)
Classics (B.A.)
Cognitive Science (B.A. or B.S.)
Comparative Literature (B.A.)
Computer Science (B.A. or B.S.)
Computer Science and Economics (B.S.)
Computer Science and Mathematics (B.S.)
Computer Science and Psychology (B.A.)
Computing and Linguistics (B.A. or B.S.)
Computing and the Arts (B.A.)
Earth and Planetary Sciences (B.A. or B.S.)
East Asian Languages and Literatures (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 (B.S.)
Electrical Engineering and Computer Science (B.S.)
Engineering Sciences (Chemical) (B.S.)
Engineering Sciences (Electrical) (B.A. or B.S.)
Engineering Sciences (Environmental) (B.A.)

Engineering Sciences (Mechanical) (B.A. or B.S.)
English (B.A.)
Environmental Engineering (B.S.)
Environmental Studies (B.A. or B.S.)
Ethics, Politics, and Economics (B.A.)
Ethnicity, Race, and Migration (B.A.)
Film and Media Studies (B.A.)
French (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, Medicine, and Public Health (B.A.)
Humanities (B.A.)
Italian Studies (B.A.)
Judaic Studies (B.A.)
Latin American Studies (B.A.)
Linguistics (B.A.)
Mathematics (B.A. or B.S.)
Mathematics and Philosophy (B.A.)
Mathematics and Physics (B.S.)
Mechanical Engineering (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.)
Neuroscience (B.A. or B.S.)
Philosophy (B.A.)
Physics (B.S.)
Physics and Geosciences (B.S.)
Physics and Philosophy (B.A. or B.S.)
Political Science (B.A.)
Portuguese (B.A.)
Psychology (B.A. or B.S.)
Religious Studies (B.A.)
Russian (B.A.)
Russian, East European, and Eurasian Studies (B.A.)
Sociology (B.A.)
South Asian Studies (second major only)
Spanish (B.A.)
Special Divisional Major (B.A. or B.S.)
Statistics and Data Science (B.A. or B.S.)
Theater and Performance Studies (B.A.)
Urban Studies (B.A.)
Women's, Gender, and Sexuality Studies (B.A.)
Programs and Certificates in Yale College

MULTIDISCIPLINARY ACADEMIC PROGRAMS
Education Studies
Energy Studies
Global Health Studies
Human Rights Studies

ADVANCED LANGUAGE CERTIFICATES
Ancient Greek (See under Classics)
Arabic (See under Near Eastern Languages and Civilizations)
Chinese (See under East Asian Languages and Literatures)
French
German
Hebrew (See under Near Eastern Languages and Civilizations)
Hindi (See under South Asian Studies)
isiZulu (See under African Studies)
Italian
Japanese (See under East Asian Languages and Literatures)
Kiswahili (See under African Studies)
Korean (See under East Asian Languages and Literatures)
Latin (See under Classics)
Portuguese
Russian
Spanish
Turkish (See under Near Eastern Languages and Civilizations)
Vietnamese (See under Southeast Asia Studies)
Yoruba (See under African Studies)

INTERDISCIPLINARY CERTIFICATES
Education Studies
Islamic Studies
Medieval Studies
Translation Studies

SKILLS-BASED CERTIFICATES
Programming (See under Computer Science)
Data Science (See under Statistics & Data Science)
Accounting

Please see Yale Course Search for information about ACCT 270, Foundations of Accounting and Valuation.
Aerospace Studies

Program adviser: George Granholm (george.granholm@yale.edu); airforce@yale.edu; afrotc.yalecollege.yale.edu

Aerospace Studies is the academic component of the Yale Air Force Reserve Officer Training Corps (AFROTC) Detachment 009. Typically, students pursue the Aerospace Studies curriculum in tandem with AFROTC program requirements, including military leadership preparation and physical training. After completing all Air Force ROTC requirements and Yale College academic degree requirements, cadets commission as officers into the Air Force or Space Force upon graduation from Yale College, serving in a variety of military specialties such as aviation, intelligence, logistics, and medicine. The Aerospace Studies program and the AFROTC prepare students to excel as Air Force and Space Force leaders and to operate effectively in a dynamic military environment.

For additional information about Yale's Air Force Reserve Officers Training Corps program, visit the program website.

COURSES FOR NONMAJORS
Enrollment in Aerospace Studies courses is not limited to cadets; courses are open to any Yale student.

ACADEMIC REQUIREMENTS OF THE MAJOR

The Aerospace Studies core curriculum introduces topics such as the profession of arms, military history, military communication, national security, and the philosophy of warfare. The Department of Aerospace Studies presents this content in the context of military leadership to prepare students for active duty service. Most Aerospace Studies courses count for enrollment credit only; they do not count toward the thirty-six course credits required for the Yale bachelor’s degree.

Students in the AFROTC program must successfully complete eight USAF courses total, typically taking one course per semester, in addition to the requirements of their Yale College major. The Department of Aerospace Studies offers these courses: USAF 101, 102, 200, 201, 301, 302, 401, 402, and 411. When the Department of History offers HIST 221, Military History of the West since 1500, cadets may use it to fulfill the one term of the 200-level AFROTC requirement (USAF 202) and also count it toward the bachelor’s degree. AFROTC scholarship recipients must also complete either four credits in a language or eight credits in any combination of mathematics, physics, chemistry, or engineering. Cadets become involved in the management of their own cadet wing through a mandatory two-hour leadership laboratory each week.

Credit/D/Fail No course taken Credit/D/Fail may be counted toward the program in Aerospace Studies.

FACULTY ASSOCIATED WITH THE PROGRAM OF AEROSPACE STUDIES

Professor Colonel George Granholm, USAF (Adjunct)

Lecturers Major Daniel Gartland, USAF, Lieutenant Colonel Greg Jeong, USAF
African American Studies

**Director of undergraduate studies:** Aimee Cox (aimee.cox@yale.edu), Rm. 302, 81 Wall St., 432-7758; afamstudies.yale.edu

The African American Studies major examines, from numerous disciplinary perspectives, questions of race, culture, and modern struggles for equality centering on the experiences of people of African descent in Black Atlantic societies including the United States, the Caribbean, Latin America, Europe, and Africa, including the global impact of those experiences. Students in the department explore the historical, cultural, political, economic, and social development of Black Atlantic societies. Majors work to become informed thinkers who are intellectually prepared to offer clarity and insight to ongoing academic and public debates centered in questions concerning race and inequality.

African American Studies majors become knowledgeable about the history, primary methodologies, and interdisciplinary breadth of the field. Students learn to critique, articulate, analyze, and interpret universal themes concerning both individuals in society and group interactions as they relate to the work of scholars, scientists, writers, artists, musicians, economists, and entrepreneurs.

**REQUIREMENTS OF THE MAJOR**

African American Studies can be taken either as a stand-alone major or as one of two majors in consultation with the director of undergraduate studies (DUS). Pertinent regulations can be found in Academic Regulations, section L, Special Academic Arrangements, "Two Majors."

The major in African American Studies requires twelve term courses, including seven core courses and five electives in an area of concentration. The seven core courses include the African American history sequence AFAM 160 and AFAM 162, which can be taken in either order; one humanities course in African American literature; one course in the social sciences relevant to African American studies; the junior seminar (AFAM 410); the senior colloquium (AFAM 480) and senior essay (AFAM 491).

**Area of concentration** Students majoring in African American Studies are required to choose an area of concentration comprised of five courses. This cluster of interrelated courses is intended to ground the student's learning experience in one area of investigation. Often students choose an area of concentration in a traditional discipline such as political science, art history, economics, sociology, American studies, history, or English language and literature. Students can also construct interdisciplinary areas of concentration that span traditional departments and encompass broader theoretical frameworks such as race and ethnicity, cultural studies, black arts, 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 core courses may be counted among the required electives in the area of concentration.

**Junior seminar** In their junior year students must take the junior seminar, AFAM 410. This course provides majors with theoretical and methodological bases for the work they will do during their research-oriented senior year.
Credit/D/Fail  No more than one course taken Credit/D/Fail may be counted toward the major.

SENIOR REQUIREMENT

Senior majors participate in a colloquium in AFAM 480 that gives them an opportunity to exchange ideas with each other and with more advanced scholars. Students in AFAM 480 submit a prospectus, compile a working bibliography, begin or continue research, and write the first twenty pages of the senior essay. After completing the colloquium, each student carries out the remaining research and writing of a senior essay in 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 in America and throughout the diaspora. The particular research topic and design are to be worked out in each case with a faculty adviser.

ADVISING

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

Two majors  The requirements for double majoring often depend on the other department or discipline in which the student is planning to major. Students interested in double majoring should initially make an appointment with the DUS in African American Studies to discuss their plans and the courses they have already taken towards the African American Studies major. The student should, then, plan a meeting with both the DUS in African American Studies as well as the DUS in the other department to ensure clarity on the requirements for both departments. During this meeting, the student may explore the possibility of writing a joint thesis instead of two separate theses.

Graduate work  African American Studies offers training of special interest to those considering admission to graduate or professional schools and careers in education, journalism, law, the arts, business management, city planning, international relations, politics, psychology, publishing, public health, 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.

STUDY ABROAD

A limited number of courses taken during sophomore or junior semesters abroad can be counted toward the major with DUS approval.

REQUIREMENTS OF THE MAJOR

Prerequisites  None

Number of courses  12 term courses (incl sen req)

Specific courses required  AFAM 160, 162, 410

Distribution of courses  1 humanities course in AFAM lit and 1 relevant social science course, both approved by DUS; 5 courses in area of concentration
Senior requirement  Senior colloquium (AFAM 480) and senior essay (AFAM 491)

FACULTY OF THE DEPARTMENT OF AFRICAN AMERICAN STUDIES

Professors  Elijah Anderson, David Blight, Daphne Brooks, Hazel Carby (Emeritus), Roderick Ferguson, Phillip Goff, Jacqueline Goldsby, Emily Greenwood, Matthew Jacobson, Gerald Jaynes, Christopher Miller (Emeritus), Robert Stepto (Emeritus), Michael Veal, Shane Vogel

Associate Professors  Aimee Cox, Crystal Feimster, Elizabeth Hinton, Jonathan Howard, Edward Rugemer

Assistant Professors  Ernest J. Mitchell, Carolyn Roberts

Lecturers  Aaron Carico, Nicholas Forster, Thomas Allen Harris, Elleza Kelley
African Studies

**Director of undergraduate studies**: Veronica Waweru (veronica.waweru@yale.edu), 115 Prospect St., Room 148; director of the program in African Languages: Kiarie Wa’Njogu (john.wanjogu@yale.edu), 115 Prospect St., Room 138, 432-0110; www.yale.edu/macmillan/african

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 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 literature, political science, or sociology or on topics such as global health, economic development, or human rights.

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 African Studies program consists of twelve 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, Twi, Wolof, Yorùbá, isiZulu, or others with permission of the director of undergraduate studies (DUS)), unless waived by examination; (3) one research methods course, AFST 505 or an alternative course that either serves to deepen the concentration or provide methodological tools for the senior essay, selected in consultation with the DUS; (4) a concentration of four term courses, in a discipline such as anthropology, art history, history, languages and literature, 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; or in a cross-disciplinary area such as diaspora studies or development studies; and (5) AFST 491, the senior essay. 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.

**Language requirement** African Studies majors are required to complete two years of college-level study (or the equivalent) of an African language, and they are encouraged to continue beyond this level. For the 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. If the requirement is waived, students must substitute other African Studies courses for the four required language courses.
With permission of the DUS, students may count courses in an additional language, such as French or Portuguese, toward the major requirements. Students are encouraged to include upper-level courses, especially those centering on research and methodology.

**Program in African Languages** The language program offers instruction in five major languages from sub-Saharan Africa: Kiswahili (eastern and central Africa), Twi (western Africa), Wolof (western Africa), Yorùbá (western 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 (john.wanjogu@yale.edu) for information.

**Roadmap** See visual roadmap of the requirements.

**SENIOR REQUIREMENT**

Students are required to complete a senior essay in AFST 491, working under the guidance of a faculty adviser. With prior approval by the DUS, a combined senior essay may be submitted for those pursuing a second major.

A preliminary statement indicating the topic to be addressed and the name of the faculty adviser must be submitted to the DUS by the end of the second week of the fall term in the senior year.

**ADVISING**

Students planning to major in African Studies should consult the DUS as early as possible.

**Graduate work, M.A. program** 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** 12 term courses (incl senior req)

**Distribution of courses**
- 1 AFST course in humanities and 1 in social sciences; 2 years of African lang; 4 courses and 1 research methods course in area of concentration

**Substitution permitted** If language req is waived, 4 addtl African Studies courses

**Senior requirement** Senior essay (AFST 491)
CERTIFICATES OF ADVANCED LANGUAGE STUDY

The Department of African Studies offers a Certificate of Advanced Language Study in three major African languages—Kiswahili, Yoruba, and isiZulu, and students may pursue a Certificate of Advanced Language Study in each of these languages. A certificate adviser, typically the director of undergraduate studies (DUS), advises students on the certification process and certifies to the University Registrar’s Office that students have completed the stated requirements before the end of eight terms of study. The Certificate of Advanced Language Study, once certified, is listed on the student’s transcript.

REQUIREMENTS

Students seeking to earn the certificate are required to take four courses beyond the L4 level in their chosen language, at least two of which must be Yale courses designated as L5. All courses must be taken for a letter grade, and students must achieve a grade of B or above. With the approval of the adviser, one advanced non-L5 Yale course, conducted in the target language, such as an independent study course, a graduate seminar, or an advanced seminar may count toward certification requirements.

The certificate adviser may allow one “language across the curriculum” (LxC) course, which ordinarily is an advanced seminar with an additional weekly discussion section in the target language, to count toward the certification requirements. The certificate adviser may also approve the substitution of up to two credits earned during study abroad and taught in the target language to count toward the certificate requirements. If the adviser approves courses taken outside of Yale for inclusion in the certificate requirements, students must take the necessary steps to ensure that those courses appear on their transcripts.

FACULTY ASSOCIATED WITH THE PROGRAM OF AFRICAN STUDIES

Professors  Lea Brilmayer (Law School), John Darnell (Near Eastern Languages & Civilizations), Owen Fiss (Law School), Robert Harms (History), Daniel Magaziner (History), Roderick McIntosh (Anthropology), Christopher Miller (African American Studies, French), Catherine Panter-Brick (Anthropology), Jeremy Seekings (Global Affairs) (Visiting), Ian Shapiro (Political Science), Robert Thompson (Emeritus), Michael Veal (Music), David Watts (Anthropology), Elisabeth Wood (Political Science)

Associate Professors  Robert Bailis (School of the Environment), Jonathan Wyrtzen (Sociology)

Assistant Professors  Katharine Baldwin (Political Science), Louisa Lombard (Anthropology)

Lecturers  Lacina Coulibaly (Theater Studies), Anne-Marie Foltz (Public Health), David Simon (Political Science)

Senior Lectors II  Sandra Sanneh, Kiarie Wa’Njogu

Senior Lectors  Oluseye Adesola, Matuku Ngame
American Studies

**Director of undergraduate studies:** Laura Wexler (laura.wexler@yale.edu), 314 WLH, 432-1524; americanstudies.yale.edu

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 coursework 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 (DUS) as early as possible.

**REQUIREMENTS OF THE MAJOR**

All students majoring in American Studies must take fourteen 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 preparatory course for work in the student’s area of concentration, to be selected in consultation with the DUS. One of these four courses must be listed as an “Early Americas” course on the American Studies website and indicated as such on Yale Course Search. Students may, with DUS permission, substitute a First-Year Seminar for a gateway course. 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.

**Areas of concentration** Each American Studies major selects an area of concentration, normally in the fall of the junior year, from six possible choices: (1) national formations, (2) the international United States, (3) material cultures and built environments, (4) politics and American communities, (5) visual, audio, literary, and performance cultures, and (6) public humanities. 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 in the public humanities concentration explore various forms of public intellectual engagement, including museum studies, documentary work, public history, digital humanities, and archival based work in the visual or performing arts; senior projects in this area may consist of works or productions beyond the traditional scholarly essay. Students may also petition the DUS to develop an independent concentration.

Roadmap  See visual roadmap of the requirements.

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. Students electing this option should submit the senior seminar registration form, signed by the seminar instructor, to the DUS and the undergraduate registrar.

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. To apply for admission to AMST 491, a student should submit a prospectus, signed by the faculty adviser, to the DUS and the undergraduate registrar.

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 methods. 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 DUS and the undergraduate registrar.

As a multidisciplinary program, American Studies draws on the resources of other departments and programs in the University. The list of American Studies 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.

ADVISING

**Combined B.A./M.A. degree program** Exceptionally able and well-prepared students may complete a course of study leading to the simultaneous award of the B.A. and M.A. degrees after eight terms of enrollment. See Academic Regulations, section L, Special Academic Arrangements, “Simultaneous Award of the Bachelor’s and Master’s Degrees.” Interested students should consult the DUS prior to the sixth term of enrollment for specific requirements in American Studies.

**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 (1 may be one term of two-term senior project); 2 electives

**Substitution permitted** 1 first-year 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 senior sem (AMST 400–490) or AMST 491

**FACULTY ASSOCIATED WITH THE PROGRAM OF AMERICAN STUDIES**


**Associate Professors**  Rene Almeling *(Sociology)*, Laura Barraclough *(Ethnicity, Race, & Migrations)*, Crystal Feimster *(African American Studies)*, Zareena Grewal *(Ethnicity, Race, & Migration, Religious Studies)*, Daniel HoSang *(Ethnicity, Race, & Migration)*,
Greta LaFleur (Women's, Gender, & Sexuality Studies), Elihu Rubin (Architecture), Edward Rugemer (African American Studies), Tisa Wenger (Divinity School, Religion)

**Assistant Professor** Albert Laguna (Ethnicity, Race, & Migration)

**Senior Lecturers** James Berger (DUS) (English), Karin Roffman (Humanities, English)

**Lecturer** Ryan Brasseaux (Head of Davenport College)
Anthropology

**Director of undergraduate studies:** William Honeychurch
(william.honeychurch@yale.edu), Rm. 305, 51 Hillhouse Ave., 432-3676; anthropology.yale.edu

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, environment and development, media and visual culture, urban life and sport, economic organization and politics, law and society, migration, 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. At least eight term courses must be taught in the Department of Anthropology. These eight must include an introductory or intermediate course (numbered ANTH 001–299) in each of at least three subfields of anthropology; three advanced courses (numbered ANTH 300–470 or 473–490, not including a senior essay seminar); and two electives. Additionally, all students must prepare a senior essay in ANTH 491 or another Anthropology seminar. Majors may take up to three cognate courses in departments other than Anthropology.

Three term courses related to anthropology may be selected from other departments, with approval by the director of undergraduate studies (DUS). Majors are not required to present such 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 Ecology and Evolutionary Biology, Earth and Planetary Sciences, Psychology, and Forestry & Environmental Studies; cognates for sociocultural anthropology can be found in Sociology, American Studies, History, Environmental Studies, Religious Studies, Global Affairs, and international and area studies. Appropriate areas of cross-disciplinary concentrations include such topics as area studies (e.g., Africa); anthropological approaches to law, environment, business, the built environment, and health; gender and sexuality studies; evolutionary biology; and geology.

**Areas of concentration** 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 303 or 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.

Credit/D/Fail A maximum of one course taken Credit/D/Fail may be applied toward the Anthropology major.

SENIOR REQUIREMENT
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 DUS 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.

Alternative thesis formats may be considered at the discretion of the DUS and the student’s primary thesis advisor.

ADVISING
With permission of the DUS, students may apply up to two courses taken outside Yale as electives or cognates toward the Anthropology major. Such courses must have been approved for Yale College credit and may include courses taken on a year or term abroad or through summer study at another college or university. See Academic Regulations, section K, Special Academic Programs.
**Graduate courses**  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.

**STUDY ABROAD**

Study abroad courses that are approved for Yale College and Anthropology credit may be used to replace one elective. If more than one such study abroad course credit is to be used for the major, it will come at the expense of one or more of the three cognate courses which may be taken in any Yale department or program with the approval of the DUS in Anthropology.

**REQUIREMENTS OF THE MAJOR**

**Prerequisites**  None

**Number of courses**  12 course credits (incl senior req)

**Distribution of courses**  At least 1 intro survey or intermediate course in each of 3 subfields; 3 advanced courses (not incl senior essay sem); 2 electives; up to 3 cognate courses in other depts or programs with DUS approval

**Substitution permitted**  1 study abroad course for 1 ANTH elective

**Senior requirement**  Senior essay in advanced sem; or ANTH 491; or a yearlong essay to include ANTH 471 or 472 in addition to ANTH 491; or alt thesis format with DUS approval

**FACULTY OF THE DEPARTMENT OF ANTHROPOLOGY**

**Professors**  †Claire Bowern, Richard Bribiescas, Richard Burger, †Michael Dove (Forestry & Environmental Studies), Kathryn Dudley (American Studies), J. Joseph Errington, Eduardo Fernandez-Duque, †Inderpal Grewal (Women's, Gender & Sexuality Studies), Marcia Inhorn (Modern Middle East Studies), William Kelly, Paul Kockelman, Roderick McIntosh, Catherine Panter-Brick, Eric Sargis, James Scott (Political Science), Helen Siu, Kalyanakrishnan Sivaramakrishnan, Anne Underhill (Chair), Claudia Valeggia, David Watts

**Associate Professors**  Aimee Cox, Erik Harms, William Honeychurch, Yukiko Koga, Douglas Rogers

**Assistant Professors**  Oswaldo Chinchilla, Louisa Lombard, Lisa Messeri, Jessica Thompson, Serena Tucci

**Senior Lecturer**  †Carol Carpenter

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

**Director of undergraduate studies**: John Wettlaufer (john.wettlaufer@yale.edu), Rm. 109 KGL, 432-0892

Mathematical models are widely used throughout natural science, social science, and engineering in fields as diverse as physics, bioinformatics, robotics, image processing, and economics. Despite the broad range of mathematical settings and applications, there exists a core of essential concepts and techniques used in addressing most problems. The Applied Mathematics major provides a foundation in these mathematical techniques and prepares 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 Data Science, and Engineering and Applied Science. Courses applying mathematics may be drawn from participating programs in Applied Physics; Astronomy; the biological sciences, including Ecology and Evolutionary Biology, Molecular Biophysics and Biochemistry, and Molecular, Cellular, and Developmental Biology; Chemistry; Economics; the various programs in engineering, including Biomedical Engineering, Chemical Engineering, Electrical Engineering, Environmental Engineering, and Mechanical Engineering; Earth and Planetary Sciences; Physics; and even Linguistics and Political Science. The Applied Mathematics degree program requires a three-course concentration in a field in which mathematics is used.

Students in the major are often sought after by graduate programs in either Applied Mathematics or in the disciplines in which they choose their concentration, as well as by industries and startup companies in which their breadth of quantitative skills are essential and often unique.

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.

**Frequently Asked Questions** Students are encouraged to consult the Applied Mathematics FAQ for more detail about courses and policies in the major.

**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 or ENAS 151, and MATH 222 or 225 or 226. It may also be satisfied by MATH 230, 231. Computer programming skills are also required and may be acquired by taking ENAS 130, CPSC 100, or 112. Details of individual programs must be worked out
in consultation with the director of undergraduate studies (DUS), whose signed permission is required.

REQUIREMENTS OF THE MAJOR

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 (S&DS 241 or S&DS 238)
3. A course in data analysis (S&DS 361 or S&DS 230)
4. A course in discrete mathematics (AMTH 244 or CPSC 202)
5. Courses in at least three of the following areas* including, but not limited to:
   (a) optimization: AMTH 437, EENG 400
   (b) probability and statistics: S&DS 242, 312, 351, 364, 400, 410, 411, 425, ECON 136, APHY 470
   (c) partial differential equations and analysis: MATH 247, 250, 255, 256, 260, 300, 301, 302, 305, 310, AMTH 428
   (d) algorithms and numerical methods: CPSC 365, 366, 424, 440, 465, 467, 468, 469, ENAS 440, 441
   (e) graph theory: AMTH 562, ENAS 962
   (f) mathematical economics: ECON 125, 126, 350, 351, 417, 433, 460, 471
   (g) electrical engineering: EENG 397, 436, 455, AMTH 342, S&DS 364
   (h) data mining and machine learning: S&DS 262, 365, 669, 671, CPSC 445, 453, 470, 474, 477, 745, AMTH 552
   (i) biological modeling and computation: CPSC 453, 475, 476, BENG 352, 445, 458, ENAS 559
   (k) engineering: MENG 280, 285, 361, 365, 383, 463, 469, CENG 301, 315
   (l) linguistics: LING 224, 227, 380

* Because departmental curricula from which the program draws regularly change, the DUS maintains a more exhaustive list of courses and areas satisfying this particular requirement. Additionally, due to rapid advances in many areas, these categories are often fluid, and their union can evolve. In order to accommodate this fluidity, students are strongly encouraged to revisit their program of study each term and share their checklist with the DUS. Students can independently and systematically plan multiple routes towards completion of the major by using the checklist and the master list of courses.
** Chemistry courses numbered 410 and above may count as a breadth requirement (either 1 full-term 1 credit course or 2 half-credit courses) with permission of the DUS.

6. At least three advanced courses in a field of concentration involving the application of mathematics to that field. Programs in science, engineering, computer science, statistics, and economics 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 those listed in point 5 above or for the B.S. below. Details of a student's program to satisfy the concentration requirement must be worked out in consultation with, and approved by, the DUS.

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), Vector analysis (MATH 302), or Analysis 2 (MATH 305); the course selected may not be counted toward the requirements for the major under item 5 above. (MATH 350 and MATH 440 can in specific cases be considered in consultation with the DUS.)

2. An additional course selected from 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 DUS.

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.

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

SENIOR REQUIREMENT
Both the B.A. and B.S. degree programs require a senior thesis research project (AMTH 491).

REQUIREMENTS OF THE MAJOR

Prerequisites MATH 120 or ENAS 151, and MATH 222 or 225 or 226, or equivalents; ENAS 130, CPSC 100, or 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; S&DS 241 or S&DS 238; S&DS 361 or S&DS 230; AMTH 244 or CPSC 202; B.S. – same, plus MATH 300, 301, 302, or 305 (in specific cases, MATH 350 and 440, with DUS approval)

Distribution of courses B.A. – at least 3 advanced courses in a field of concentration concerning the application of math to that field; 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 thesis research project (AMTH 491)

FACULTY ASSOCIATED WITH THE PROGRAM OF APPLIED MATHEMATICS

Professors  Andrew Barron (Statistics & Data Science), David Ber covici (Earth & Planetary Sciences), Donald Brown (Emeritus, Economics, Mathematics), Joseph Chang (Statistics & Data Science), Ronald Coifman (Mathematics), Michael Fischer (Computer Science), Igor Frenkel (Mathematics), Anna Gilbert (Mathematics, Statistics & Data Science), Roger Howe (Emeritus) (Mathematics), Peter Jones (Mathematics), John Lafferty (Statistics & Data Science), A. Stephen Morse (Electrical Engineering), Corey O’Hern (Mechanical Engineering & Materials Science), David Pollard (Statistics & Data Science), Nicholas Read (Physics, Applied Physics), Vladimir Rokhlin (Computer Science, Mathematics), John Schotland (Mathematics), Peter Schultheiss (Emeritus) (Electrical Engineering), Martin Schultz (Emeritus) (Computer Science), Mitchell Smooke (Mechanical Engineering & Materials Science, Applied Physics), Daniel Spielman (Computer Science, Statistics & Data Science), Mary-Louise Timmermans (Earth & Planetary Sciences), Van Vu (Mathematics), Günter Wagner (Ecology & Evolutionary Biology), John Wettlaufer (Earth & Planetary Sciences, Mathematics, Physics), Huibin Zhou (Statistics & Data Science), Steven Zucker (Computer Science, Biomedical Engineering)

Associate Professors  John Emerson (Statistics & Data Science), Thierry Emonet (Molecular, Cellular, & Developmental Biology, Physics), Josephine Hoh (Epidemiology & Public Health), Yuval Kluger (Pathology), Michael Krauthammer (Pathology), Smita Krishnaswamy (Genetics, Computer Science), Sekhar Tatikonda (Electrical Engineering, Statistics & Data Science), Madhusudhan Venkadesan (Mechanical Engineering & Materials Science)

J. W. Gibbs Assistant Professors  Yariv Aizenbud, Abinand Gopal, Erik Hiltunen, Boris Landa, Kevin O’Neill
Applied Physics

Director of undergraduate studies: Daniel Prober (daniel.prober@yale.edu), 417 BCT, 432-4280; appliedphysics.yale.edu

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 (DUS).

PREREQUISITES

During their first year, students interested in Applied Physics should start by taking courses in mathematics, and in 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. The multiplicity of choices facing students interested in this general area indicates the importance of informed advice for first-year students. Students should consult freely with DUSes 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 required prerequisites for students interested in Applied Physics include two physics courses and one physics lab; APHY 151 or MATH 120; and PHYS 301 (or APHY 194 with either MATH 222 or MATH 225 or MATH 226).

The required prerequisites for students interested in Applied Physics include two physics courses and one physics lab; APHY 151 or MATH 120; and PHYS 301 (or APHY 194 with either MATH 222 or MATH 225 or MATH 226).

The recommended starting courses in physics are PHYS 200 and 201. These courses should be taken in the first 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 first year, or PHYS 200 and 201 during their sophomore year after they have taken more mathematics courses. One laboratory course, PHYS 166L or 206L, should be taken at some time during the first or second year.

REQUIREMENTS OF THE MAJOR

The major in Applied Physics requires eight courses beyond the introductory sequence. Two of these must be APHY 471 and 472. All majors are also required to take APHY 322, 439, and 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, and MENG 285. Many other concentrations are possible.

**Credit/D/Fail** All courses required for the major, beyond the prerequisites, must be taken for a letter grade, with the single exception that one such course may be taken Credit/D/Fail with permission of the DUS. The senior special projects, APHY 471 and 472, may only be taken for a letter grade.

**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, Physics, Engineering, or related departments. 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 DUS as early as possible to discuss available options and general requirements.

**ADVISING**

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 DUS as early as possible, and in any case by the end of their sophomore year.

A well-prepared student interested in materials physics or quantum electronics who starts the senior research in the junior year might elect the following course sequence:

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<thead>
<tr>
<th>First-Year</th>
<th>Sophomore</th>
<th>Junior</th>
<th>Senior</th>
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<tr>
<td>APHY 151</td>
<td>APHY 322</td>
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<td>APHY 448</td>
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<td>PHYS 200</td>
<td>APHY 439</td>
<td>EENG 320</td>
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<td>PHYS 201</td>
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<td>APHY 420</td>
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<td>PHYS 206L</td>
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A student interested in alternative energy who starts physics in the sophomore year and conducts research in the senior year might elect:

<table>
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<tr>
<th>First-Year</th>
<th>Sophomore</th>
<th>Junior</th>
<th>Senior</th>
</tr>
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<tbody>
<tr>
<td>MATH 120</td>
<td>PHYS 200</td>
<td>APHY 322</td>
<td>APHY 448</td>
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<tr>
<td>PHYS 201</td>
<td>APHY 439</td>
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<tr>
<td>PHYS 206L</td>
<td>EENG 320</td>
<td>APHY 472</td>
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<tr>
<td>PHYS 301</td>
<td>APHY 420</td>
<td>EENG 406</td>
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**REQUIREMENTS OF THE MAJOR**

**Prerequisites** PHYS 180, 181, or 200, 201, with appropriate math coreqs and PHYS 166L or 206L; APHY 151 or MATH 120; PHYS 301 (or APHY 194 with either MATH 222 or MATH 225 or MATH 226)

**Number of courses** 8 term courses beyond prereqs (incl senior req)

**Distribution of courses** 3 adv courses in physical or mathematical sciences or engineering in area of concentration, with DUS approval

**Specific courses required** APHY 322, 439, 420, or equivalents

**Substitution permitted** Any relevant course approved by DUS
Senior requirement  APHY 471 and 472

FACULTY OF THE DEPARTMENT OF APPLIED PHYSICS

Professors  Charles Ahn, †Sean Barrett, Hui Cao, Michel Devoret, Paul Fleury (Emeritus), †Steven Girvin, †Leonid Glazman, †Jack Harris, Victor Henrich (Emeritus), Sohrab Ismail-Beigi, †Marshall Long, Simon Mochrie, †Corey O’Hern, Vidvuds Ozolins, Daniel Prober, Nicholas Read, Peter Schiffer, Robert Schoelkopf, †Ramamurti Shankar, †Mitchell Smooke, A. Douglas Stone, †Hongxing Tang, Robert Wheeler (Emeritus), Werner Wolf (Emeritus)

Associate Professor  Peter Rakich

Assistant Professors  †Michael Choma, Yu He, Owen Miller, Shruti Puri

†A joint appointment with primary affiliation in another department.
Archaeological Studies

**Director of undergraduate studies:** Oswaldo Chinchilla
(oswaldo.chinchilla@yale.edu), 51 Hillhouse Ave., Rm. 301, 436-5923, archaeology.yale.edu

This interdisciplinary 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 (richard.burger@yale.edu), Department of Anthropology, 10 Sachem St., or to the director of undergraduate studies (DUS).

The major in Archaeological Studies provides a program of interdepartmental offerings covering prehistoric, early historic, medieval, and other 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 scientific. Also emphasized are substantive studies including (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 prehistoric, early historic, and medieval cultures, including the iconography of ancient cultures, the relationship between art and society, ancient writing systems, and American historical archaeology.

**REQUIREMENTS OF THE MAJOR**

The major consists of twelve term courses, including the senior project. In addition, students must participate in a Yale-affiliated summer research project, or that of another archaeological field school approved in advance by the DUS. The following five courses are required: an introductory survey; 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 subject areas represented by the departments and programs offering courses multiple-titled with Archaeological Studies, with three of those seven courses falling in different departments and programs. The relevant departments and programs are Anthropology, Classics, Earth and Planetary Sciences, Environmental Studies, History, History of Art, Near Eastern Languages and Civilizations, and Religious Studies. With the permission of the DUS, a course may be counted toward a subject area other than the one(s) under which it is listed. For three of the seven archaeology electives students may, with permission of the DUS, substitute courses from other departments in areas related to their research.

**Field research** In addition to being the base for several faculty field projects around the globe, the Council on Archaeological Studies takes as its principal mission the encouragement of multiple field experiences. Our undergraduate majors are required to participate in at least one intensive summer field school. Approval is required, and costs are often subsidized by the Council. Students are encouraged to participate in each other’s field projects, thereby learning about the greatest number of cultures and areas possible, while experiencing a diverse array of field situations.

Students are strongly encouraged, but are not required, to devote a second summer to archaeological research, either in the field or in a laboratory. Members of the Council
faculty currently direct archaeological field projects in China, Egypt, Guatemala, Peru, Mongolia, Senegal, Armenia, and Italy. 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.

**ADVISING**

Students majoring in Archaeological Studies should consult with the DUS at the beginning of each term.

**REQUIREMENTS OF THE MAJOR**

**Prerequisites** None

**Number of courses** 12 term courses (incl senior project)

**Specific course required** ARCG 316L (intro lab)

**Distribution of courses** 1 intro survey; 1 advanced lab; 1 theory course; 7 electives, at least 1 in each of 3 areas, as specified

**Field requirement** 1 summer field techniques course or research project, as specified and approved by the DUS

**Substitution permitted** For 3 electives, 3 courses related to research, with DUS permission

**Senior requirement** Research project (ARCG 491)

**COUNCIL ON ARCHAEOLOGICAL STUDIES**

**Anthropology** Richard Burger (*Chair*), Oswaldo Chinchilla, Ellery Frahm, William Honeychurch, Roderick McIntosh, Eric Sargis, Jessica Thompson, Anne Underhill, David Watts

**Classics** Andrew Johnston, Diana Kleiner

**Earth and Planetary Sciences** Ronald Smith

**History** Joseph Manning

**History of Art** Edward Cooke, Jr., Milette Gaifman

**Near Eastern Languages & Civilizations** John Darnell, Karen Foster, Eckart Frahm, Gregory Marouard, Nadine Moeller, Harvey Weiss

**Religious Studies** Stephen Davis
Architecture

Director of undergraduate studies: Michael Schlabs (michael.schlabs@yale.edu), RDH, 180 York St.; architecture.yale.edu

Architecture is a humanistic endeavor. 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 urbanism, and leads to a bachelor of arts degree with a major in Architecture. As a liberal arts major in Yale College, it is not an accredited professional degree program. For accredited professional degree programs, refer to the requirements of the National Architectural Accrediting Board (NAAB).

INTRODUCTORY COURSES FOR NONMAJORS AND MAJORS
Introductory courses are ARCH 150, 200, and 280. They are open to all Yale College students and are required for those interested in the Architecture major prior to submitting a Declaration of Intent to Major. Interested students may also consider courses such as ARCH 154, 160, 260, 312, or 345.

PREREQUISITES
Three courses are prerequisite for all concentrations: ARCH 150, 200, and 280.

REQUIREMENTS OF THE MAJOR
Students majoring in Architecture are required to take fifteen course credits, including prerequisites and the senior requirement. Majors are expected to take the three prerequisites by the end of their sophomore year and to complete a core of four courses, for five course credits, by the end of their junior year. They must also base their studies in one of two areas of concentration: the Design concentration or the History, Theory, Criticism of Architecture, and Urbanism concentration. Majors are also required to complete three orientation sessions: advanced technology orientation, library orientation, and shop orientation. Within the concentrations, electives are categorized under four broad subject areas: history and theory of architecture and the city; urbanism and landscape; materials and design; and structures and computation.

Students in the Class of 2023 and the Class of 2024 may continue to concentrate in the Urbanism concentration.

Design concentration The Design concentration explores the role of architecture in shaping the world around us. It 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. Design studios provide a forum for production and discourse. Studio projects address issues of architectural form, space, composition, site, tectonics, and programs within broader humanistic ideals.

For the Design concentration, the following additional courses are required:

1. A core of four courses: the studio courses ARCH 250 and 251 taken during the junior year after the student is accepted into the major; and the history of
architecture surveys, ARCH 260 and 312, to be completed by the end of the junior year
2. One elective in history and theory of architecture as outlined in the elective options below
3. One elective in urbanism and landscape as outlined in the elective options below
4. One elective in materials and design as outlined in the elective options below
5. One elective in structures and computation as outlined in the elective options below
6. The senior requirement, ARCH 450 and 494

**History, Theory, Criticism of Architecture, and Urbanism concentration**  The History, Theory, Criticism of Architecture, and Urbanism concentration is intended to establish a broad historical and intellectual framework for the study of architecture and the city. An interdisciplinary approach is encouraged through additional courses taken in various fields of humanities and social sciences. Such courses may include archaeology, urban studies, aesthetics, philosophy, or visual culture. Permission of the director of undergraduate studies (DUS) is required if the courses fall outside the specified course of studies. During their senior year students complete a senior essay or project on a topic approved by the faculty.

For the History, Theory, Criticism of Architecture, and Urbanism concentration, the following additional courses are required:

1. A core of four courses: the urban laboratory, ARCH 250 or 360 taken during the fall term of junior year; ARCH 362 or an elective taken during the spring term of junior year; and the history of architecture surveys ARCH 260 and 312 to be completed by the end of junior year
2. Four electives in history and theory of architecture and the city as outlined in the elective options below
3. One elective in urbanism and landscape, materials and design, or structures and computation or other relevant course approved by the DUS as outlined in the elective options below
4. The senior requirement, ARCH 490 and 491

**ELECTIVE OPTIONS IN SUBJECT AREAS**

**History and theory of architecture and the city**  Electives can be chosen from ARCH 006, 271, 272, 314, 316, 327, 332, or other relevant courses in History of Art and other, related fields approved by the DUS. Examples of approved courses include: HSAR 143, 160, 221, 260, and 432

**Urbanism and landscape**  Electives can be chosen from ARCH 006, 160, 314, 316, 324, 327, 341, 345 or other relevant courses in American Studies; Ethics, Politics, and Economics; Environmental Studies; or Political Science approved by the DUS. Examples include: AFAM 297, 358, 450; AFST 235, 345; AMST 258, 348; ANTH 414; ENAS 425; ER&M 293; EVST 196, 227, 255, 292, EVST 403; SOCY 341 and 584.

**Materials and design**  Electives can be chosen from ARCH 154, 162, 325, 332 or another relevant course approved by the DUS. Examples include: ART 110, 123, 130, and 210
Structures and computation  Electives can be chosen from ARCH 161, an approved calculus course such as MATH 112, 115, 120, or physics course such as PHYS 180, 201, PHYS 280, or other relevant course approved by the DUS. One example of an approved course is MENG 280. (Elementary calculus is strongly recommended as preparation for graduate studies in architecture.)

REQUIRED ORIENTATIONS

Advanced Technology orientation  All Architecture students are required to complete orientation sessions in advanced technology workshop and materials laboratory. Students enrolled in ARCH 200 are required to complete these sessions at the beginning of the spring term of the sophomore year. Access to digital media equipment is not allowed until the required orientation sessions have been completed. Questions should be addressed to the DUS or the director of advanced technology, Vincent Guerrero (vincent.guerrero@yale.edu), 432-7552.

Library orientation  The Architecture program requires all students to complete a ninety-minute introductory library research session. Students enrolled in ARCH 200 must take this session at the beginning of the spring term of the sophomore year. Failure to complete the required orientation precludes completion of the major. Students may not offer substitutions for this orientation. Students should register with the Haas Family Arts Library Public Services Librarian, Lindsay King (lindsay.king@yale.edu), 436-8052. Questions should be addressed to the DUS.

Shop orientation  The Architecture program requires all majors to complete several woodshop and materials lab orientation sessions. Students who plan to enroll in ARCH 250 must take these sessions at the beginning of fall term in the junior year, before the first day of classes. Access to the woodshop and materials lab is not allowed until the required orientation sessions have been completed. Questions should be addressed to the DUS or to the shop coordinator, Timothy Newton (timothy.newton@yale.edu), 432-7234.

Credit/D/Fail  No course taken Credit/D/Fail may be counted toward the Architecture major.

SENIOR REQUIREMENT

Seniors in the Design concentration take ARCH 450 in the fall term and 494 in the spring term. Seniors in the History, Theory, Criticism of Architecture, and Urbanism concentration take ARCH 490 in the fall term and 491 in the spring term. Proposals for senior projects and essays are submitted in the fall term for review and approval by the senior project coordinator; they are then distributed to faculty members for review. Upon successful review, students may ask faculty members to act as senior advisers. Senior essays and projects for ARCH 491 are due in the office of the DUS by early April. Design projects for ARCH 494 are due as specified by the course instructor. All seniors must submit a portfolio of their work to the office of the DUS by late April. For all architecture majors, this portfolio must be representative of the student’s design work including prerequisites and the senior project. History, Theory, Criticism of Architecture, and Urbanism majors must also include a copy of the senior essay and other appropriate texts.
ADVISING AND DECLARATION OF INTENT TO MAJOR

Yale College students interested in the Architecture major must submit a Declaration of Intent to Major during the spring term of their sophomore year, after taking ARCH 150, 200, and 280. The Declaration of Intent to Major must be submitted to the office of the DUS (contact DUS for deadlines) and must include the following information: name, address, telephone number, courses related to architecture already taken, and a statement of purpose. Students should also indicate their desired concentration at this time. Additionally, students must submit an electronic portfolio representative of coursework for ARCH 150, 200, and a paper from ARCH 280. Upon the successful completion of these requirements, students are notified in writing regarding their acceptance to the major. Refer to the department website for important deadlines.

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 available for the Credit/D/Fail option. Students are admitted on the basis of their previous coursework and previous performance.

REQUIREMENTS OF THE MAJOR

Prerequisites  ARCH 150, 200, and 280
Number of courses  15 course credits (incl prereqs and senior req)
Specific courses required  Design — ARCH 250, 251, 260, 312; History, Theory, Criticism of Architecture, and Urbanism — ARCH 250 or 360; ARCH 362 or elective; ARCH 260; and ARCH 312
Distribution of courses  Design — 1 elective in history and theory of arch, 1 in urbanism and landscape, 1 in materials and design, 1 in structures and computation, all approved by DUS; History, Theory, Criticism of Architecture, and Urbanism — 4 electives in history and theory of arch and city, 1 elective in urbanism and landscape, or materials and design, or structures and computation; all approved by DUS.
Other requirements  Orientation sessions in advanced technology, library, and shop
Senior requirement  Both concentrations — portfolio representative of design work, including prereqs and senior req; Design — ARCH 450 and 494; History, Theory, and Criticism of Architecture and Urbanism — ARCH 490 and 491

MEMBERS OF THE SCHOOL OF ARCHITECTURE TEACHING IN YALE COLLEGE

Professors  Turner Brooks (Adjunct), Keller Easterling, Steven Harris (Adjunct), Eeva-Liisa Pelkonen, Alan Plattus, Alexander Purves (Emeritus)
Associate Professors  Kyoung Sun Moon, Elihu Rubin
Assistant Professors  Anthony Acciavatti (Visiting), Sunil Bald (Adjunct), Joyce Hsiang, Bimal Mendis (Adjunct)
Senior Lecturers  Marta Justo Caldeira, Bryan Fuermann
Lecturers  Kyle Dugdale, Jerome Haferd, Erleen Hatfield, Justin Moore
Senior Critics  Katherine Davies, Andrei Harwell, Gavin Hogben
Critics  Anne Barrett, Adam Hopfner, George Knight, Timothy Newton, M. Surry Schlabs
Art
(Drawing, Filmmaking, Graphic Design, Painting/Printmaking, Photography, and Sculpture)

Director of undergraduate studies: Lisa Kereszi (art.dus@yale.edu), 122 GRN, 432-2600; art.yale.edu

Students in the Art major develop a critical and practical understanding of the visual arts and design through a studio-based curriculum that organically blends practice with critical thinking and art historical precedents; apply fundamentals of visual art across a variety of mediums and disciplines; relate the practice of making art and design to the study areas of art history and theory; and learn to embody the knowledge and practice of at least one artistic discipline through active search and research. Students may concentrate on a medium such as painting/printmaking, sculpture, graphic design, photography, or filmmaking, and interdisciplinary study is supported. Art majors learn to place their own work in the context of an inclusive group of contemporary art worlds and national and global cultures. This study is a crucial element in a liberal arts curriculum both for future arts practitioners and for those ultimately studying and working in other fields. A key element of the creative learning process is the critique, which is implemented via both group settings and one-on-one studio visits with faculty and visiting critics. Through rigorous practice and regular feedback, a student gains insight into one’s own critical voice. Art majors have access to the graduate program by attending regular lectures, critiques, events, and exhibitions that represent a diverse set of art practitioners who regularly visit the School of Art.

COURSES FOR NONMAJORS AND MAJORS
Courses in Art are open to all undergraduate students, but are registered by permission of instructor only due to limited class size. In cases where student demand for entry into a course is greater than can be accommodated, priority is given to School of Art students and declared Art and CPAR majors. The director of undergraduate studies (DUS) and members of the Art faculty typically hold counseling meetings during the registration period. See the Art department website listed above for more information. Students seeking advice about course selection or the program in Art should attend these advising sessions. Others wishing to elect an Art course should visit the course’s Canvas site for details, and request instructor permission during early registration to apply for these limited-enrollment classes. Many studio art courses require the purchase of a limited number of supplies in addition to those materials provided in the class. All Art majors are required to register with the DUS at the beginning of each term in order to be enrolled or to continue in the major.

PREREQUISITES
The prerequisites for acceptance into the major are a sophomore review, which is an intensive advising session and evaluation of work from studio courses taken at the Yale School of Art, and five introductory courses (courses numbered 001–199). 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, and may not be waived. 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 DUS.

REQUIREMENTS OF THE MAJOR

The Art major requires fourteen courses, including the following: (1) five prerequisite courses at the Introductory level numbered 001–199 (including Basic Drawing and Visual Thinking); (2) four courses at the 200 level or above; (3) the Junior Seminar (ART 395) or Critical Theory in the Studio (ART 301); (4) the two-term senior project (ART 495 and ART 496); and (5) two courses in the history of art. A student who has completed five courses numbered 001–199 may count a sixth such course towards the 200-level course requirement. Program guidelines and specific requirements for the various areas of concentration are described below.

Areas of concentration Each Art major selects an area of concentration from five possible choices: (1) graphic design, (2) painting/printmaking, (3) photography, (4) sculpture, and (5) filmmaking. Suggested courses for the graphic design concentration are: ART 132; ART 264; ART 265, 266 or 368; ART 369 or 370; and ART 468 or 469. Students in the photography concentration should take ART 136 and/or ART 138; ART 237 and/or 239; ART 337 or 338; ART 379; and ART 401. The sculpture concentration recommends ART 110; ART 120 or 121; ART 123 or 210; and 2 of the following: ART 348, 360, 371. Required courses for the filmmaking concentration are ART 142; ART 241; ART 341; ART 342; and ART 442 or 443. Students in the filmmaking concentration may substitute two non-production courses in Film and Media Studies for the history of art requirement, and the same for other concentrations only with permission of the DUS. Students wishing to work interdisciplinarily should consult with the DUS.

Requirements of the painting/printmaking concentration for the Class of 2023 and subsequent classes Specific courses recommended for this concentration are ART 116; ART 130; ART 331 or 332; ART 224, 245 or 356; and ART 421, 432, 433 or 457.

Credit/D/Fail Courses taken Credit/D/Fail may be counted toward the requirements of the major.

SENIOR REQUIREMENT

The senior requirement consists of a two-term senior project, ART 495 and ART 496.

UNIQUE TO THE MAJOR

Summer fellowship Art majors are eligible to apply for the Ellen Battell Stoeckel Fellowship for study at the Yale University Summer School of Music and Art in 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.

Repeated and outside courses Some Art courses may be repeated for credit, with permission of both the instructor and the DUS. Course credits in studio art earned at other institutions may, in some cases, be applied toward the requirements of the major,
but not to replace the two prerequisites, and is done solely at the discretion of the DUS and subject to a faculty review process.

**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 courses numbered 001–199

**Number of courses** 14 courses (incl prereqs and yearlong senior project)

**Specific courses required** *All concentrations* — ART 395 or 301; *Graphic design* — ART 132; ART 264; ART 265, 266 or 368; ART 369 or 370; and ART 468 or 469; *Painting/printmaking* — ART 116, 130; ART 331 or 332; ART 224, 245 or 356; and ART 421, 432, 433 or 457; *Photography* — ART 136 and/or 138; ART 237 and/or 239; ART 337 or 338; ART 379, 401; *Sculpture* — ART 110; ART 120 or 121; ART 123 or 210; and any 2 of ART 348, 360, 371; *Filmmaking* — ART 142, 241, 341, 342; ART 442 or 443

**Distribution of courses** 4 courses at 200 level or above; 2 courses in hist of art

**Senior requirement** Two-term senior project (ART 495, ART 496)

**Substitution permitted** Filmmaking concentration — 2 courses in Film and Media Studies may be substituted for the hist of art req

**MEMBERS OF THE SCHOOL OF ART TEACHING IN YALE COLLEGE**

**Professor** Anoka Faruqee

**Senior Critics** Julian Bittiner, Sandra Burns, Alice Chung, Benjamin Donaldson, Pamela Hovland, Matt Keegan, Lisa Kereszi, Sophy Naess, Christopher Pullman, Douglass G. A. Scott, A.L. Steiner, Sarah Stevens-Morling, Alexander Valentine

**Critics** Alex Adams, Michel Auder, Justin Berry, Danniele Bowman, Yeju Choi, Oscar Cornejo, Rachelle Dang, Neil Goldberg, Corey McCorkle, Mike Rader, Halsey Rodman, Karin Schneider, Anahita Vossoughi

**Lecturers** Jonathan Andrews, Elena Bertozzi, Ernest Bryant, Nathan Carter, Christian Curiel, Ben Hagari, Ilana Harris Babou, Desmond Lewis, Jesse Marsolais, Rosa McElheny, Ted Partin, Kern Samuel, Carly Sheehan, Danna Singer, Elizabeth Tubergen, Henk van Assen
Astronomy

**Director of undergraduate studies:** Greg Laughlin (astro.dus@yale.edu), 46 Hillhouse, 208, 436-9405; astronomy.yale.edu

Astronomy is a quantitative physical science that applies physics, mathematics, and statistical analysis to observing, describing, and modeling the universe. The undergraduate courses and degree programs offered by the Department of Astronomy train students in research techniques and quantitative reasoning and develop creative problem solvers. Students who complete the major continue on to top-tier graduate programs in astrophysics or related science fields, and they are sought after by employers in a range of fields from health care management to the banking and investment industry. The department offers a B.A. in Astronomy and a B.S. in Astrophysics.

**INTRODUCTORY COURSES**

**Introductory courses with no prerequisites** 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 are intended for students who desire a broad, nontechnical introduction to astronomy. These courses fulfill the science distributional requirement, and some also fulfill the quantitative reasoning distributional requirement.

Courses with numbers from 150 to 199 are topical rather than survey courses. Most of these offerings fulfill both the science and the quantitative reasoning requirements. ASTR 155 is a laboratory course that provides a hands-on introduction to astronomical observing. ASTR 160 and 170 provide an introduction to frontier topics in modern astrophysics and cosmology.

**Introductory courses with high school calculus and physics prerequisites** Students who have taken calculus and physics in high school may enroll in quantitative introductory courses. ASTR 210 and ASTR 220 focus on fundamental measurements and tools used in astronomy and include an in-depth study of stellar astrophysics (ASTR 210) or galaxies and cosmology (ASTR 220). These courses overlap in content, so students should take either ASTR 210 or 220 but not both. ASTR 255 provides training in data analysis and research techniques, including computer programming and numerical and statistical analysis.

**PREREQUISITES**

**B.A. degree program** The prerequisites for the B.A. degree are PHYS 170 and 171, or 180 and 181, or 200 and 201, and MATH 112 and 115.

**B.S. degree program** Prerequisites for the B.S. degree include an introductory physics sequence (PHYS 180 and 181, or 200 and 201, or 260 and 261); a physics laboratory sequence (PHYS 165L and 166L, or 205L and 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. All prerequisites should be completed by the end of the sophomore year.
Prerequisites for advanced electives  Courses numbered 300 and above are specialized and intensive. The prerequisites for these courses include ASTR 210 or 220, multivariable calculus, and two terms of introductory college physics.

REQUIREMENTS OF THE MAJOR

B.A. degree program  The B.A. degree program in Astronomy is designed for students who do not plan to continue in a graduate program in astronomy, but who are interested in the subject as a basis for a liberal arts education or as a physical science background to careers such as 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.

Ten courses are required beyond the prerequisites, including either ASTR 210 or 220, ASTR 255, 310, one additional Astronomy elective numbered 150 or above, and the senior requirement (ASTR 492). Two of the ten courses must be advanced courses in mathematics, such as MATH 120 or ENAS 151, or courses in mathematical methods, including statistics or computer science, such as CPSC 112, MATH 200 or above, or ASTR 356. Three electives can be drawn from any of the natural, applied, or mathematical sciences (including additional astronomy courses); at least two of these must be advanced enough to have college-level prerequisites.

B.S. degree program  The B.S. degree program in Astrophysics is designed to provide a strong foundation in astrophysics for students interested in graduate study or a career in astronomy, physics, or a related science.

Beyond the prerequisites, twelve courses are required in astronomy, physics, and mathematics. Students complete at least six courses in astronomy, including either ASTR 210 or 220, 255, 310, 320, and a two-term senior project (ASTR 490 and 491). Students also complete three physics courses numbered 400 or above, normally PHYS 401, 402, and 439. In addition, majors choose either one additional 400-level course in physics or an astronomy elective numbered 300 or higher. In mathematics, students complete a course in differential equations selected from MATH 246, PHYS 301, or ENAS 194, and either an additional mathematics course numbered 200 or above or a course in statistics or computing such as CPSC 112, 201, or ASTR 356.

Credit/D/Fail  Courses taken Credit/D/Fail may not be counted toward the requirements of either degree program.

SENIOR REQUIREMENT

B.A. degree program  The senior requirement consists of a senior essay or independent research project carried out for one term in ASTR 492 under the supervision of a faculty member.

B.S. degree program  The senior requirement consists of an independent research project in astronomy carried out for two terms in ASTR 490 and 491 under the supervision of a faculty member.

ADVISING

Before entering the junior year, students must obtain approval of a course of study from the director of undergraduate studies (DUS).
Graduate work  Graduate courses in astronomy are open to qualified undergraduates who already have a 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.

REQUIREMENTS OF THE MAJOR

ASTRONOMY, B.A.

Prerequisites  PHYS 170, 171, or 180, 181, or 200, 201; MATH 112, 115

Number of courses  10 courses beyond prereqs, incl senior req

Specific courses required  ASTR 210 or 220; ASTR 255, 310

Distribution of courses  1 astronomy elective numbered 150 or above; 2 advanced math courses; 3 science electives (may include addtl astronomy courses), at least 2 with college-level prereqs

Senior requirement  Senior essay or senior research project (ASTR 492)

ASTROPHYSICS, 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 courses beyond prereqs, incl senior req

Specific courses required  ASTR 210 or 220; ASTR 255, 310, 320

Distribution of courses  3 courses in physics numbered 400 or above; 1 addtl upper-level course in astronomy or physics; 2 courses in math or mathematical methods, as specified

Substitution permitted  ASTR 155 for 1 term of physics lab prereq

Senior requirement  Senior independent research project (ASTR 490 and 491)

FACULTY OF THE DEPARTMENT OF ASTRONOMY

Professors  Hector Arce, Charles Bailyn, †Charles Baltay, Sarbani Basu (Chair), Paolo Coppi, Pierre Demarque (Emeritus), Debra Fischer, Marla Geha, Jeffrey Kenney, Richard Larson (Emeritus), Gregory Laughlin, Priyamvada Natarajan, †C. Megan Urry, William van Altena (Emeritus), Frank van den Bosch, Pieter van Dokkum, Robert Zinn

Associate Professors  †Daisuke Nagai, †Nikhil Padmanabhan

Lecturer  Michael Faison

†A joint appointment with primary affiliation in another department.
Biology

Program coordinator: Leah Hartmann (amaleah.hartman@yale.edu)

Yale offers four biological science majors: Ecology and Evolutionary Biology (E&EB); Molecular Biophysics and Biochemistry (MB&B); Molecular, Cellular, and Developmental Biology (MCDB); and Neuroscience (NSCI). The distinctions between these majors reflect the types of biological systems analysis each represents: the analysis of whole organisms, populations, and ecosystems (E&EB); the analysis of life at the molecular level using tools of chemistry and physics (MB&B); the analysis of molecular, cellular, and developmental biology, genetics, neurobiology, and quantitative biology (MCDB); and the analysis of neurons, neural circuits, brains, and behavior, using a wide range of approaches (NSCI).

Yale also offers the Biomedical Engineering (BENG) major for students interested in studying biological systems from the perspectives of the physical sciences and engineering.

Together, these approaches cover the vast breadth of disciplines in the biological sciences. The courses BIOL 101–104 are designed as entry points to all four programs. The prerequisites for the four majors are similar, so students need not commit to a specific major in their first year. Students who wish to major in any of the four tracks (E&EB, MB&B, MCDB, and NSCI) must complete all four modules.

For information on the major requirements, course offerings, and departmental faculty of the biological sciences programs, see Ecology and Evolutionary Biology; Molecular Biophysics and Biochemistry; Molecular, Cellular, and Developmental Biology; and Neuroscience. See also information for Biomechanical Engineering.
Biomedical Engineering

Director of undergraduate studies: Lawrence H. Staib, N309 B TAC, 785-5958; seas.yale.edu/departments/biomedical-engineering

Engineering methods and strategies are used to address biomedical problems ranging from studies of physiological function using images to the development of novel drug delivery methods and new biomaterials. The B.S. degree in Biomedical Engineering is designed to provide students with an understanding of common fundamental methodologies and the ability to develop quantitative approaches to one of four biomedical engineering tracks: Bioimaging, Biomechanics and Mechanobiology, Biomolecular Engineering, and Systems Biology. The flexible course structure of the major permits students to bridge basic concepts in the life sciences and traditional areas of engineering, while gaining a comprehensive understanding of biomedical engineering as a field of study.

PREREQUISITES

The following prerequisites are common to all tracks in the major: BIOL 101 and 102 or a higher-level course in MCDB or MB&B, with the permission of the director of undergraduate studies (DUS); a lecture course in chemistry numbered CHEM 161 or higher; ENAS 194; MATH 115 (not necessary if placed into MATH 120 or ENAS 151); MATH 120 or ENAS 151; PHYS 180, 181, 205L, and 206L (or 165L and 166L, with DUS permission).

REQUIREMENTS OF THE MAJOR

Students must complete thirteen 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); BENG 280, a half-credit course taken sophomore year as part of the senior requirement; and the senior requirement (see below). During the first year, students study basic mathematics, chemistry, and biology. By the end of the sophomore year, students should have taken physics, ENAS 194, BENG 249, and BENG 350. In the junior year, students gain a comprehensive grounding in the field through BENG 351, BENG 352, BENG 353, BENG 355L, and BENG 356L. During the junior and senior years, students acquire depth by taking electives in one of the four areas of concentration. One relevant course (e.g. MB&B 300) may be substituted with DUS permission. A senior seminar and a senior project give students practical, detailed information about their chosen area of concentration.

Students in all tracks are required to take the following courses: BENG 249, 280, 350, 351, 352, 353, 355L, 356L and 480.

Students in the Bioimaging track must also take three courses chosen from BENG 404, 406, 410, 444, 445, 475, 476, or 485.

Students in the Biomechanics and Mechanobiology track must also take three courses chosen from MENG 185, 361, BENG 404, 406, 410, 434, 453, 455, 456, 457, or 458.
Students in either the Biomolecular Engineering track and the Systems Biology track must also take three courses chosen from BENG 404, BENG 410, 411, 434, 435, 463, 464, 465, 467, 469, MENG 361.

Research Courses Students are permitted and encouraged to engage in research before the senior year by enrolling in BENG 471 and/or BENG 472. These courses, offered Pass/Fail, may be taken more than once for credit, but repeated courses do not count toward the major. See Academic Regulations, section C, Course Credits and Course Loads.

Credit/D/Fail No course taken Credit/D/Fail may count toward the major, including prerequisites.

Roadmap See visual roadmap of the requirements.

SENIOR REQUIREMENT
In their sophomore year, all students must enroll in BENG 280 and in their senior year, all students must enroll in BENG 480; both are half-credit courses. They must also complete a one-term senior project in their final term of enrollment (BENG 474) or a two-term, yearlong project (BENG 473, 474).

ADVISING
Preparation for graduate study The Biomedical Engineering curriculum is excellent preparation for graduate study in engineering, science, and medicine.

Combined B.S./M.S. degree program Exceptionally able and well-prepared students may apply to complete a course of study leading to the simultaneous award of the B.S. and M.S. degrees after eight terms of enrollment. See Academic Regulations, section L, Special Academic Arrangements, “Simultaneous Award of the Bachelor’s and Master’s Degrees.” Interested students should consult the DUS prior to the sixth term of enrollment for specific requirements in Biomedical Engineering.

REQUIREMENTS OF THE MAJOR
Prerequisites BIOL 101 and 102, or higher-level course in MCDB or MB&B with DUS permission; 1 lecture course in chemistry numbered CHEM 161 or higher; ENAS 194; MATH 115 (not necessary if placed into MATH 120 or ENAS 151); MATH 120 or ENAS 151; PHYS 180, 181, and 205L, 206L (or 165L, 166L with DUS permission)

Number of courses 13 term courses, totaling at least 11 course credits, beyond prerequisites (incl senior req)


Distribution of courses 2 term courses in life sciences among prerequisites and required courses (typically BIOL 101 and 102 and BENG 350)

Substitution permitted Relevant course with DUS permission
Senior requirement BENG 280, a half-credit course taken sophomore year; BENG 480, a half-credit course taken senior year; a one-term senior project in final term of enrollment (BENG 474) or two-term, yearlong senior project (BENG 473 and 474)

FACULTY OF THE DEPARTMENT OF BIOMEDICAL ENGINEERING

Professors †Helene Beneviste, †Joerg Bewersdorf, Richard Carson, †Nicholas Christakis, †Todd Constable, †Robin de Graaf, James Duncan, Jay Humphrey, Fahmeed Hyder, Themis Kyriakides, †Francis Lee, Andre Levchenko, †Greame Mason, †Evan Morris, †Laura Niklason, †Xenophon Papademetris, Douglas Rothman, Mark Saltzman, †Martin Schwartz, †Frederick Sigworth, †Albert Sinusas, †Brian Smith, Lawrence Staib, †Hemant Tagare, †Paul Van Tassel, Steven Zucker

Associate Professors Stuart Campbell, †Daniel Coman, Tarek Famy, Rong Fan, †Gigi Galiana, Anjelica Gonzalez, †Michelle Hampson, †Henry Hsia, Farren Isaacs, †Chi Liu, Kathryn Miller-Jensen, †Dana Peters, †Corey Wilson, †Jiangbing Zhou

Assistant Professors †Nicha Dvornek, †Ansel Hillmer, Michael Mak, Michael Murrell, †Dustin Scheinost, Gregory Tietjen, †Steven Tommasini, †Daniel Wiznia

Lecturers †Liqiong Gui, †Jing Zhou

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

(Courses at the Paul Mellon Centre in London)

The Yale in London program offers Yale undergraduates the opportunity to take spring or summer courses in London at the Paul Mellon Centre for Studies in British Art. The program gives students the opportunity to go beyond the traditional classroom into the rich and vibrant environment in British studies, generally including British history and the history of London, where students can view great works of art in museums and galleries; explore historic palaces and houses; and watch new and legendary actors treading the boards in London.

The spring program consists of four courses, while the summer program has two courses. There are no prerequisites and students from any major and from any year of study may apply. All courses carry full academic credit and must be taken for a letter grade. Courses are taught seminar-style by Yale faculty and leading academics from the UK. Courses bring together British art, architecture, history, literature, theatre, and culture to explore Britain's identity and impact, both local and global, from the Medieval period to today. Classes are held Monday through Thursday so that students can explore London and beyond in the afternoons and on weekends.

Further information on housing, fees, financial aid, and student life is available on the program website. Inquiries may also be directed to yaleinlondon@yale.edu.

The application deadline for the spring term 2023 is Friday, October 14, 2022. Students will be notified of acceptance within one month of the application deadline. Inquiries about the summer program, described under "International Experience" in The Undergraduate Curriculum, should be directed to the same address. Applications for summer 2023 are due Wednesday, February 15, 2023.
Chemical Engineering

Director of undergraduate studies: Paul Van Tassel (paul.vantassel@yale.edu); seas.yale.edu/departments/chemical-and-environmental-engineering

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 pharmaceutics.

The Chemical Engineering program, with two degree programs (see below), 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.

Upon graduation, Yale's Chemical Engineering students are expected to have achieved "Student Outcomes" as defined by ABET (www.abet.org) and the program. The Chemical Engineering major produces graduates who demonstrate: (1) an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics; (2) an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors; (3) an ability to communicate effectively with a range of audiences; (4) an ability to recognize ethical and professional responsibilities in engineering situations and to make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts; (5) an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives; (6) an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions; and (7) an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Yale and ABET also look ahead, several years beyond graduation. Program educational objectives provide the expectations for graduates early in their career. The Chemical Engineering objectives are to produce graduates who: (1) have mastery of the basic principles of science and modern chemical engineering practice and are able to adapt and creatively apply them to solve new problems in a broad range of fields; (2) become ethical professionals who advance chemical engineering practice and knowledge in
multiple fields and recognize the local and global impacts of their work on humans and the environment; (3) are able to work well with people from diverse backgrounds and are committed to the advancement of women and under-represented groups in engineering; (4) have a strong educational foundation enabling them to study in graduate and professional schools as well as become leaders in STEM or non-STEM career paths; and (5) are committed to, and engage in, lifelong learning throughout their careers.

PREREQUISITES
Students considering a Chemical Engineering major are encouraged to take two terms of chemistry and mathematics during the first year, and to contact the director of undergraduate studies (DUS).

Students in both degree programs (see below) take the following prerequisite courses: MATH 112, 115, and ENAS 151 or MATH 120; CHEM 161 and 165 or CHEM 163 and 167; CHEM 134L and 136L; PHYS 180, 181 or PHYS 200, 201 or PHYS 260. Students with advanced high school preparation may reduce the number of prerequisites by placing out of certain courses.

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). All students majoring in Chemical Engineering and Engineering Sciences (Chemical) must follow the requirements listed below as approved by the program’s faculty.

B.S. degree program in Chemical Engineering
The curriculum for the ABET-accredited B.S. degree in Chemical Engineering requires twenty courses, totaling nineteen credits, including the senior requirement, CENG 416, and the following courses beyond the prerequisites:

1. Computing: ENAS 130 or CPSC 100 or CPSC 112 or CPSC 200
2. Mathematics: ENAS 194
3. Chemistry: CHEM 174 and 175 or CHEM 220 and 221; CHEM 222L and 223L; CHEM 332 and 333
4. Engineering science: Three term courses chosen from engineering electives
5. Chemical engineering: CENG 150 or CENG 210; CENG 300, 301, 314 (or MENG 361), CENG 315, 411, 412L, 480

B.S. degree program in Engineering Sciences (Chemical) 
The B.S. degree in Engineering Sciences (Chemical) requires twelve term courses, including the senior requirement, CENG 416 or CENG 490, and the following courses beyond the prerequisites, chosen in consultation with the DUS:

1. Computing: ENAS 130 or CPSC 100 or CPSC 112 or CPSC 200
2. Mathematics: ENAS 194
3. Chemistry: 3 advanced chemistry courses: option 1: CHEM 174 and 175 or CHEM 220 and 221; and CHEM 332; or option 2: CHEM 174 or 220; CHEM 332 and 333
4. Chemical engineering: CENG 150 or CENG 210; CENG 300, 301, 314 (or MENG 361), CENG 315, 411

SENIOR REQUIREMENT

B.S. degree program in Chemical Engineering In their senior year, students must complete a senior research project in CENG 416.

B.S. degree program in Engineering Sciences (Chemical) In their senior year, students must complete a senior research project in CENG 416 or CENG 490.

REQUIREMENTS OF THE MAJOR

CHEMICAL ENGINEERING, B.S.

Prerequisites MATH 112, 115; ENAS 151 or MATH 120; CHEM 161 and 165 or CHEM 163 and 167; CHEM 134L and 136L; PHYS 180, 181 or PHYS 200, 201 or PHYS 260.

Number of courses 20 courses, totaling 19 credits, beyond prereqs (incl senior req)

Specific courses required ENAS 130, CPSC 100, 112, or 200; ENAS 194; CHEM 174 and 175 or CHEM 220 and 221; CHEM 222L and 223L; CHEM 322, 333; CENG 150 or CENG 210; CENG 300, 301, 314 (or MENG 361), CENG 315, 411, 412L, 480

Distribution of courses 3 addtl electives in engineering

Senior requirement CENG 416

ENGINEERING SCIENCES (CHEMICAL), B.S.

Prerequisites MATH 112, 115; ENAS 151 or MATH 120; CHEM 161 and 165 or CHEM 163 and 167; CHEM 134L and 136L; PHYS 180, 181 or PHYS 200, 201 or PHYS 260.

Number of courses 12 term courses beyond prereqs (incl senior req), chosen in consultation with DUS

Specific courses required ENAS 130, CPSC 100, 112, or 200; ENAS 194; CENG 150 or CENG 210; CENG 300, 301, 314 (or MENG 361), CENG 315, 411

Distribution of courses 3 adv chem courses, as specified

Senior requirement CENG 416 or CENG 490

FACULTY OF THE DEPARTMENT OF CHEMICAL AND ENVIRONMENTAL ENGINEERING

Professors Eric Altman, †Paul Anastas, †Michelle Bell, †Ruth Blake, Menachem Elimelech, Gary Haller (Emeritus), †Edward Kaplan, Jaehong Kim, Michael Loewenberg, †Andrew Miranker, Jordan Peccia, Lisa Pfefferle, Daniel Rosner (Emeritus), †Mark Saltzman, †Udo Schwarz, T. Kyle Vanderlick, Paul Van Tassel, Julie Zimmerman

Associate Professors John Fortner, Drew Gentner

Assistant Professors Peijun Guo, Amir Haji-Akbari, †Shu Hu, Lea Winter, Mingjiang Zhong

Lecturers †Anikó Bezur, †Paul Whitmore

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

Director of undergraduate studies: Nilay Hazari (nilay.hazari@yale.edu), 210 KCL, 203-432-0885; chem.yale.edu

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

The Chemistry department offers one-term courses with no prerequisites, which are intended for non-science majors. These courses do not satisfy medical school requirements or the general chemistry requirement for any science major. Courses for nonmajors are numbered CHEM 100–109.

PREREQUISITES AND INTRODUCTORY COURSES

**Prerequisite courses** Prerequisites common to all four Chemistry degree programs include two terms of general chemistry and laboratory; single-variable calculus at the level of MATH 115; and one term of introductory physics numbered 170 or higher, or the equivalents in advanced placement. Students also are encouraged to complete a course in multivariable calculus (MATH 120 or ENAS 151).

**Introductory courses** The majority of students begin with a general chemistry sequence: either CHEM 161 and 165 or CHEM 163 and 167. These courses fulfill the prerequisite for general chemistry in the Chemistry major. Students taking CHEM 161 may be studying chemistry for the first time, perhaps took chemistry as a high school sophomore, or even may have completed AP chemistry but did not fully master the subject at that level. Students in CHEM 163 will have completed a year or two of chemistry later in high school, although motivated students may have last taken chemistry as a high-school sophomore if they have a strong math and physics background. Typically students who complete CHEM 163 in the fall term complete CHEM 167 in the spring term. Regardless of whether a student completes the CHEM 161 and 165 sequence or the CHEM 163 and 167 sequence, the introductory laboratory sequence is CHEM 134L and 136L; each laboratory course earns one-half course credit.

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. While CHEM 174 and 175 are offered expressly for first-year students, other courses in organic chemistry, including CHEM 220 and 221, also are available to qualified first-year students. Students with a strong background in physics and calculus may be eligible for the physical chemistry courses CHEM 332 and 333.
PLACEMENT PROCEDURES
Details about placement and preregistration for chemistry courses can be found on the department website. Information about the placement examination and advising also are available on the department website.

Permission Enrollment in CHEM 163 or CHEM 174 through the Yale Online Course System requires permission from the department. Permission is issued automatically after placement has been completed for entering first-year students. For more information email chemistry.dus@yale.edu.

Upper-level students Upper-level students wishing to take CHEM 161, 163, 165, or 167 should confirm their placement on Canvas@Yale by accessing the Chemistry Placement site that corresponds to their year of matriculation. If permission is required in the Yale Online Course System, upper-level students should write to chemistry.dus@yale.edu. Those wishing to enroll in CHEM 220 may do so as long as they have satisfied the general chemistry prerequisite.

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 in Yale Course Search.

Advanced courses All chemistry advanced lecture courses are half-semester courses, which count for 0.5 Yale College credits. Some courses start in the first-half of semester, while other start in the second-half of semester. Information about the timing of courses is available in Yale Course Search. Because most advanced courses are offered either in the fall term or have a fall-term course as a prerequisite, students should give consideration to the advanced courses they plan to take in the spring term. For the purpose of degree requirements, all undergraduate Chemistry courses numbered 401 or higher, approved by the director of undergraduate studies (DUS), typically count as advanced lecture or laboratory courses, as do CHEM 226L, 251L, 331L, 349L, 355L, and 335L. Many graduate-level Chemistry courses (those numbered 500 and above) also may count toward the advanced-course requirement; consult the DUS for information about eligible courses.

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 completing CHEM 161 and 165, CHEM 163 and 167, or two terms of physical chemistry. Students should consult with the Office of Career Strategy for the most up-to-date premedical course advice.

REQUIREMENTS OF THE MAJOR
Four degree programs are offered: the B.A., the B.S., an intensive major leading to the B.S., and the combined B.S./M.S. The B.A. degree 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, or the environment. The B.S. degree is intended to prepare students for graduate study while permitting extensive exploration of other disciplines and is also recommended for those planning to attend graduate school. 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. 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.

The major requires a group of prerequisites or their equivalent in advanced placement, a core of courses common to all four degree programs, advanced courses specific to each degree program, and a senior requirement.

**Course requirements common to all Chemistry degree programs** All degrees require two terms of organic chemistry (CHEM 174 or 220, and CHEM 175, 221, or 230) with laboratory (CHEM 222L and 223L), one term of physical chemistry (CHEM 332 or 328), and one term of inorganic chemistry (CHEM 252).

**B.A. degree program** The B.A. degree program requires ten course credits, beyond the prerequisites. In addition to the common degree requirements and one-term senior requirement, the B.A. degree requires four additional course credits of advanced chemistry lecture or laboratory courses. At least one full credit must be attained through advanced lecture courses in the Chemistry department and at least one must be a Chemistry laboratory course. CHEM 333 may be counted toward the advanced-course requirement, although not as the sole lecture course.

**B.S. degree program** The B.S. degree program requires thirteen course credits, beyond the prerequisites. In addition to the common degree requirements and two-term senior requirement, the B.S. degree requires completion of a second term of physical chemistry (CHEM 333), one term of physical chemistry laboratory (CHEM 330L), and four additional course credits of advanced chemistry lecture or laboratory courses. At least one full credit must be attained through advanced lecture courses in the Chemistry department and at least one must be a Chemistry laboratory course.

**B.S. degree program, intensive major** The B.S. degree program, intensive major requires fifteen course credits, beyond the prerequisites. In addition to the common degree requirements and two-term senior requirement, the B.S. degree with an intensive major requires completion of a second term of introductory physics numbered 171 or higher, a second term of physical chemistry (CHEM 333), one term of physical chemistry laboratory (CHEM 330L), and five additional course credits of advanced chemistry lecture or laboratory courses. At least two full credits must be attained through advanced lecture courses in the Chemistry department and at least one must be a Chemistry laboratory course.

**Combined B.S./M.S. degree** 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 no later than the last day of classes in the fifth term of enrollment. To be considered for admission, by the end of their fifth term applicants must 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 the major, including prerequisites. Two terms of CHEM 490 must be taken in the fifth and sixth terms with earned grades of A or A– to continue in the program. The B.S./M.S. degree program requires completion of the intensive major requirements, including the senior requirement, which typically is completed in the fifth and sixth terms. The introductory physics requirement must be fulfilled with PHYS 200 and 201 or PHYS 260 and 261; a term course in physics numbered 400 or higher and approved by the Chemistry DUS may be substituted for
the introductory sequence. In addition, eight credits of graduate courses in chemistry (four of which count toward the B.S.) are required. Four terms of research are required, including two terms of research taken in CHEM 990. Students in the program must earn grades of A in at least two of their graduate-level term courses (or in one yearlong course) and have at least a B average in other graduate-level courses. B.S./M.S. candidates also are expected to continue their independent research in a summer internship between their junior and senior years. At the end of their eighth semester students are required to write a thesis summarizing their research activities. The thesis must be written under the guidance of the faculty member who supervises the student’s research and it must be submitted to their research adviser on the final day of classes of the student’s eighth semester. The thesis should be no shorter than twenty-five pages (double-spaced, twelve-point font, excluding figures, tables, and bibliography) and normally should contain the following sections: Introduction, Results and Discussion, Summary and Conclusions, Research Methods, and Bibliography. Students in the B.S./M.S. program must also present their research in the form of a poster presentation at the end of their sixth semester (to fulfill the requirements of the B.S. degree) and an oral presentation at the end of their eighth semester (to fulfill the requirements of the M.S. degree). Both the poster and oral presentation are coordinated by the instructor of CHEM 490. For more information, see Academic Regulations, section L, Special Academic Arrangements, “Simultaneous Award of the Bachelor’s and Master’s Degrees.”

**Credit/D/Fail** No chemistry courses taken Credit/D/Fail may be counted toward the major (including substitutions for advanced courses).

**Roadmap** See visual roadmap of the requirements.

**SENIOR REQUIREMENT**

**For the B.A. degree program** Students in the B.A. degree program must complete the senior seminar CHEM 400, in which they prepare a capstone essay on a chemistry-related topic. The paper is expected to be 15–25 pages in length (double-spaced, twelve-point font, exclusive of figures, tables, and bibliography).

**For the B.S. degree program** Students in the B.S. degree program may fulfill the senior requirement by completing two terms of the independent research course CHEM 490 and writing a capstone report under the guidance of a faculty member that describes their research activities. Alternatively, they may complete the senior seminar CHEM 400, in which they prepare a capstone essay on a chemistry-related topic, and complete one additional course credit of advanced chemistry lecture or laboratory courses. One term of CHEM 490 may be counted as the additional advanced course. The capstone report or essay is expected to be 15–25 pages in length (double-spaced, twelve-point font, exclusive of figures, tables, and bibliography). All students performing research also must present their work in the form of an oral or poster presentation as coordinated by the instructor of CHEM 490.

**For the B.S. degree program with an intensive major** Students in the B.S. degree program with an intensive major fulfill the senior requirement by completing two terms of the independent research course CHEM 490 and writing a capstone report of 15–25 pages in length (double-spaced, twelve-point font, exclusive of figures, tables, and bibliography) under the guidance of a faculty member that describes their research
activities. Students in the intensive major program also must present their work in the form of an oral or poster presentation as coordinated by the instructor of CHEM 490.

ADVISING
Majors are encouraged to begin their programs in the first year to provide the greatest flexibility in scheduling. It is possible, however, to complete the B.S. in as few as six terms if a student has advanced placement. One sample B.S. program follows, but many others are possible:

<table>
<thead>
<tr>
<th>First-Year</th>
<th>Sophomore</th>
<th>Junior</th>
<th>Senior</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 161, 165, 134L, 136L, math prereq</td>
<td>CHEM 220, 221, 252, 222L, 223L, physics prereq</td>
<td>CHEM 332, 333, 330L, 251L, 1 elective (1 credit)</td>
<td>2 terms of CHEM 490, 2 electives (2 credits)</td>
</tr>
</tbody>
</table>

Substitutions for required courses Up to two credits of advanced science courses outside Chemistry may be counted as electives, with the written approval of the DUS. CHEM 490 may not in any circumstance be substituted for any of the laboratory requirements. The graduate courses CHEM 562L, 564L, and 565L may not be counted toward any requirement of the major.

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 may include CHEM 421 and two biochemistry electives chosen from MCDB 300, MB&B 300, 301, or selected graduate courses. An inorganic chemistry specialization could include CHEM 452, and 457. A program with emphasis in physical chemistry and chemical physics would have three electives chosen from CHEM 430, 442, 470, or a graduate course in quantum mechanics. Students interested in synthetic organic chemistry complete three electives chosen from CHEM 418, 423, 425, 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 DUS. For a list of graduate courses appropriate for a particular specialization, consult the DUS.

Approval of major programs of study All Chemistry majors in their sophomore, junior, and senior years must have their programs approved by the DUS. A program tailored to each student’s goals is created and recorded on a Chemistry Course of Study (COS) form.

STUDY ABROAD
In most instances, Chemistry majors find their course of study easier to schedule if they choose to study abroad in a spring term. Students studying abroad in the spring term of their junior year are required to obtain approval for the project that will fulfill their senior requirement before the end of the prior term. For general information on the Year or Term Abroad, see Academic Regulations, section K, Special Academic Programs, “Year or Term Abroad.”

UNIQUE TO THE MAJOR
Special restrictions on lecture courses For the general, organic, or physical chemistry sequences, CHEM 161 and 165; CHEM 174 or 220 and CHEM 175, 221, or 230; and
CHEM 332 or CHEM 328 and 333, completion of the first term with a passing grade is a prerequisite for registration in the subsequent term. Completion of CHEM 163 with a passing grade is a prerequisite for registration in CHEM 167.

Students receive credit for only one chemistry sequence of any given type. For example, a student who has completed CHEM 161 and 165 may not subsequently enroll in CHEM 163 or 167; a student who has completed CHEM 174 and 175 may not subsequently enroll in CHEM 220, 221, or 230. Similarly, students may not enroll in a course (typically of lower number) that is a prerequisite to a course they already have taken. 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 DUS. Students dropping the lecture course corequisite with a laboratory must also drop the laboratory course.

**REQUIREMENTS OF THE MAJOR**

**Prerequisites** CHEM 161 and 165 or CHEM 163 and 167; CHEM 134L and 136L; MATH 115 (MATH 120 or ENAS 151 suggested); PHYS 170, 180, 200, or 260; or equivalents in adv placement

**Number of courses** 
- **B.A.** — 10 course credits, beyond prereqs (incl senior req); **B.S.** — 13 course credits, beyond prereqs (incl senior req); **B.S., intensive major** — 15 course credits, beyond prereqs (incl senior req)

**Specific courses required** All degrees — 2 terms of organic chem (CHEM 174 or 220 and CHEM 175, 221, or 230); 2 terms of organic chem lab (CHEM 222L and 223L); 1 term of physical chem (CHEM 332 or 328); 1 term of inorganic chem (CHEM 252); **B.S.** — CHEM 330L, 333; **B.S., intensive major** — CHEM 330L, 333; second term of intro physics, PHYS 171 or higher

**Distribution of courses** 
- **B.A. and B.S.** — 4 addtl course credits in adv lectures or labs, incl at least 1 lecture credit and 1 lab; **B.S., intensive major** — 5 addtl course credits in adv lectures or labs, incl at least 2 credits of lectures and 1 lab

**Substitution permitted** Up to 2 relevant adv science courses in other departments for adv chemistry courses with DUS permission

**Senior requirement** 
- **B.A.** — CHEM 400; **B.S.** — 2 terms of CHEM 490, or CHEM 400 and 1 addtl course credit in adv lecture or lab; **B.S., intensive major** — 2 terms of CHEM 490; all degree programs require submission of senior capstone essay

**FACULTY OF THE DEPARTMENT OF CHEMISTRY**

**Professors** Victor Batista, Gary Brudvig, Robert Crabtree (Emeritus), †Craig Crews, R. James Cross, Jr. (Emeritus), Jonathan Ellman, John Faller (Emeritus), Sharon Hammes-Schiffer, Nilay Hazari, Seth Herzon, Patrick Holland, Mark Johnson, William Jorgensen, J. Patrick Loria, James Mayer, J. Michael McBride (Emeritus), Scott Miller, Peter Moore (Emeritus), †Anna Pyle, †James Rothman, Martin Saunders (Emeritus), †Dieter Söll, David Spiegel, †Scott Strobel, John Tully (Emeritus), Patrick Vaccaro, Kenneth Wiberg (Emeritus), Elsa Yan, Frederick Ziegler (Emeritus), Kurt Zilm
Associate Professors  Jason Crawford, Timothy Newhouse, Sarah Slavoff, Hailiang Wang

Assistant Professors  Caitlin Davis, Ziad Ganim, †Stavroula Hatzios, Stacy Malaker, †Mingjiang Zhong

Lecturers  Paul Anastas, Paul Cooper, Christine DiMeglio, N. Ganapathi, Jonathan Parr

Preceptor  Aaron Clark

†A joint appointment with primary affiliation in another department.
Child Study

**Director of undergraduate studies: James McPartland;** medicine.yale.edu/childstudy/

The Child Study Center is a department at Yale University School of Medicine which brings together multiple disciplines to further the understanding of the problems of children and families. Among the many disciplines are child psychiatry, pediatrics, genetics, neurobiology, epidemiology, psychology, nursing, social work, and social policy. The mission of the Yale Child Study Center is to improve the mental health of children and families, advance understanding of their psychological and developmental needs, and treat and prevent childhood mental illness through the integration of research, clinical practice, and professional training. The Child Study Center is unique in its scope of research, clinical services, training programs, policy work, and its local, state, national, and international collaborations. The strengths of the Center are reflected in the breadth and integrative nature of research, clinical services and training. More information is available on the Child Study Center website.
Classics

**Director of undergraduate studies:** Andrew Johnston (andrew.johnston@yale.edu), 311 Phelps Hall

The Department of Classics offers a major in Classics, concentrating in either Greek or Latin literature, or in both literatures; 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. Programs for all majors must be approved by the director of undergraduate studies (DUS).

**COURSE NUMBERING**

All CLCV courses are taught in translation, with no knowledge of Greek or Latin required. CLCV courses numbered 001–099 are First-Year Seminars, with enrollment limited to eighteen. CLCV courses numbered at the 100-level and 200-level are primarily introductory, lecture-style courses, which may or may not include a discussion-section component. CLCV courses numbered at the 300-level are discussion-oriented seminars, with enrollment limited to fifteen.

For courses in Ancient Greek (GREK) and Latin language (LATN), those at the 100-level are introductory and intermediate courses (L1, L2, L3, and L4), while those at the 400-level are advanced seminar-style courses (L5).

**PLACEMENT PROCEDURES**

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 possible.

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.

**REQUIREMENTS OF THE MAJOR IN CLASSICS**

The major in Classics is primarily a liberal arts major. It provides a rigorous interdisciplinary education in the literature, material culture, and history that underlie Western civilization and other humanities disciplines; it can also provide foundational disciplinary expertise for students 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 the linguistic, historical, and theoretical interpretative tools to analyze classical antiquity and its relevance in the modern world. All courses in the department emphasize a combination of precise analysis, original thought, creativity, and breadth of historical inquiry. Courses in other literatures, in history, in art 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 of 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.

The standard major The standard major in two literatures requires no fewer than ten term courses. These include six language courses in both Greek and Latin at the level of 390 or above, and must include GREK 403 or LATN 390. Also required are one course that covers broadly the literature and/or culture of ancient Greece (CLCV at the 100- or 200-level), one course that covers broadly the literature and/or culture of ancient Rome (CLCV at the 100- or 200-level), one course in a related field in ancient history, and one course in a related field in ancient history, ancient philosophy, 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 language courses in that literature level of 390 or above, and must include GREK 403 or LATN 390. Also required are one course that covers broadly the literature and/or culture of ancient Greece (CLCV at the 100- or 200-level), one course that covers broadly the literature and/or culture of ancient Rome (CLCV at the 100- or 200-level), a course in ancient history related to the chosen literature, and an additional course in ancient history, classical art and archaeology, ancient philosophy, or classical civilization. Students are encouraged to do some work in the second language and may substitute two terms at the intermediate level (131 and 141) or higher in the second language for two 400-level courses in the major literature.

Students majoring in one literature (Greek or Latin) are required to take no fewer than ten term courses. These include six language courses in that literature level of 390 or above, and must include GREK 403 or LATN 390. Also required are one course that covers broadly the literature and/or culture of ancient Greece (CLCV at the 100- or 200-level), one course that covers broadly the literature and/or culture of ancient Rome (CLCV at the 100- or 200-level), a course in ancient history related to the chosen literature, and an additional course in ancient history, classical art and archaeology, ancient philosophy, or classical civilization. Students are encouraged to do some work in the second language and may substitute two terms at the intermediate level (131 and 141) or higher in the second language for two 400-level courses in the major 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 write a senior essay under the regular guidance of a faculty adviser.

Combined B.A./M.A. degree Exceptionally able and well-prepared students may complete a course of study leading to the simultaneous award of the B.A. and M.A. degrees after eight terms of enrollment. See Academic Regulations, section L, Special Academic Arrangements, “Simultaneous Award of the Bachelor’s and Master’s Degrees.” Interested students should consult the DUS prior to the sixth term of enrollment for specific requirements in Classics.

Credit/D/Fail Courses taken Credit/D/Fail may not be counted toward the requirements of the major.

SENIOR REQUIREMENT

For the standard major At the end of the senior year the student majoring in both Greek and Latin takes a comprehensive examination in the history of Greek and Latin literature and culture and in translation of both languages; the student majoring in either Greek or Latin takes a senior departmental examination in the history of the literature of the major and in translation of that literature.

For the intensive major Students may write a one-term essay in either the fall or spring (CLSS 492), or they may write a two-term essay (CLSS 490 and 491) starting in the fall of their senior year. A brief prospectus of the essay must be submitted, preferably at the end of the junior year and in no case later than the end of September of the senior year. The candidate must submit two copies of the senior essay to the DUS.
no later than December 6 (CLSS 492) or April 18 (CLSS 490, 491 or 492) of the senior year.

REQUIREMENTS OF THE MAJOR

Prerequisites None

Number of courses 10 term courses

Specific courses required GREK 403 or LATN 390

Distribution of courses Two literatures — 6 courses in both langs at level 390 or above, with one of those being GREK 403 or LATN 390; 1 course that covers broadly the literature and/or culture of ancient Greece, and 1 course that covers broadly the literature and/or culture of ancient Rome; 1 course in ancient hist, classical art and archaeology, ancient philosophy, or classical civ; One literature — 6 courses in lit at level 390 or above, with one of those being GREK 403 for the Greek major and LATN 390 for the Latin major; 1 course that covers broadly the literature and/or culture of ancient Greece, and 1 course that covers broadly the literature and/or culture of ancient Rome; 1 course in ancient hist related to lit of major; 1 addtl course in ancient hist, classical art and archaeology, ancient philosophy, or classical civ

Substitution permitted One literature — 2 courses in the other literature numbered 131 or higher for 2 courses in the major literature at 400 level

Senior requirement Two literatures — senior dept exam in hist and translation of Greek and Latin lit; One literature — senior dept exam in hist and translation of major lit

Intensive major Senior essay (CLSS 490, 491 or CLSS 492) in addition to above

REQUIREMENTS OF 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 contemporary societies. Each year, the department offers courses that focus on ways that subsequent ages have used and made sense of classical antiquity. Ancient texts are studied primarily in translation, under the guidance of instructors who have expertise in Greek and Latin.

Candidates for the major complete at least twelve term courses (including the senior essay) 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 one course that covers broadly the literature and/or culture of ancient Greece (CLCV at the 100- or 200-level), and one term course that covers broadly the literature and/or culture of ancient Rome (CLCV at the 100- or 200-level). It is strongly recommended that candidates elect one course each in the general areas of ancient epic, drama, philosophy, Roman civilization, and the classical tradition. Candidates for the major are encouraged to take related courses in other departments.

Credit/D/Fail Courses taken Credit/D/Fail may not be counted toward the requirements of the major.
SENIOR REQUIREMENT

Students research and complete an original research project, usually an essay, under the guidance of a faculty adviser. Students choose either a two-term senior project for two course credits (CLCV 450, 451) or a one-term senior project for one course credit (CLCV 452). Students who elect the one-term senior project need to take one additional course towards the major. A brief prospectus of the project must be submitted to the DUS, preferably at the end of the junior year and in no case later than the end of September of the senior year. The completed project must be submitted to the department no later than December 6 (CLCV 452) or April 18 (CLCV 450, 451 or CLCV 452) of the senior year.

REQUIREMENTS OF THE MAJOR

Prerequisites None

Number of courses 12 term courses (incl a two-term senior essay, or a one-term senior essay and an additional course)

Specific courses required None

Distribution of courses 2 courses in ancient history and/or classical art and archaeology; 2 courses in Greek or Latin, or both, numbered 131 or higher; 2 CLCV courses at the 100- or 200-level, 1 course that covers broadly the literature and/or culture of ancient Greece, and 1 course that covers broadly the literature and/or culture of ancient Rome

Senior requirement Senior project (CLCV 450, 451 or CLCV 452 and an additional course)

REQUIREMENTS OF 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, one of which should be GREK 493; and four term courses, to consist of: one term course that covers broadly the literature and/or culture of ancient Greece (a course with the designation CLCV at the 100- or 200-level), one term course that covers broadly the literature and/or culture of ancient Rome (a course with the designation CLCV at the 100- or 200-level), one term course in ancient Greek history, and 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. 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, MGRK 140), or above.

**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 write a senior essay under the regular guidance of a faculty adviser.

**Credit/D/Fail** Courses taken Credit/D/Fail may not be counted toward the requirements of the major.

**SENIOR REQUIREMENT**

**The standard major** At the end of the senior year the student takes a comprehensive examination in the history of Greek literature and culture.

**The intensive major** Students may write a one-term essay in the fall or spring (CLSS 492), or they may write a two-term essay starting in the fall of their senior year (CLSS 490 and 491). A brief prospectus of the essay must be submitted, preferably at the end of the junior year and in no case later than the end of September of the senior year. The candidate must submit two copies of the senior essay to the DUS no later than December 6 (CLSS 492) or April 18 (CLSS 490, 491, or CLSS 492) of the senior year.

**REQUIREMENTS OF THE MAJOR**

**Prerequisites** None

**Number of courses** 10 term courses

**Specific courses required** GREK 403

**Distribution of courses** 4 term courses in ancient Greek numbered 390 or higher, as indicated; 4 term courses in Greek and Roman history and lit, as indicated; 2 term courses in modern Greek at the intermediate level

**Senior requirement** Senior dept exam

**Intensive major** Senior essay (CLSS 490 and 491 or CLSS 492)

**CERTIFICATES OF ADVANCED LANGUAGE STUDY**

The Classics Department offers a Certificate of Advanced Language Study to non-majors in ancient Greek and in Latin. A certificate adviser, typically the director of undergraduate studies (DUS), advises students on the certification process and certifies to the University Registrar’s Office that students have completed the stated requirements before the end of eight terms of study. The Certificate of Advanced Language Study, once certified, is listed on the student transcript.

**REQUIREMENTS**

Students seeking to earn the certificate are required to take four courses in ancient Greek or Latin beyond the L4 level (four L5 courses; 400-level Greek or 400-level Latin courses), at least two of which must be Yale courses designated as L5. All courses must be taken for a letter grade, and students must achieve a grade of B or above. With the approval of the certificate adviser, one course, conducted in the target language, such as
an independent study course, a graduate seminar, or an advanced seminar may count toward certification requirements.

The adviser may also approve the substitution of up to two credits earned during study abroad and taught in the target language to count toward the certificate requirements. If the adviser approves courses taken outside of Yale for inclusion in the certificate requirements, students must take the necessary steps to ensure those courses appear on their transcripts.

**Credit/D/Fail** No courses taken Credit/D/Fail may be counted toward the requirements of the certificate.

For additional questions or concerns, please contact the DUS in Classics, Andrew Johnston. (andrew.johnston@yale.edu)

**FACULTY OF THE DEPARTMENT OF CLASSICS**

**Professors** Egbert Bakker, Kirk Freudenburg, Milette Gaifman, Verity Harte, Brad Inwood, Christina Kraus, Noel Lenski, Pauline LeVen, Joseph Manning

**Associate Professor** Andrew Johnston

**Assistant Professors** Jessica Lamont, Erika Valdivieso

**Lecturers** Susan Matheson, James Patterson, Timothy Robinson, Joseph Solodow
Cognitive Science

Director of undergraduate studies: Joshua Knobe (joshua.knobe@yale.edu), 102 C, 432-1699; www.yale.edu/cogsci

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, economics, 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.

Prerequisite
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.

Requirements of the Major
The requirements of the major for the B.S. and B.A. degrees are the same, except for the skills requirement and the senior requirement. Fourteen term courses, for a total of thirteen and one half course credits, are required for the major, including the introductory course and the senior requirement. Each major program must include the elements described below. The particular selection of courses must be approved by the director of undergraduate studies (DUS) in order to assure overall coherence. No course may be used to fulfill more than one requirement for the major.

Breadth requirement A breadth requirement introduces students to the subfields of cognitive science. Each major is required to take a course from four of the following six areas:

1. Computer science: CPSC 201
2. Economics and decision making: ECON 159
5. Philosophy: PHIL 126, 182, 269, 270, 271
6. Psychology: PSYC 110, S139E, 140

Depth requirement Students fulfill a depth requirement by completing six courses that focus on a specific topic or area in cognitive science. The depth courses must be chosen from at least two disciplines, and are typically drawn from the six cognitive science subfields. It may be possible to draw depth courses from other fields when necessary to explore the student’s focal topic, in consultation with the DUS. All six depth courses must be at the intermediate or advanced level; for most disciplines, courses numbered
300 or above fulfill the requirement. With permission of the DUS, up to two directed reading or research courses may count toward the depth requirement.

**Skills requirement**  Because formal techniques are fundamental to cognitive science, one skills course is required, preferably prior to the senior year. Courses that fulfill the skills requirement for the B.A. include CPSC 112, 202, LING 224, PSYC 200, and 270, and S&DS 100, 220 and 230. Other courses may fulfill this requirement with permission of the DUS. The skills requirement for the B.S. is fulfilled by PSYC 200 or another course with permission of the DUS.

**Junior colloquium**  In the junior year, students are required to take CGSC 395, a half-credit colloquium in which majors discuss current issues and research in cognitive science and select a senior essay topic.

**Credit/D/Fail**  Courses taken Credit/D/Fail may not be counted toward the requirements of the major, except with permission of the DUS.

**SENIOR REQUIREMENT**

In the senior year, students take CGSC 491, a full-credit capstone course in which the senior essay is written. Students in the course meet regularly with one another and with the faculty to discuss current work in cognitive science and their own developing research projects. Students must take this course during their last spring term at Yale. If spring is not the student’s final term, (e.g., a planned December graduation date), then it is possible to attend the class and complete some of the assignments, but not turn in the finished thesis until November. In this case, a grade of INC will be given for the Spring term. (Unlike other incomplete grades at Yale, an incomplete for a thesis does not expire.)

**B.S. degree program**  The B.S. degree is typically awarded to students who conduct empirical research as part of their senior requirement. This normally includes designing an experiment and collecting and analyzing data.

**B.A. degree program**  The B.A. degree is typically awarded to students who conduct a nonempirical senior essay. There are no restrictions on the research format for the B.A.

**ADVISING AND APPLICATION TO THE MAJOR**

Students may apply to enter the major at any point after the first year. Applications must be made in writing to the DUS. Applications must include (1) an official or unofficial transcript of work at Yale, (2) a brief statement of purpose, which indicates academic interests and expected focus within the areas of the Cognitive Science major, and (3) a list of the six upper-level courses that the student plans to take as part of the research focus. Application forms and answers to frequently asked questions are available on the program website.

**Roadmap**  See visual roadmap of the requirements.

**REQUIREMENTS OF THE MAJOR**

**Prerequisite**  CGSC 110

**Number of courses**  14 term courses, for a total of 13.5 course credits (incl prereq and senior req)

**Specific course required**  CGSC 395
Distribution of courses 1 course each in 4 of 6 subfields, as specified for breadth req; 6 courses in a specific topic or area, as specified for depth req; 1 skills course, as specified

Senior requirement B.S. — empirical research and senior essay in CGSC 491; B.A. — nonempirical senior essay in CGSC 491

FACULTY ASSOCIATED WITH THE PROGRAM IN COGNITIVE SCIENCE

Professors  Woo-kyoung Ahn (Psychology), Stephen Anderson (Emeritus), Amy Arnsten (School of Medicine), Richard Aslin (Haskins Laboratories), John Bargh (Psychology), Paul Bloom (Emeritus) (Psychology), Hal Blumenfeld (School of Medicine), Claire Bowern (Linguistics), Marvin Chun (Psychology), Venecita Dayal (Linguistics), Michael Della Rocca (Philosophy), Ravi Dhar (School of Management), Julie Dorsey (Computer Science), Robert Frank (Linguistics), Shane Frederick (School of Management), David Gelernter (Computer Science), Tamar Gendler (Philosophy), Laurence Horn (Emeritus) (Linguistics), Marcia Johnson (Emeritus), Christine Jolls (Law School), Dan Kahan (Law School), Frank Keil (Psychology, Linguistics), Joshua Knobe (Philosophy), Gregory McCarthy (Psychology), Nathan Novemsky (School of Management, Psychology), Kenneth Pugh (School of Medicine), Ian Quinn (Music), Holly Rushmeier (Computer Science), Laurie Santos (Psychology), Brian Scassellati (Computer Science, Mechanical Engineering), Brian Scholl (Chair) (Psychology), Sun-Joo Shin (Philosophy), Jason Stanley (Philosophy), Zoltán Szabó (Philosophy), Nick Turk-Browne (Psychology), Tom Tyler (Law School), Julie Van Dyke (Haskins Laboratories), Fred Volkmar (School of Medicine), David Watts (Anthropology), Karen Wynn (Emeritus) (Psychology), Gideon Yaffe (Law School), Raffaella Zanuttini (Linguistics), Gal Zauber (School of Management), Steven Zucker (Computer Science, Biomedical Engineering)

Associate Professors Philip Corlett (School of Medicine), Jason Dana (School of Management), Yarrow Dunham (Psychology), Hedy Kober (School of Medicine), James McPartland (Child Study Center), Maria Piñango (Linguistics)

Assistant Professors Ryan Bennett (Linguistics), Steve Chang (Psychology), Philip Corlett (School of Medicine), Julian Jara-Ettinger (Psychology), Julia Leonard (Psychology), Samuel McDougle (Psychology), Al Powers (School of Medicine), Robb Rutledge (Psychology), Marynel Vázquez (Computer Science), Ilker Yildirim (Psychology)

Lecturer Daylian Cain (School of Management)
College Seminars

The Residential College Seminar program is designed to enhance the intellectual life of the residential colleges by offering courses that fall outside typical departmental structures, often taught by instructors whose professional life lies outside the university. Each residential college sponsors one seminar each term, and a defining feature of the program is that undergraduates play a central role in the seminar selection process. Each residential college has a student committee responsible for evaluating seminar proposals and interviewing candidates.

Course descriptions for college seminars for the fall and spring terms can be found in Yale Course Search. The online listings contain course titles, descriptions, and prerequisites. Course syllabuses are available on Canvas @ Yale.

Students apply to college seminars during early registration. Students may apply to no more than two college seminars in a given term and may enroll in no more than one college seminar in a term. Students may not ordinarily enroll in more than four college seminars in their Yale College career. Auditing is not permitted in college seminars.
Comparative Literature

Directors of undergraduate studies: Moira Fradinger (moira.fradinger@yale.edu), 451 College Street, Rm. 213, 432-8267; registrar: Mary Jane Stevens (maryjane.stevens@yale.edu); complit.yale.edu/literature-major

The Comparative Literature major allows students to address fundamental questions about the nature, function, and value of literature in a broadly comparative context. Students read and write about a wide variety of literary works across periods, genres, and national traditions. They investigate ancient and contemporary approaches to literary study, theories and methods of comparison, and the relationship of literature to film and other media. Majors have the freedom to construct a program of study that reflects their intellectual goals. All prospective majors should register with the director of undergraduate studies (DUS), who will work with them to develop a coherent sequence of courses suited to their individual interests.

The Comparative Literature major offers four unique concentrations: Literature and Comparative Cultures; Intensive Language; Film; and Literary Translation. These concentrations share the same core courses. 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 Language and Literature, Film and Media Studies, French, German Studies, Italian Studies, Near Eastern Languages and Civilizations, Portuguese, Russian and other Slavic Languages and Literatures, and Spanish.

Prospective 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. All concentrations of the Comparative Literature major require students to have advanced (L4/L5) competence in at least one foreign language. Students interested in graduate study in comparative literature should be aware that many programs require reading knowledge of two or three foreign languages.

Requirements of the Major

The Comparative Literature major requires twelve term courses, including the senior requirement and two required foundational seminars, one of which must be LITR 130. Beyond the two required courses and the senior essay, the major requires nine term courses, with specific requirements for each concentration. All concentrations require students to take courses in at least one foreign literature; all have a period requirement and a theory requirement. Additionally, prospective majors must have an L5 in the foreign language in which they plan to work (in some cases an L4 is acceptable with DUS advisement).

For the period requirement, students must take at least one course in three of five historical periods: (1) Antiquity; (2) Medieval; (3) Early Modern; (4) 17th–18th centuries; and (5) the Modern period (1800–present). Courses taken from other departments (excluding Directed Studies) may fulfill the period requirement with DUS permission.

For the theory requirement, students must take one course that involves a significant component of literary or cultural theory. Students who wish to know if a course,
particularly those offered in other departments, may count toward this requirement should consult the DUS.

The Literature and Comparative Cultures concentration

Prospective majors electing the Literature and Comparative Cultures concentration must take two required foundational seminars; LITR 130 and one of LITR 140, 143, or 348. Beyond the two required courses and the senior essay, the concentration requires three courses in a foreign literature (see below), three courses that fulfill the period requirement, two elective courses, and one theory course. Period courses, elective courses, and the theory course may be taken in any literature department and may include two courses in a related discipline that has direct bearing on the student's program of study in literature, such as history of art, philosophy, anthropology, music, or theater studies. One of the elective courses may be in creative writing or Directed Studies.

Foreign literature requirement Majors are required to take at least three literature courses in one foreign language. One of these courses may award the language distributional requirement (L5) in an ancient or modern foreign literature, in which the literature is read in the original language. In some cases, the L5 course with which students entered the major can be counted as one of the three foreign literature courses. Two courses can be taken at a basic literature level (normally equivalent to the third year of language study), but at least one course must be taken at an advanced level (normally equivalent to the fourth year of language study or higher).

The Intensive Language concentration

Prospective majors electing this concentration focus their plan of study on two foreign literatures studied in the original language. They must take two required foundational seminars: LITR 130 and LITR 140; three courses in one foreign literature (one of which may be an L5 course); two courses in a second foreign literature (one of which may be an L5 course); three courses that fulfill the period requirement; and one course that involves a significant element of literary or cultural theory. In all five of the foreign literature courses, the literature must be read in the original language.

The Film concentration

Students in the Film concentration focus their plan of study on film and media. They must take two required foundational seminars: LITR 130 and LITR 143 (or equivalent approved by DUS); three courses that fulfill the period requirement; and they must take two foreign literature courses and one course in film theory. They must choose their three electives from courses in Film and Media Studies.

The Literary Translation concentration

Students in the Literary Translation concentration focus on the theory and practice of literary translation. They must take two required foundational seminars: LITR 130 and LITR 348 (or equivalent approved by DUS); three courses that fulfill the period requirement; three courses in one foreign literature (one of which can be an L5 course); one course in literary or cultural theory; and two courses that engage with some aspect of translation studies. The DUS can provide a list of qualifying courses.
Credit/D/Fail A maximum of two courses taken Credit/D/Fail may count toward the major, with permission of the DUS. None of the specific required courses may be taken Credit/D/Fail.

SENIOR REQUIREMENT
For the senior essay, students develop a research topic of their choice and work closely with a faculty adviser, preferably from the department. Normally, the essay makes use of texts in the language of their original composition. Any exceptions must be approved by the DUS. Deadlines for the prospectus, the rough draft, and the completed essay are listed in the course descriptions of the senior essay course (LITR 491, 492, 493).

The senior essay may be written over one term (LITR 491) or over two terms (LITR 492, 493). Students with an especially well-developed project may petition to write a yearlong senior essay. Interested juniors must apply 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 LITR 493 in the spring term. December graduates enroll in LITR 492 in the spring term and complete their essays in LITR 493 during the following fall term. Students planning to begin their essay in the spring term should notify the DUS by the last day of classes in the fall term.

COURSE SUBSTITUTIONS
A literature course taught in English translation is sometimes suitable as a foreign literature course. In such cases, majors are expected to request additional assignments from their instructors that demonstrate they have engaged with the texts in the original language. They should submit the appropriate form, signed by the instructor, attesting to their intent to do so. The registrar or the DUS can provide this form; students should submit it to the DUS along with their course schedule.

Non-native speakers of English who are granted permission by Yale College to complete the language distributional requirement by taking ENGL 114, 115, 120, 121, or 450 may take a total of three English literature courses to fulfill the three foreign literature course requirement, or they may fulfill the major requirements by taking three courses in a third language.

STUDY ABROAD
Comparative Literature majors are encouraged to consider spending a summer, a term, or a year abroad. One course taken through international programs and approved by Yale College may, with permission of the DUS, be applied to the literature requirement.

COURSES WITH ADVANCED LITERATURE INSTRUCTION
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 majors. 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.
Other ancient and modern languages, including those from Africa, South Asia, and the Middle East, may be suitable for the major if a qualified faculty adviser is available to supervise the student.

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<thead>
<tr>
<th>Language</th>
<th>Basic Literature Course</th>
<th>Advanced Literature Course</th>
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<tr>
<td>Arabic</td>
<td>ARBC 150, 151</td>
<td>ARBC 161 or 165</td>
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<tr>
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<td>German</td>
<td>Courses in German numbered 170 or higher</td>
<td>Courses in German numbered 200 or higher</td>
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<td>Ancient Greek</td>
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<td>By arrangement with instructor</td>
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<td>Italian</td>
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<tr>
<td>Latin</td>
<td>LATN 131 or 141</td>
<td>Latin courses numbered 400 or higher</td>
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<tr>
<td>Persian</td>
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<td>PERS 150 and above</td>
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<tr>
<td>Spanish</td>
<td>SPAN 261, 262, 266, or 267</td>
<td>Courses in Spanish numbered 300 or higher</td>
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**REQUIREMENTS OF THE MAJOR**

**Prerequisites**  None

**Number of courses**  12 term courses (incl senior req)

**Specific courses required**  
- All concentrations – LITR 130; Literature and Comparative Cultures – 1 of LITR 140, 143, or 348; Intensive Language – LITR 140; Film – LITR 143 or equivalent; Literary Translation – LITR 348 or equivalent

**Distribution of courses**  
- All concentrations – 3 period courses, as specified; Literature and Comparative Cultures – 3 courses in a foreign lit, as specified, 1 course in literary or cultural theory, 2 elective courses; Intensive Language – 3 courses in one foreign lit, 2 courses in a second foreign lit, 1 course in literary or cultural theory; Film – 2 foreign lit courses, 1 course in film theory; 3 electives in Film and Media Studies; Literary Translation – 3 courses in a foreign lit, as specified, 1 course in literary or cultural theory, 2 courses in translation studies

**Senior requirement**  One-term senior essay (LITR 491); or two-term senior essay (LITR 492 and LITR 493)
FACULTY OF THE DEPARTMENT OF COMPARATIVE LITERATURE

Professors Dudley Andrew, Peter Brooks (*Emeritus*), Rüdiger Campe, Katerina Clark, Roberto González Echevarría, Martin Hägglund, Hannan Hever, Carol Jacobs (*Emeritus*), Pericles Lewis, Rainer Nägele (*Emeritus*), David Quint, Katie Trumpener, Jing Tsu, Jane Tylus, Jesús Velasco

Associate Professors Robyn Creswell, Marta Figlerowicz, Moira Fradinger, Ayesha Ramachandran

Assistant Professor Samuel Hodgkin

Senior Lecturer Peter Cole

Lecturers Jan Hagens, Candace Skorupa, George Syrimis

Computer Science

Director of undergraduate studies: Y. Richard Yang (yang.r.yang@yale.edu), 432-6400, AKW 208A; cpsc.yale.edu

The Department of Computer Science offers both B.S. and B.A. degree programs, as well as four combined majors in cooperation with other departments: Electrical Engineering and Computer Science, Computer Science and Economics, Computer Science and Mathematics, and 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, 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 (CPSC 202), data structures (CPSC 223), systems programming and computer architecture (CPSC 323), and algorithm analysis and design (CPSC 365, or CPSC 366). Together these courses include the material that every major should know.

The core courses are supplemented by electives (and, for the combined 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 (CPSC 490), through which students experience the challenges and rewards of original research under the guidance of a faculty adviser.

Prospective majors are encouraged to discuss their programs with the director of undergraduate studies (DUS) 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. Except for CPSC 200 and CPSC 201, none assumes previous knowledge of computers.

1. CPSC 100 is taught jointly with Harvard University, and teaches students majoring in any subject area how to program a computer and solve problems. No prior programming experience is required. Students with previous programming experience should consider taking CPSC 201 instead. This course satisfies the Quantitative Reasoning distributional requirement.

2. CPSC 112 teaches students majoring in any subject area how to program a computer and solve problems using the language Java. No prior programming experience is required. Students with previous programming experience should consider taking CPSC 201 instead. This course satisfies the Quantitative Reasoning distributional requirement.

3. CPSC 134 provides an introduction to computer music, including musical representations for computing, automated music analysis and composition, interactive systems, and virtual instrument design.

4. CPSC 150 explores how some of the key ideas in computer science have affected philosophy of mind, cognitivism, connectionism, and related areas. This
humanities-style course requires a significant amount of reading and writing a paper, and satisfies the Writing and the Humanities and Arts distributional requirements.

5. CPSC 151 studies the history of the graphical user interface in an attempt to guess its future. This course also satisfies the Writing distributional requirement.

6. CPSC 183 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.

7. CPSC 184 focuses on the evolving and oftentimes vexing intellectual property regime of the new digital age. This course satisfies the Social Science and the Humanities and Arts distributional requirements.

8. CPSC 200, intended as a survey course for nonmajors, focuses on practical applications of computing technology while examining topics including computer hardware, computer software, and related issues such as security and software engineering. This course satisfies the Quantitative Reasoning distributional requirement.

9. CPSC 201 teaches the basic concepts, techniques, and applications of computer science, including systems (computers and their languages) and theory (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.) This course satisfies the Quantitative Reasoning distributional requirement.

10. CPSC 202 presents the formal methods of reasoning and the concepts of discrete mathematics and linear algebra used in computer science and related disciplines. This course satisfies the Quantitative Reasoning distributional requirement.

11. CPSC 210 examines the political challenges wrought by massive increases in the power of computational and communication technologies and the potential for citizens and governments to harness those technologies to solve problems. This course satisfies the Social Science distributional requirement.

Requirements of the Major

The B.S. and the B.A. degree programs have the same required five core courses: CPSC 201; CPSC 202 or MATH 244; CPSC 223; CPSC 323; and CPSC 365 or 366.

B.S. degree program The B.S. degree program requires a total of twelve term courses: the five core courses, six intermediate or advanced courses in Computer Science, and the senior requirement.

B.A. degree program The B.A. degree program requires a total of ten term courses: the five core courses, four intermediate or advanced courses in Computer Science, and the senior requirement.

Combined B.S./M.S. degree 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. General eligibility requirements are described in the Academic Regulations, section L, Special Academic
Arrangements, “Simultaneous Award of the Bachelor’s and Master’s Degrees.” Specific requirements for the combined degree in Computer Science are as follows:

1. Candidates must satisfy the Yale College requirements for the B.S. degree in Computer Science.

2. At the end of their fifth term of enrollment candidates must have earned at least nine of their Computer Science required course credits, which together with three additional Computer Science required course credits, satisfy the requirements for the B.S. in Computer Science. Candidates must also have achieved A grades in at least three quarters of these courses.

3. Candidates must also complete eight graduate courses from the approved list, up to two of which may, with the permission of the DUS 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. All eight graduate courses must be completed in the final four terms of enrollment, and at least six of them must be completed in the final three terms of enrollment.

Credit/D/Fail Courses taken Credit/D/Fail may not be counted toward the major. All courses in the major must be taken for a letter grade.

Roadmap See visual roadmap of the requirements.

SENIOR REQUIREMENT

In the senior year students must take CPSC 490, an independent project course, in which a student selects an adviser to conduct original research with substantial work in a subfield of computer science. With permission of the DUS, students may enroll in 490 more than once or before their senior year.

ADVISING

All Computer Science majors in the sophomore, junior, and senior years should review their programs with their class advisers and the DUS. Students majoring in Computer Science are advised to complete CPSC 201 and 223 by the end of the sophomore year.

Electives

The field of computer science has broadened substantially in the last few decades and the Computer Science department advises its majors to choose intermediate and advanced electives covering the breadth of computer science, including theoretical computer science; computer systems and languages (e.g., operating systems, database, networking, systems security, programming languages); and computer applications (e.g., artificial intelligence, computer graphics, computer vision, natural language processing, robotics).

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 DUS, be counted toward the requirements, but no more than two such courses may be counted toward the B.S., and no more than one toward the B.A.

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, MATH 226, and MATH 120.

**Typical programs** For students who already know how to program, typical B.S. programs starting in the first and sophomore years are indicated below. For typical B.A. programs, two of the electives would be omitted.

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<tr>
<th>First-Year</th>
<th>Sophomore</th>
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<th>Senior</th>
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<tr>
<td>CPSC 201</td>
<td>CPSC 202 and CPSC 323</td>
<td>Two electives</td>
<td>CPSC 490</td>
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<tr>
<td>CPSC 223</td>
<td>CPSC 365 or 366</td>
<td>Two electives</td>
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<th>Sophomore</th>
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<td>CPSC 201</td>
<td>CPSC 323</td>
<td>CPSC 490</td>
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<tr>
<td>CPSC 202</td>
<td>Two electives</td>
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**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; CPSC 323; and CPSC 365 or 366

**Distribution of courses** B.S. — 6 addtl intermediate or advanced Comp Sci courses; B.A. — 4 addtl intermediate or advanced Comp Sci courses

**Substitution permitted** Advanced courses in other depts, with DUS permission

**Senior requirement** Senior project (CPSC 490)

**CERTIFICATE IN PROGRAMMING**

**Certificate in programming advisor:** Theodore Kim, AKW 412; cpsc.yale.edu

The Certificate in Programming prepares students to program computers in support of work in any area of study. While the certificate does not provide the grounding in theory and systems that the computer science majors do, it does provide a short path to programming literacy that can be completed in a span of four terms. Majors in Computer Science, and in the joint programs with Economics, Electrical Engineering, Mathematics, and Psychology, or in Computing and the Arts may not pursue the Certificate.

Refer to the Computer Science website for more information.

**PREREQUISITE**

The prerequisite for the Certificate is an introductory programming course, CPSC 100, 112, S115 or successful completion of an AP Computer Science course.
REQUIREMENTS OF THE CERTIFICATE

Students may not use any of the five required courses, indicated below, to satisfy the requirements of any major, multidisciplinary academic program (MAP), or other certificate. If such a course is required for another program, the student must substitute another course from the same category or a more advanced one for the Programming Certificate. No course taken Credit/D/Fail may be used to satisfy any of the requirements; no course may be used to satisfy more than one of them.

**Programming** One from CPSC 201 or CPSC 200

**Data structures** CPSC 223

**Advanced programming** One from CPSC 327 or CPSC 323

**A programming elective** A CPSC course with CPSC 223 as a listed or implied prerequisite and a primary focus on programming (such as CPSC 424, 437, 439, 446, or 478) or a second course that satisfies the advanced programming requirement

**An applications or algorithms elective** Either a programming in context course that requires significant programming (such as CPSC 334, 335, 376, 431, 432, 474, 477, or LING 380) or a course in algorithms (such as CPSC 365 or 366)

**ADVISING**

Theodore Kim from the Department of Computer Science is the Certificate Coordinator. He advises students pursuing the Certificate. Exceptions to the requirements, other than the substitution of a more advanced course for a required one, are limited.

**REQUIREMENTS**

**Prerequisite** CPSC 100, 112, CPSC S115 or AP Computer Science course

**Number of courses** 5 term courses

**Specific course required** CPSC 201 or 200; CPSC 223; CPSC 327 or 323

**FACULTY OF THE DEPARTMENT OF COMPUTER SCIENCE**

**Professors** Dana Angluin (Emeritus), James Aspnes, *Dirk Bergemann, Julie Dorsey, Joan Feigenbaum, Michael Fischer, David Gelernter, *Mark Gerstein, Drew McDermott (Emeritus), Dragomir Radev, †Vladimir Rokhlin, Holly Rushmeier, Brian Scassellati, Martin Schultz (Emeritus), Zhong Shao (Chair), Avi Silberschatz, †Daniel Spielman, Nisheeth Vishnoi, Y. Richard Yang (DUS), Lin Zhong, †Steven Zucker

**Associate Professors** Abhishek Bhattacharjee, Yang Cai, Theodore Kim, *Smita Krishnaswamy, Charalampos Papamanthou, Ruzica Piskac, Robert Soulé

**Assistant Professors** *Kim Blenman, Yongshan Ding, Benjamin Fisch, Anurag Khandelwal, Marynel Vázquez, Andre Wibisono, Rex Ying

**Senior Research Scientists** Robert Bjornson, Andrew Sherman

**Senior Lecturers** James Glenn, Stephen Slade
Lecturers  Timothy Barron, Andrew Bridy, Ozan Erat, Jay Lim, Dylan McKay, Cody Murphey, Sohee Park, Scott Petersen, Brad Rosen, Inyoung Shin, Alan Weide, Cecillia Xie

*A secondary appointment with primary affiliation in another department or school.

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

For a complete list of Computer Science Department personnel, visit the department website.
Computer Science and Economics

**Director of undergraduate studies:** Philipp Strack (philipp.strack@yale.edu) (Economics), Rm. 27, 30 HLH

Computer Science and Economics (CSEC) is an interdepartmental major for students interested in the theoretical and practical connections between computer science and economics. The B.S. degree in CSEC provides students with foundational knowledge of economics, computation, and data analysis, as well as hands-on experience with empirical analysis of economic data. It prepares students for professional careers that incorporate aspects of both economics and computer science and for academic careers conducting research in the overlap of the two fields. Topics in the overlap include market design, computational finance, economics of online platforms, machine learning, and social media. The CSEC major requires some classes in the intersection between Computer Science and Economics which are not mandatory for either major.

**PREREQUISITES**

Prerequisite to this major is basic understanding of computer programming, discrete math, calculus, microeconomics and macroeconomics. Grades of 4 or 5 on high-school AP computer science, statistics, calculus, microeconomics, and macroeconomics signal adequate preparation for required courses in the CSEC major. For students who have not taken these or equivalent courses in high school, the programming prerequisite may be satisfied with CPSC 100 or CPSC 112; the discrete mathematics prerequisite may be satisfied with CPSC 202 or MATH 244; the calculus prerequisite may be satisfied with MATH 112; the microeconomics prerequisite may be satisfied with ECON 110 or ECON 115; and the macroeconomics prerequisite may be satisfied with ECON 111 or ECON 116. Other courses may suffice, and students should consult the director of undergraduate studies (DUS) and their academic advisers if they are unsure whether they have the prerequisite knowledge for a particular required course.

**REQUIREMENTS OF THE MAJOR**

The B.S. degree program requires successful completion of fourteen term courses (not including courses taken to satisfy prerequisites) and the senior project. Nine of the fourteen courses are listed below; the remaining five courses are electives. With permission of the DUS and the academic adviser, a student may substitute a more advanced course in the same area as a required course. When a substitution is made, the advanced course counts toward the nine required courses and not toward the five electives.

The required courses include CPSC 201; CPSC 223; CPSC 323; CPSC 365 or 366; ECON 121 or 125; two courses in econometrics (ECON 117 and 123 or ECON 135 and 136); ECON 351; one course in the intersection of computer science and economics (e.g., CPSC 455, ECON 417, ECON 433 or CPSC 474) which may not also count as one of the five remaining electives. With permission of the DUS, S&DS 241 and S&DS 242 may be taken instead of ECON 135.

Elective courses are essentially those courses that count as electives in the Computer Science major, the Economics major, or both. ECON 122 and S&DS 365 can count as an elective, ECON 159 can count as an elective. At least two electives must be taken in the Computer Science department, and at least one must be taken in the Economics
department. With the permission of the academic adviser, a student may use as the fourth and/or fifth elective (one or two courses) in related departments that do not usually serve as electives in Computer Science or Economics.

**Credit/D/Fail** Courses taken Credit/D/Fail may not be counted toward the major.

**SENIOR REQUIREMENT**

In the senior year, each student must complete CSEC 491, a one-term independent-project course that explicitly combines both techniques and subject matter from computer science and economics. A project proposal must be approved by the student’s academic adviser and project adviser, and it must be signed by the DUS by the end of the third week of the term.

**Distinction in the Major** Computer Science and Economics majors may earn Distinction in the Major if they receive grades of A or A– in at least three quarters of their courses in the major (not including courses taken to satisfy prerequisites), and their senior-project advisers determine that their senior projects are worthy of distinction.

**ADVISING**

**Approval of course schedules** Students considering the major but not yet declared should arrange to meet with the DUS during the registration period to ensure that their proposed course schedules are appropriate. Similarly, declared majors should meet with their academic advisers to ensure that they are on track to satisfy all of the requirements of the major. Course schedules must be signed by the DUS each term, and they must be approved by an academic adviser before the DUS signs them.

**Transfer credit** Students who take a term abroad or take summer courses outside of Yale may petition the DUS 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 courses taken outside Yale do not meet the standards of the CSEC major; therefore, students should consult with their academic advisers and the DUS before taking such courses. Courses taken outside Yale may not be counted toward the major requirements in intermediate microeconomics, econometrics, or the intersection of computer science and economics.

**REQUIREMENTS OF THE MAJOR**

**Prerequisites** Basic knowledge of programming, discrete math, calculus, microeconomics, and macroeconomics as determined by DUS and academic advisers, as indicated

**Number of courses** 14 term courses (not incl prereqs or senior req)

**Specific courses required** CPSC 201, 223, and 323; CPSC 365 or 366; ECON 121 or 125; ECON 117 and 123 or ECON 135 and 136; ECON 351

**Distribution of courses** 1 course in intersection of CPSC and ECON, as specified; 5 electives as specified

**Substitution permitted** S&DS 241 and 242 may substitute for ECON 135 with DUS permission; a more advanced course in the same area may substitute for a required course with DUS and academic adviser permission

**Senior requirement** CSEC 491
Computer Science and Mathematics

Directors of undergraduate studies: Y. Richard Yang (yang.r.yang@yale.edu) (Computer Science), AKW 208A, 432-6400; Andrew Neitzke (andrew.neitzke@yale.edu) (Mathematics) DL 425; associate director of undergraduate studies: Miki Havlickova (miki.havlickova@yale.edu) (Mathematics), DL 446

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.

REQUIREMENTS OF THE MAJOR

The major requires fourteen term courses as well as a senior project. Six of the fourteen courses must be in computer science: CPSC 201; CPSC 223, 323; and CPSC 365 or 366; one advanced course with significant mathematical content; and one additional advanced course other than CPSC 490. The remaining eight courses must be in mathematics: MATH 120, either MATH 225 or 226, MATH 244, and five additional term courses numbered above MATH 200 other than MATH 470. MATH 222 is not recommended as a substitute for MATH 225 or 226, as it does not provide an introduction to proof writing, which is an essential skill for completing upper level mathematics courses.

Students who completed multivariable calculus during high school may consult the DUSes about replacing MATH 120 with a higher level mathematics course. MATH 230 and MATH 231 may replace (but do not count in addition to) MATH 120 and MATH 225 or 226.

A course must be listed with a MATH number to count toward the mathematics requirements and must be listed with a CPSC number to count toward the computer science requirements—substitutions from other departments are not allowed.

Credit/D/Fail Courses taken Credit/D/Fail may not be counted toward the major.

SENIOR REQUIREMENT

The senior requirement is a project or an essay on a topic acceptable to both departments. Students typically enroll in CPSC 490 or MATH 475. An oral report on the mathematical aspects of the project must be presented to the Mathematics faculty. Permission must be obtained in writing from the director of undergraduate studies (DUS) of both departments before embarking on the project or the essay.

ADVISING

The entire program of each student majoring in Computer Science and Mathematics must be approved by the DUS in each department.

REQUIREMENTS OF THE MAJOR

Prerequisites None

Number of courses 14 term courses, 6 in computer science and 8 in math (not incl senior req)

Specific courses required CPSC 201; CPSC 223, 323; CPSC 365 or 366;
MATH 120; MATH 225 or 226; MATH 244
Distribution of courses: 2 addtl courses in computer science with 1 adv course with significant mathematical content and 1 adv course other than CPSC 490; 5 addtl courses in math numbered above 200 (may not be MATH 470)

Substitution permitted: MATH 230 and MATH 231 for MATH 120 and MATH 225 or 226

Senior requirement: Senior project or senior essay on topic acceptable to Comp Sci and Math depts with written approval from both DUSes; oral report to Math dept on mathematical aspects of the project
Computer Science and Psychology

**Directors of undergraduate studies:** Y. Richard Yang  
(yang.r.yang@yale.edu) (Computer Science); Yarrow Dunham  
(yarrow.dunham@yale.edu) (Psychology)

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.

**PREREQUISITE**

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.

**REQUIREMENTS OF THE MAJOR**

Eight of the fourteen required courses must be in computer science: CPSC 201, 202, 223, 323, and CPSC 365 or 366, and three advanced computer science courses in artificial intelligence (examples of such courses are those in the range CPSC 470–CPSC 477, CPSC 452, 453, and CPSC 481–CPSC 484). CPSC 280 and 490 may not be counted as one of these courses. MATH 244 may substitute for CPSC 202.

The remaining six courses must be in psychology, including PSYC 200; at least one from PSYC 210–299; at least two psychology courses from the social science point of view; and at least two courses from the natural science point of view. At least one of the two psychology courses from both the social science point of view and the natural science point of view must be designated as Core in the course listings. Refer to the Psychology program overview for a listing of courses that fulfill the social science and natural science requirements and a description of courses designated as Core.

With the permission of both directors of undergraduate studies (DUSes), a course in cognitive psychology or cognitive science that is highly relevant to the major and that is not counted as one of the six courses in psychology 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.

**Credit/D/Fail**  
No course in computer science taken Credit/D/Fail may be counted toward the major; no more than one course in psychology taken Credit/D/Fail may be counted toward the major. No 200-level course in psychology taken Credit/D/Fail may be counted.

**SENIOR REQUIREMENT**

Students must take either CPSC 490 or PSYC 499, and the project must be approved by the DUS in each department.

**ADVISING**

The entire program of each student majoring in computer science and psychology must be approved by the DUS in each department.
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, and CPSC 365 or 366; PSYC 200

Distribution of courses  8 courses in CPSC, with 3 advanced AI courses; 6 courses in PSYC, incl PSYC 200; at least 1 additional course from PSYC 210–299; at least 2 from social science point of view and 2 from natural science point of view, with 1 designated Core course from each, as specified

Substitution permitted  With permission of both DUSes, and as specified: MATH 244 for CPSC 202; 1 relevant course in cognitive psychology or cognitive science for 1 course in AI; 1 addtl course in PSYC and exam arranged with instructor for PSYC 200

Senior requirement  CPSC 490 or PSYC 499, with project approved by DUS in each dept
Computing and the Arts

Director of undergraduate studies: Julie Dorsey (julie.dorsey@yale.edu), 508 Watson Hall, 51 Prospect St., 432-4249

Computing and the Arts is an interdepartmental major designed for students who wish to integrate work in computing with work in one of five arts disciplines: architecture, 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; and 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 either CPSC 100 or CPSC 112, which should be taken during the first year. There are two additional prerequisites for the Art track, ART 111 and 114. There are two additional prerequisites for the Theater and Performance Studies track, THST 110 and 111. There are no additional prerequisites for the Architecture track, the History of Art track, or the Music track. There is no required favorable review of studio work for admission to the major in any track, but a sophomore review advising session is required for the Art track.

REQUIREMENTS OF 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 architecture, art, history of art, music, or theater and performance studies. All requirements for a single track must be satisfied, as specified below.

The Architecture track requires the following courses in addition to the Computer Science courses listed above: (1) ARCH 150 and 200; (2) two courses from ARCH 260, 312, 360, and 362; (3) two elective courses from either of the two concentrations: Design; or History, Theory, Criticism of Architecture, and Urbanism; (4) two courses from CPSC 376, 437, 446, 451, 475, 478, 479, or 484; and (5) one additional intermediate or advanced CPSC course (excluding CPSC 490).

The Art track requires the following courses in addition to the Computer Science courses listed above, as well as a sophomore review at the School of Art: (1) two 100-level courses beyond ART 111 and 114, such as ART 132 or 184; (2) two courses in Art
at the 200 or 300 level, such as ART 285 or ART 369; (3) ART 395 or ART 301; (4) one course in Art at the 400 level, such as ART 495; (5) two courses selected from CPSC 376, 437, 446, 451, 475, 478, 479, or 484; (6) one additional intermediate or advanced Computer Science course (excluding CPSC 490). Seniors following the art track will have access to a shared studio and many facilities in the School of Art.

*The History of Art track* requires the following courses in addition to the Computer Science courses listed above: (1) one introductory, 100-level, History of Art course; (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 376, 437, 451, 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 315; (2) five term courses chosen from MUSI 231, MUSI S290, 320, 321, 409, 414, 415, 420, 421, 425, 481, 495; (3) CPSC 431; (4) CPSC 432; (5) one additional intermediate or advanced Computer Science course (excluding CPSC 490).

*The Theater and Performance Studies track* requires the following courses in addition to the prerequisites and Computer Science courses listed above: (1) two courses in the Artistic Practice domain; (2) two courses in the Histories domain; (3) two courses in the Performance Theory domain; (4) CPSC 431 or 432; (5) CPSC 478, 479, or 484; (6) one additional intermediate or advanced Computer Science course (excluding CPSC 490).

**Credit/D/Fail** Courses taken Credit/D/Fail may not be counted toward the major.

**SENIOR REQUIREMENT**

The senior project requires two terms: one term of CPAR 491, and one term of ARCH 491, ART 496, HSAR 499, one from MUSI 496–499, or THST 471 or 491, depending on the track chosen. The project must be approved by the DUS and be acceptable to both departments. Students must submit a written report, including an electronic abstract and webpage(s).

**ADVISING AND APPROVAL OF PROGRAM**

The entire program of each student majoring in Computing and the Arts must be approved by the DUS.

**REQUIREMENTS OF THE MAJOR**

**Prerequisites** All tracks—CPSC 100 or CPSC 112; Art track—ART 111, 114, and sophomore review; Theater and Performance 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; Architecture track
—ARCH 150, 200; 2 courses from ARCH 260, 312, 360, 362; Art track—ART 395 or 301; History of Art track—HSAR 401; Music track—CPSC 431, 432; MUSI 315; Theater and Performance Studies track—CPSC 431 or 432; CPSC 478, 479, or 484
Distribution of courses  *All tracks* — 3 addtl courses in Comp Sci as specified for each track, to incl 1 intermediate or advanced course (excluding CPSC 490); *Architecture track* — 2 courses from the concentrations, as specified; *Art track* — 2 courses in Art at 100 level (excluding prereqs), 2 courses at 200 or 300 level, and 1 at 400 level as specified; *History of Art track* — 1 intro, 100-level course; 2 courses in different areas of History of Art at 200, 300, or 400 level; 1 sem at 400-level in History of Art; 1 studio art course; *Music track* — 5 courses from MUSI 231, MUSI S290, 320, 321, 409, 414, 415, 420, 421, 425, 481, 495; *Theater and Performance Studies track* — 2 courses in each of three domains as specified

Substitution permitted  MATH 244 for CPSC 202

Senior requirement  *All tracks* — Two-term senior project including CPAR 491, approved by DUS; *Architecture track* — ARCH 491; *Art track* — ART 496; *History of Art track* — HSAR 499; *Music track* — one from MUSI 496–499; *Theater and Performance Studies track* — THST 471 or 491
Computing and Linguistics

**Director of undergraduate studies:** Robert Frank (robert.frank@yale.edu)  
(Linguistics); Computing and Linguistics website

The Computing and Linguistics major provides multidisciplinary training in the computational study of human language, the development of systems for natural language processing, and the automated analysis of textual data in applications in the humanities, social sciences, and sciences. Students learn the foundational tools and methods that underlie this work, including areas of computer science, statistics and data science, and linguistics, and apply them to some empirical domain, through coursework and an independent research project in the senior year.

The B.A. in Computing and Linguistics exposes students to the fundamental ideas and foundational techniques of the field, while the B.S. provides more extensive training and engagement in research, preparing students for graduate work in the area.

**PREREQUISITES**

The prerequisites to this major fall in three areas: (1) **statistics**, satisfied through S&DS 100, 101–106, 123, or 220, or comparable background in statistics (e.g., through a score of 5 on the AP Statistics exam) as approved by the director of undergraduate studies (DUS); (2) **programming**, satisfied through CPSC 100 or 112 or comparable programming experience as approved by the DUS; and (3) **linguistics**, satisfied through one 100 level Linguistics course. It is also advisable that students have some background in single-variable calculus, prior to beginning this major.

**REQUIREMENTS OF THE MAJOR**

**B.A. degree program**  The B.A. degree program requires 11 term credits beyond the prerequisites and not including the senior requirement. Core courses, as listed below, are required from the following categories: 2 math core courses; 1 statistics core course (S&DS 238); 2 linguistics core courses; 2 computation core courses; 3 advanced courses; 1 elective, and 1 senior requirement course.

**B.S. degree program**  The B.S. degree program requires 14 term credits beyond the prerequisites and not including the senior requirement. Core courses, as listed below, are required from the following categories: 2 math core courses; 2 statistics core courses; 3 linguistics core courses; 2 computation core courses; 3 advanced courses; 2 electives, and 2 senior requirement courses.

**Math core courses**  Both B.A. and B.S. degree students must take one course in proof-based discrete mathematics (one of MATH 244, LING 224, or CPSC 202) and one course in linear algebra (either MATH 222 or MATH 225).

**Statistics core courses**  These provide foundations in probability and statistical theory. B.A. degree students satisfy this requirement by taking S&DS 238; B.S. degree students choose between two options (1) one of S&DS 240 or S&DS 241, together with S&DS 242; (2) S&DS 238 and either S&DS 230 or any S&DS course numbered 242 or above.

**Linguistics core courses**  These courses, LING 232, 253, and 263, expose students to the nature of linguistic structure and its variability across languages, at the level of sound
(phonology), form (syntax) and meaning (semantics). B.A. degree students must take 2 out of these 3 courses, while B.S. degree students must take all 3.

**Computation core courses** Computational studies of language rest crucially on the foundations of computer science and programming. To this end, both B.A. and B.S. degree students must take CPSC 201 and 223.

**Advanced courses** Both B.A. and B.S. degree students must take 1 advanced course in linguistic structure, either LING 235, 254, or 264; 1 course in natural language processing, either CPSC 477 or LING 227; and 1 course in machine learning, either S&DS 265, 365, or CPSC 481.

**Electives** Elective courses may be used to explore the application of the techniques of computational linguistics across a range of disciplines or to deepen expertise in these techniques. Courses that are pre-approved to satisfy the elective requirement are listed on the Computing and Linguistics major website, but other relevant courses may satisfy this requirement with DUS approval. B.A. degree students take 1 elective course; B.S. degree students take 2 electives.

**Credit/D/Fail** Courses taken Credit/D/Fail may not be counted toward the major (other than as prerequisites).

**SENIOR REQUIREMENT**
All Computing and Linguistics majors enroll in the capstone seminar in the fall of the senior year. This seminar includes discussion of student research, as well as presentations by researchers in the field from both inside and outside of Yale. B.A. degree students complete a senior project as part of this course, working either on an independent project supervised by a Yale faculty member with relevant expertise or as part of a group effort of capstone seminar participants. B.S. degree students enroll in the capstone seminar in the fall and continue work on their senior project in the spring. The senior project of B.S. degree students must involve independent research.

**ADVISING**
Students interested in the Computing and Linguistics major are encouraged to consult with the DUS. Further information about the major and answers to FAQs are available on the Computing and Linguistics website. The entire selection of courses by students in the major must be approved by the DUS.

**REQUIREMENTS OF THE MAJOR**

**Prerequisites**
- **Statistics**: one of S&DS 100, 101-106, 123, or 220 or comparable experience;
- **Programming**: CPSC 100 or 112 or comparable experience;
- **Linguistics**: one 100-level LING course

**Number of courses**
- B.A. — 11 term credits beyond prereqs and not incl senior req; B.S. — 14 term credits beyond prereqs and not including senior req

**Specific courses required**
- For both degrees — 2 computational core course CPSC 201 and CPSC 223; for B.A. degree — S&DS 238

**Distribution of courses**
- Both degrees — 2 math core courses, 1 adv linguistics structure course, 1 adv natural language processing course, 1 adv course in machine learning; B.A. — S&DS 238, 2 linguistics core courses, 1 elective; B.S. — 2 statistics core courses, 3 linguistics core courses, two electives
Substitution permitted  Elective courses in computational linguistics, machine-learning and applications of computational linguistics, as approved by DUS
Senior requirement  Both degrees – Capstone seminar; B.S. – one additional semester of senior project
DeVane Lecture Course

The next DeVane Lecture Course will be offered during the spring 2023 term. Information is pending.
Directed Studies

**Director of undergraduate studies:** Katja Lindskog (katja.lindskog@yale.edu), HQ (320 York St.); Chair of Humanities: Francesco Casetti, HQ (320 York St.); directedstudies.yale.edu

Directed Studies (DS), a selective program for first-year students, is a seminar-based interdisciplinary introduction to influential texts that have shaped many Western traditions and cultures. Spanning works from ancient Greece and the Near East to the present, Directed Studies is a coherent program of study that encourages students to put rich and complex texts into conversation with one another across time and across disciplinary boundaries. Students in Directed Studies learn to analyze challenging and urgent texts, to participate meaningfully in seminar discussions, and to write clear and persuasive analytic essays.

**PREREQUISITES**

Directed Studies has no prerequisites and is designed for students with or without any background in humanities or Western thought, ancient or modern. Students must enroll in the full slate of Directed Studies courses in both semesters of the program. (In order to enroll for the second term, students must have completed the first term’s courses.)

**UNIQUE TO THE PROGRAM**

The Directed Studies program consists of three integrated full-year courses in Literature, Philosophy, and Historical and Political Thought. Approximately ten percent of the first-year class are accepted each year. Students entering the program must enroll in all three courses and are expected to enroll for both semesters. Students participating in DS become members of a close-knit and supportive intellectual cohort that endures well beyond the end of the first year.

Each of the three Directed Studies courses meets weekly for two seminars and one lecture. Seminars have a maximum of fifteen students and provide an opportunity to work closely with Yale faculty. The regular lectures and seminars are complemented by colloquia that feature distinguished speakers from Yale and beyond. Our study of written texts is enhanced by special sessions at the Yale Art Gallery, the Yale Center for British Art, and the Beinecke Rare Book and Manuscript Library.

Directed Studies fulfills a number of Yale College distributional requirements, including the two required course credits in the humanities and arts (HU), the two required course credits in the social sciences (SO), and the two required course credits in writing (WR). Moreover, courses taken in Directed Studies can be counted toward satisfying requirements in a variety of majors. For example, both terms of DS Historical and Political Thought may be counted toward the History major, and one term may be counted toward the major in Political Science; both terms of DS Literature may be counted toward the Comparative Literature major. The program serves as a strong foundation for all majors in Yale College, including many STEM fields, and is an outstanding basis for careers in law, public policy, business, education, the arts, journalism, consulting, engineering, and medicine.
Earth and Planetary Sciences

**Director of undergraduate studies:** Celli Hull (pincelli.hull@yale.edu); earth.yale.edu

The Earth and Planetary Sciences (EPS) program, formerly Geology and Geophysics, prepares students for the application of scientific principles and methods to the understanding of the Earth system and other planets. Subjects range from the history of Earth and life to present-day environmental processes and climate change, the deep interiors of Earth and other planets, tectonic plates, oceans, atmospheres, climates, land surface, natural resources, and biota. The emphasis of the curriculum is on employing basic principles from the core sciences (physics, chemistry, and 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 select a specific track to focus their work on planetary or environmental phenomena of particular interest. The four B.S. tracks emphasize hands-on research experience in fieldwork, in laboratories, or in theoretical analyses and 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. There is also a B.A. track, which is most suitable for students who wish to study Earth and Planetary Sciences as a second major, complementing other majors in, for example, mathematics, economics, physics, biology, or engineering, and who do so in preparation for a career in law, business, government, or environmental fields.

**PREREQUISITES**

With permission of the director of undergraduate studies (DUS), acceleration credits awarded at matriculation for high scores on national or international examinations (such as Advanced Placement 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 DUS, be substituted for prerequisites and for specific required courses. For prerequisites specific for each track, see Requirements of the Major.

**REQUIREMENTS OF THE MAJOR**

**The following course change requirements** may, with DUS approval, be fulfilled by students who declared their major under previous requirements.

**The following course change requirements for the Class of 2025 and subsequent classes** apply for the B.S. degree and the B.A. degree as indicated.

**B.S. degree program** Majors in the B.S. program in Earth and Planetary Sciences 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 earth and planetary sciences. Students may change tracks during their course of study with guidance from the DUS.

1. The Atmosphere, Ocean, and Climate track provides a comprehensive understanding of the atmosphere-ocean-climate system. Topics range from past climate changes, including the ice ages, to present-day atmospheric and ocean circulation, to weather phenomena, to global warming projections. The
prerequisites are CHEM 165 or CHEM 167; PHYS 180, 181 and PHYS 205L, 206L; 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 at least eleven 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 EPS, selected from EPS 100; EPS 101; EPS 110 with 111L; or EPS 125 with 126L. EPS 100 and 101 do not require an accompanying lab. Five core courses, totaling five course credits, introduce students to Earth's climate system (EPS 140), meteorology (EPS 322), physical oceanography (EPS 335), fluid mechanics (MENG 361), and statistics or linear algebra (S&DS 230 or 238 or MATH 222). Other higher-level courses in EPS can be substituted with the permission of the DUS. Four 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 DUS or on the department website. At least one elective must be from EPS.

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 CHEM 165 or CHEM 167 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; or PHYS 180, 181; or PHYS 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 EPS 125 and 126L). The major requirements consist of at least eleven term courses, for at least 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 EPS, selected from EPS 100; EPS 101; EPS 110 with 111L; EPS 125 with 126L; or EPS 140. Four core courses are chosen from Earth's surface processes (EPS 232), the microbiology of surface and near-surface environments (EPS 255), fossil fuels and energy transitions (EPS 274), renewable energies (EPS 275), geochemical principles (EPS 310), geology (EPS 210 or EPS 220 or EPS 312), meteorology (EPS 322), and satellite-based image analysis (EPS 362). Other higher-level courses in EPS can be substituted with the permission of the DUS. Four electives chosen from Earth & Planetary Sciences, 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 DUS or on the department website. Electives may be chosen from the core courses, and at least two must be from EPS.

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), CHEM 165 or CHEM 167, and mathematics through multivariate calculus (MATH 120 or ENAS 151). The major requirements consist of at least twelve term courses, for at least eleven and a half course credits, beyond the prerequisites, including either the senior essay or the senior thesis. Students take one of EPS 100; EPS 101; or EPS 110 with 111L, to gain geological and environmental context, and they also take EPS 125 and 126L as an introduction to the fossil record and evolution. Four core courses are chosen from topics in four of the following areas: in sedimentary processes (EPS 232 or EPS 355), the study of evolution (E&EB 225), vertebrates and vertebrate paleontology (EPS 270 or EPS 325 or EPS 375), invertebrate paleontology (EPS 313), paleoecology (EPS 345), microbiology in past and present environments (EPS 255), Earth's carbon cycle and climate (EPS 310 or 402), and statistical data analysis as applied to the life sciences (S&DS 101 or equivalent). Other higher-level courses in EPS can be substituted with the permission of the DUS. Four electives selected from Earth and Planetary Sciences, 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 DUS or on the department website. At least four of the twelve term courses should be upper level (200 or above) paleontology courses and at least one elective must be from EPS.

4. The Solid Earth Science track emphasizes an integrated geological, geochemical, and geophysical approach to the study of processes operating within Earth and their manifestations 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 of 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 CHEM 165 or CHEM 167, physics (PHYS 170, 171; or PHYS 180, 181; or PHYS 200, 201), and mathematics through multivariate calculus (MATH 120 or ENAS 151). The major requirements consist of at least eleven courses, for at least 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 EPS, selected from EPS 100; EPS 101; EPS 110 with 111L; EPS 125 with 126L; or EPS 140. The core of the track consists of four courses chosen from topics in mountain building and global tectonics (EPS 210 or EPS 212 or EPS 350), rocks and minerals (EPS 220), sedimentary rocks and processes (EPS 232), isotope geochemistry (EPS 310), and structural geology (EPS 312). Other higher-level courses in EPS can be substituted with the permission of the DUS. Students also select four electives in geology, geochemistry, geophysics, or related topics. A list of suggested electives is available from the office of the DUS or on the department website. Electives may be chosen from core courses, and at least two must be from EPS.

B.A. degree program The B.A. degree in Earth and Planetary Sciences requires fewer upper-level courses than the B.S. degree. It may be more appropriate for students who plan to fulfill the requirements of two majors, who study Earth and Planetary Sciences
in preparation for a career in law, business, government, or environmental fields, or
who decide to pursue a science major only after the first year. The prerequisites include
mathematics (MATH 115), biology (BIOL 101 and 102, or MCDB 120, or EPS 255), or
physics (PHYS 170, 171; or PHYS 180, 181; or PHYS 200, 201), and a lecture course
in chemistry. The major requirements consist of at least nine term courses for at least
nine credits, beyond the prerequisites. These include two courses in EPS numbered
100–140, with any accompanying laboratories; courses in natural resources (EPS 274 or
EPS 275) and geochemical processes (EPS 220 or EPS 232 or EPS 261 or EPS 310); and
five additional courses at the 200 level or higher in Earth and Planetary Sciences or
related fields, approved by the DUS and including either the senior essay or the senior
thesis. Course selections can be guided by any of the B.S. tracks described above.

**Credit/D/Fail** Courses taken Credit/D/Fail may not be applied to the prerequisites or
to the requirements of the major.

**SENIOR REQUIREMENT**

Seniors in both degree programs must prepare either a senior essay based on one term
of library, laboratory, or field research (EPS 492) or, with the consent of the faculty, a
two-term senior thesis (EPS 490, EPS 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 DUS for approval of the thesis proposal. The petition
should be submitted by the start of the senior year. If the two-term senior thesis is
elected, EPS 491 may count as an elective toward the major. A copy of each senior thesis
or senior essay is made available on the department website.

**ADVISING**

Qualified juniors and seniors are encouraged to enroll in graduate courses, with
permission of the instructor, the DUS, and the director of graduate studies.
Descriptions of graduate courses are available at the office of the DUS.

**Practical experience** In addition to prerequisites and required courses in Earth and
Planetary Sciences, candidates for the B.A. and B.S. degrees are strongly encouraged
to gain practical experience. 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 Earth and Planetary Sciences, by other
academic institutions, or by certain government agencies and private industries.
Consult the DUS or see the department website for further information.

**Combined B.S./M.S. degree program** 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. See Academic Regulations, section L, Special
Academic Arrangements, “Simultaneous Award of the Bachelor’s and Master’s Degrees.”
Interested students should consult the DUS prior to the sixth term of enrollment for
specific requirements in Earth and Planetary Sciences.

**Physics and Geosciences major** The Department of Earth and Planetary Sciences also
offers a combined major with the Department of Physics. For more information, see
Physics and Geosciences.
REQUIREMENTS OF THE MAJOR

Prerequisites  
B.A. — MATH 115; biology (BIOL 101 and 102, or MCDB 120, or EPS 255) or physics (PHYS 170, 171; or PHYS 180, 181; or PHYS 200, 201); and a lecture course in chem; B.S. — All tracks — CHEM 165 or CHEM 167; MATH 120 or ENAS 151; Atmosphere, Ocean, and Climate track — ENAS 130 or equivalent; ENAS 194; PHYS 180, 181, 205L, 206L; Environmental and Energy Geoscience track — physics (PHYS 170, 171, or PHYS 180, 181, or PHYS 200, 201) or biology (BIOL 101 and 102, or MCDB 120; and BIOL 103 and 104, or E&EB 122, or EPS 125 and EPS 126L); Paleontology and Geobiology track — BIOL 101–104, or MCDB 120 and E&EB 122; Solid Earth Science track — PHYS 170, 171, or PHYS 180, 181, or PHYS 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, Environmental and Energy Geoscience, and Solid Earth Science tracks — at least 11 courses, for 11 credits, beyond prereqs for letter grades (incl senior req); Paleontology and Geobiology track — at least 12 courses, for 11.5 credits, beyond prereqs for letter grades (incl senior req)

Specific core courses  
B.A. — EPS 274 or EPS 275; 1 from EPS 220, 232, 261, or 310; B.S. — Atmosphere, Ocean, and Climate track — EPS 140, 322, 335, MENG 361, S&DS 230 or 238 or MATH 222; Paleontology and Geobiology track — EPS 125, 126L

Distribution of courses  
B.A. — 2 intro courses in EPS, with labs; 5 addtl courses at 200 level or higher in EPS or related fields incl senior req; B.S. tracks — 1 or 2 intro courses in EPS, with labs, as specified; 4 or 5 core courses, as specified; 4 electives, as specified

Substitution permitted  
All programs — with DUS permission, higher-level courses for prereqs or core courses

Senior requirement  
All programs — senior essay (EPS 492) or, with permission of faculty, two-term senior thesis (EPS 490, 491)

FACULTY OF THE DEPARTMENT OF EARTH AND PLANETARY SCIENCES

Professors  
Jay Ague, David Bercovici, Ruth Blake, Mark Brandon, Derek Briggs, David Evans, Alexey Fedorov, Debra Fischer, Jacques Gauthier, Shun-ichiro Karato, Jun Korenaga, Maureen Long (Chair), Jeffrey Park, Peter Raymond, Danny Rye (Emeritus), James Saiers, Ronald Smith (Emeritus), Mary-Louise Timmermans, John Wettlaufer

Associate Professor  
Noah Planavsky

Assistant Professors  
Bhart-Anjun Bhullar, Pincelli Hull, Juan Lora, Alan Rooney, Lidya Tarhan

Lecturer  
Michael Oristaglio
East Asian Languages and Literatures

**Director of undergraduate studies:** Luke Bender, (luke.bender@yale.edu) Humanities Quadrangle (HQ, 320 York St.), Room 111, (203) 432-5823

The major in East Asian Languages and Literatures provides rigorous training in the study of East Asian languages, literatures, cultures, and thought from ancient times through the present, with a strong focus on the reading and analysis of texts, theater, film, and other forms of media. Students select either the Chinese or the Japanese track but are encouraged to take courses in both tracks to become familiar with East Asian literary culture more broadly. The major is excellent preparation for careers including business, law, academia, foreign service, translation, and journalism that demand advanced linguistic proficiency and analytical sophistication. East Asian Languages and Literatures graduates have gone on to careers in law, business, medicine, academia, film, translation, teaching, and diplomacy.

**COURSES FOR NONMAJORS**

All courses offered by the Department of East Asian Languages and Literatures are open to nonmajors.

**COURSE NUMBERING**

Language courses use the subject codes CHNS, JAPN, or KREN. Multiple-titled courses that include CHNS and JAPN subject codes and are numbered 200–299 are taught in English with some sections taught in Chinese or Japanese. Courses with the subject code EALL are content courses whose focus is critical and humanistic; those numbered 200–299 are introductory, and those numbered 300–399 are advanced. Courses numbered EALL 001–099 are First-Year Seminars with topics on East Asian literature, film, and humanities.

**PREREQUISITE**

Candidates for the major must complete CHNS 140 or JAPN 140 or the equivalent.

**PLACEMENT PROCEDURES**

Students who enroll in the department’s language courses 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 before the beginning of the academic year. These exams can be accessed via the department website and must be completed before the end of July. Students of Japanese, Chinese, and Korean who are returning from programs abroad must take a placement examination, unless the coursework was completed at an institution preapproved by the Richard U. Light Fellowship program. For questions, consult with the director of undergraduate studies (DUS).

**REQUIREMENTS OF THE MAJOR**

The major consists of at least eleven term courses beyond the prerequisite. Students must take two terms of advanced modern Chinese (CHNS 150 and 151 or equivalents) or advanced Japanese (JAPN 150 and 151 or equivalents), as well as two terms of literary Chinese or Japanese (CHNS 170 and 171, or JAPN 170 and 171). Students also take a survey course in Chinese, Japanese, or East Asian history and culture, preferably early in their studies. Three courses are required in literature in translation,
taught in English, selected from EALL 200–399; one must be focused primarily on premodern content. These three may include courses on theater and film. In addition, two advanced courses with readings in literary or modern Chinese and/or Japanese are required.

**Credit/D/Fail**
A maximum of one course taken Credit/D/Fail may be counted toward the requirements of the major, with permission of the DUS.

**SENIOR REQUIREMENT**
Students prepare a one-term senior essay in EALL 491 or a yearlong senior essay in EALL 492 and 493. Those who elect a yearlong essay effectively commit to taking twelve term courses in the major, because the second term of the essay may not be substituted for any of the eleven required courses.

**STUDY ABROAD**
Students are encouraged to study abroad. Interested students should consult with the DUS and with the office of the Richard U. Light Fellowship to apply for support for programs in China, Japan, and Korea.

**REQUIREMENTS OF THE MAJOR**

**Prerequisite**
CHNS 140 or JAPN 140 or equivalent

**Number of courses**
11 courses (incl one-term senior essay) or 12 courses (incl yearlong senior essay) beyond prerequisite

**Specific courses required**

- **Chinese track**
  - CHNS 150, 151 or equivalents, and 170, 171

- **Japanese track**
  - JAPN 150, 151 or equivalents, and 170, 171

**Distribution of courses**
1 survey course in Chinese, Japanese, or East Asian hist and culture; 3 courses in lit in translation numbered EALL 200–399, one of them premodern; 2 adv courses with readings in Chinese and/or Japanese

**Senior requirement**
One-term senior essay (EALL 491) or yearlong senior essay (EALL 492, 493)

**CERTIFICATE OF ADVANCED LANGUAGE STUDY**
The Department of East Asian Languages and Literatures offers a Certificate of Advanced Language Study in Chinese, Korean, and Japanese. A certificate adviser, typically the director of undergraduate studies (DUS), advises students on the certification process and certifies to the University Registrar’s Office that students have completed the stated requirements before the end of eight terms of study. The Certificate of Advanced Language Study, once certified, is listed on the student’s transcript.

**REQUIREMENTS**
Students seeking to earn the certificate are required to take four courses beyond the L4 level in their chosen language, at least two of which must be Yale courses designated as L5. All courses must be taken for a letter grade, and students must achieve a grade of B or above. With the approval of the certificate adviser, one advanced non-L5 course, conducted in the target language, such as an independent study course, a graduate seminar, or an advanced seminar may count toward certification requirements.

The certificate adviser may allow one “language across the curriculum” (LxC) course, which ordinarily is an advanced seminar with an additional weekly discussion
section in the target language, to count toward the certification requirements. The certificate adviser may also approve the substitution of up to two credits earned during study abroad and taught in the target language to count toward the certificate requirements. If the adviser approves courses taken outside of Yale for inclusion in the certificate requirements, students must take the necessary steps to ensure those courses appear on their transcript.

**Credit/D/Fail** No courses taken Credit/D/Fail may be counted toward the requirements of the certificate.

**FACULTY OF THE DEPARTMENT OF EAST ASIAN LANGUAGES AND LITERATURES**

**Professors** Aaron Gerow (Chair), Edward Kamens, Tina Lu, Jing Tsu

**Associate Professor** Michael Hunter

**Assistant Professor** Lucas Bender

**Senior Lecturer** Pauline Lin

**Senior Lectors II** Seungja Choi, Angela Lee-Smith, Ninghui Liang, Peisong Xu

**Senior Lectors** Hsiu-hsien Chan, Min Chen, Rongzhen Li, Fan Liu, Kumiko Nakamura, Hiroyo Nishimura, Jianhua Shen, Mari Stever, Wei Su, Chuanmei Sun, Haiwen Wang, Yu-lin Wang Saussy, Mika Yamaguchi, Yongtao Zhang, William Zhou

**Lector** Hyun Sung Lim
East Asian Studies

**Director of undergraduate studies:** Valerie Hansen (valerie.hansen@yale.edu); ceas.yale.edu

In the East Asian Studies major, students focus on a country or an area within East Asia and concentrate 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 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 (DUS).

**PREREQUISITE**

The prerequisite to the major is completion of study at the L2 level of an East Asian language taught at Yale or the equivalent.

**REQUIREMENTS OF THE MAJOR**

Beyond the 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. Areas of concentration include: China, Korea, or Japan. 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. These courses are normally taken at Yale during the academic year, but with prior approval of the DUS the requirement may be fulfilled through successful course work undertaken elsewhere.

**Credit/D/Fail** A maximum of one course taken Credit/D/Fail may be counted toward the requirements of the major, with permission of the DUS.

**Roadmap** See visual roadmap of the requirements.

**SENIOR REQUIREMENT**

During the senior year, all students must satisfy a senior requirement consisting of a major research project that uses Chinese-, Japanese-, or Korean-language materials, reflects an up-to-date understanding of the region, and demonstrates a strong command of written English. This requirement can be met in one of three ways.

1. Students may take a seminar that relates to the country or area of concentration, culminating in a senior thesis. Students who are unable to write a senior essay in a seminar may complete (2) a one-term senior essay in EAST 480 or (3) a one-credit, two-term senior research project in EAST 491, 492 culminating in an essay. The adviser for the senior project should be a faculty member associated with the Council on East Asian Studies with a reading knowledge of the target language materials consulted for the essay.
ADVISING

Selection of courses  Upon entering the major, students are expected to draw up an intellectually coherent sequence of courses in consultation with the DUS. They must consult with the DUS 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 Council on East Asian Studies website.

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 EAST DUS, and the director of graduate studies of the relevant department or the dean or registrar of the professional school.

Combined B.A./M.A. degree program  Exceptionally able and well-prepared students may complete a course of study leading to the simultaneous award of the B.A. and M.A. degrees after eight terms of enrollment. See Academic Regulations, section L, Special Academic Arrangements, “Simultaneous Award of the Bachelor’s and Master’s Degrees.” Interested students should consult the DUS prior to the fifth term of enrollment for specific requirements in East Asian Studies.

REQUIREMENTS OF THE MAJOR

Prerequisite  L2 level of an East Asian lang taught at Yale or the equivalent

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  Senior sem culminating in senior thesis, or one-term senior essay in EAST 480, or one-credit, two-term senior research proj in EAST 491, 492 culminating in an essay

FACULTY ASSOCIATED WITH THE PROGRAM OF EAST ASIAN STUDIES

Professors  Daniel Botsman (History), Fabian Drixler (History), Aaron Gerow (East Asian Languages & Literatures; Film & Media Studies), Valerie Hansen (History), Edward Kamens (East Asian Languages & Literatures), Tina Lu (East Asian Languages & Literatures), Frances Rosenbluth (Political Science), Helen Siu (Anthropology), Chloe Starr (Divinity School), Jing Tsu (East Asian Languages & Literatures; Comparative Literature), Anne Underhill (Anthropology), Arne Westad (Global Affairs; History), Mimi Yiengpruksawan (History of Art)

Associate Professors  William Honeychurch (Anthropology), Michael Hunter (East Asian Languages & Literatures), Hwansoo Kim (Religious Studies), Yukiko Koga (Anthropology)
Assistant Professors Lucas Bender (East Asian Languages & Literatures), Jinyi Chu (Slavic Languages & Literatures), Eric Greene (Religious Studies), Denise Ho (History), Daniel Mattingly (Political Science), Quincy Ngan (History of Art), Hannah Shepherd (History), Emma Zang (Sociology)

Senior Lecturer Pauline Lin (East Asian Languages & Literatures)

Lecturers Allison Bernard, Xuenan Cao, Julia Cross, Philip Gant, Na Sil Heo, Alex Finn Macartney, Kyle Shernuk, Trenton Wilson

Senior Lectors II Seungja Choi, Angela Lee-Smith

Senior Lectors Hsiu-hsien Chan, Min Chen, Rongzhen Li, Ninghui Liang, Fan Liu, Kumiko Nakamura, Hiroyo Nishimura, Yu-lin Wang Saussy, Jianhua Shen, Mari Stever, Wei Su, Chuanmei Sun, Haiwen Wang, Peisong Xu, Mika Yamaguchi, Yongtao Zhang, William Zhou

Lector Hyun Sung Lim
Ecology and Evolutionary Biology

Director of undergraduate studies: Richard Prum (richard.prum@yale.edu); eeb.yale.edu

The Department of Ecology and Evolutionary Biology (E&EB) offers broad education in the biological sciences, covering subject matter that ranges from molecules, cells, and organs through organisms to communities and ecosystems, and the evolutionary processes that shape them. The department offers a B.S. and a B.A. degree. The B.S. program is designed for students planning to pursue graduate study in ecology and evolutionary biology, other biological disciplines, environmental science, or to attend medical, dental, or veterinary school. 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, or for students who are interested in a second major. The two programs share the same prerequisites, introductory courses, and core requirements but differ in their electives and senior requirements.

COURSES FOR NONMAJORS

Several E&EB 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 plants, fish, mammals, birds, and insects or other invertebrates.

CONCENTRATIONS

Students majoring in E&EB select one of two concentrations. The concentration in Biodiversity and the Environment (formerly Track 1) emphasizes courses appropriate for careers in ecology, evolutionary biology, and environmental science. The concentration in Organismal Biology (formerly Track 2) is appropriate for premedical, predental, and preveterinary students, and for students interested in research in physiology, functional morphology, and anatomy. The E&EB major offers opportunities for independent research in both laboratory and field.

PREREQUISITES

The prerequisites for the major are intended to provide core scientific literacy; they include courses in biology, chemistry, physics, and mathematics. Finishing these introductory courses early allows for a more flexible program in later years, but it is not necessary to complete them before declaring the major.

The introductory biology sequence BIOL 101, 102, 103, and 104 is required. Also required are a two-term lecture sequence in general chemistry, CHEM 161, 165 or CHEM 163, 167, with associated laboratories, CHEM 134L and 136L; and one term of organic chemistry, CHEM 174 or 175, or CHEM 220 or 221, with associated laboratories, CHEM 222L or 223L. Optionally, CHEM 174, 175, taken with CHEM 222L, 223L, satisfies both chemistry requirements. Two terms of lecture courses in physics are required, PHYS 170, 171 or higher, and one term of mathematics (MATH 115 or 116) or one term of statistics & data science (S&DS 100 or 230). A
different statistics course approved by the director of undergraduate studies (DUS) may be substituted for the mathematics course.

An online program, ONEXYS for Physics, will be offered in the summer by the Mathematics and Physics departments and by the Poorvu Center for Teaching and Learning, to review math skills needed in preparation for introductory physics courses.

Acceleration credit awarded in chemistry, mathematics, and physics, or completion of advanced courses in those departments, may be accepted in place of the corresponding introductory courses for the E&EB major. Students who have mathematics preparation equivalent to MATH 115 or higher are encouraged to take a statistics course (usually S&DS 101–106) and/or additional mathematics or statistics courses such as MATH 120, 121, MATH 222 or 225 or 226, and S&DS 220 or 230. Because chemistry courses are prerequisite to several E&EB courses, students are strongly urged to take general and organic chemistry in the first and second years. Students who place out of general chemistry should take organic chemistry during their first year.

PLACEMENT PROCEDURES

Students can place out of the introductory biology sequence (BIOL 101, 102, 103, 104) by means of the biology placement examination administered jointly by the biological science departments, E&EB, MB&B, and MCDB, at the beginning of the first year.

Potential E&EB majors are expected to take the mathematics placement test. Those who place above the level of MATH 112 may proceed to introductory courses for the E&EB major; those who place into MATH 112 must take that course first.

For information about placement examinations, refer to the Calendar for the Opening Days of College and the Yale College Dean’s Office website. The Chemistry department arranges placement in chemistry courses.

REQUIREMENTS OF THE MAJOR

B.S. degree program Beyond the prerequisites, the B.S. degree requires three lecture courses and one laboratory, for three and one-half course credits; two electives for two course credits, one of which must be a lecture or a seminar; and the senior requirement. The required courses in the Biodiversity and the Environment concentration are E&EB 220, 225, and a lecture course on organismal diversity usually chosen from E&EB 246–272 or E&EB 280, along with its associated laboratory, or E&EB 226 and 227L. Other lecture courses on organismal diversity, with laboratory, are permitted with approval of the DUS, including MCDB 290 and 291L. Required courses in the Organismal Biology concentration include E&EB 290; E&EB 295 or BENG 350; MCDB 300 or MB&B 300; and E&EB 291L. A second term of organic chemistry and laboratory and up to two terms of physics laboratories are allowed as electives. Most E&EB, 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 Yale School of Medicine. Courses from other science departments as well as Mathematics, Statistics and Data Science, and Computer Science may qualify with permission of the DUS. Residential College Seminars may not be counted toward the requirements of the major.
B.A. degree program Beyond the prerequisites, the B.A. degree requires the same courses as the B.S. degree, except for the two electives for a total of three and one-half course credits (not counting the senior requirement).

Substitutions permitted Organic Chemistry and Organic Chemistry Lab can be substituted for two of the following courses: EPS 210, 212, 220, 310, 312, 319, 322, 335, 342, 428, 456, or any 200-level or higher courses in Mathematics, Applied Mathematics, Applied Physics, Computer Science, Statistics and Data Science, or Engineering and Applied Science.

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 Academic Regulations, section C, Course Credits and Course Loads. Interested sophomores and juniors can take E&EB 469 and E&EB 474. For information on how to become involved in research, see the E&EB Guide to Research and Undergraduate Research Opportunities. For information on fellowships and summer experiences, see the E&EB Guide to Fellowships and Summer Experiences.

Limit on courses taken in the professional schools Undergraduates may apply up to 4 courses taken in the professional schools for credit towards graduation. See Academic Regulations, section L, Special Academic Arrangements for more information.

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 Graduate School online bulletin, and many are posted on the Biological and Biomedical Sciences website. There is no limit on the number of courses students may take in the Graduate School of Arts and Sciences. Additional information is available from the DUS 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.

Credit/D/Fail No course, including prerequisites and introductory courses, taken Credit/D/Fail may be counted toward the E&EB major.

Roadmap See visual roadmap of the requirements.

SENIOR REQUIREMENT

B.S. degree program Students in the B.S. degree program fulfill the senior requirement by completing two terms of original research in E&EB 475 and 476, or in E&EB 495 and 496. Students interested in conducting research before their senior year may do so by taking E&EB 469 or E&EB 474.

B.A. degree program Students in the B.A. degree program fulfill the senior requirement either by completing one term of independent study in E&EB 470 or by writing a senior essay. The senior essay may be related to the subject matter of a course, but the senior 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 DUS and have it signed by the senior essay adviser before the end of the course selection period. Senior essays must be submitted to the DUS by the last day of classes.
ADVISING
First-year students considering a major in Ecology and Evolutionary Biology are invited to consult with the DUS. After the first 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 E&EB website. Students in E&EB should consult one of the advisers assigned to their class (see below). The course schedules of all E&EB majors (including sophomores intending to major in E&EB) must be reviewed by a faculty member in E&EB; the signature of the DUS is not required, but is valid for any student. Students whose regular adviser is on leave can consult the DUS to arrange for an alternate.

Class of 2023: Martha Munoz and Marta Wells
Class of 2024: Walter Jetz and Richard Prum
Class of 2025: Casey Dunn and Carla Staver
Class of 2026: Erika Edwards and David Vasseur

Peer Mentors provide a helpful student perspective to navigating the major and the department. You are encouraged to contact them.

YEEBUG is an undergraduate group of Yale’s Ecology and Evolutionary Biology majors. The student members organize social events and panels, lead field trips, and represent the group at bazaars and academic fairs.

STUDY ABROAD
Participation in study abroad field programs is encouraged. The Organization for Tropical Studies (OTS) and the School for Field Studies (SFS) provide specific opportunities for study of tropical and conservation biology. Credit for such programs may apply toward the major; interested students should consult the DUS prior to going abroad.

REQUIREMENTS OF THE MAJOR

Prerequisites
Introductory biology sequence (BIOL 101, 102, 103, 104); 2-term general chemistry lecture sequence (CHEM 161, 165 or CHEM 163, 167) with labs (CHEM 134L, 136L); 1 term of organic chemistry (CHEM 174 or 175, or CHEM 220 or 221) with labs (CHEM 222L or 223L); alternatively, CHEM 174, 175 taken with CHEM 222L, 223L satisfies both chemistry requirements; 2 terms of lecture courses in physics (PHYS 170, 171 or higher); 1 term of MATH 115, MATH 116, S&DS 100 or S&DS 230

Number of courses
B.S. — 5½ course credits beyond prereqs (not incl senior req); B.A. — 3½ course credits beyond prereqs (not incl senior req)

Specific courses required
For both the B.A. and the B.S. degrees in Biodiversity and the Environment — E&EB 220, 225; 1 from E&EB 246–272 or E&EB 280 with associated lab, or E&EB 326 and 327L; Organismal Biology — E&EB 290; E&EB 295 or BENG 350; MCDB 300 or MB&B 300; and E&EB 291L

Distribution of courses
Additionally for the B.S. — 2 electives as specified

Substitutions permitted
With DUS permission, other higher-level math or stat course for math or stat intro course requirement; two upper-level courses in EPS, MATH, AMTH, APHY, CPSC, S&DS, or ENAS for organic chemistry and lab; MCDB
lecture/lab courses on organismal diversity for E&EB lecture/lab; a second term of organic chemistry and lab and two physics labs may count as electives

**Senior requirement** B.S. – two terms of E&EB 475 and 476, or E&EB 495 and 496; B.A. – E&EB 470 or senior essay

**FACULTY OF THE DEPARTMENT OF ECOLOGY AND EVOLUTIONARY BIOLOGY**

**Professors** †Richard Bribiescas, †Nicholas Christakis, Michael Donoghue, Casey Dunn, Erika Edwards, †Vivian Irish, Walter Jetz, Thomas Near (Chair), David Post, Jeffrey Powell, Richard Prum, †Eric Sargis, †Oswald Schmitz, †David Skelly, Stephen Stearns, †Jeffrey Townsend, Paul Turner, †J. Rimas Vaišnys, Günter Wagner

**Associate Professors** †Craig Brodersen, †Liza Comita, †Forrest Crawford, †James Noonan, Carla Starver, †Alison Sweeney, David Vasseur

**Assistant Professors** Martha Munoz, Alvaro Sanchez

**Senior Lecturer** Marta Martínez Wells

**Lecturers** Adalgisa Caccone, Linda Puth

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

**Director of undergraduate studies:** Giovanni Maggi (giovanni.maggi@yale.edu), 115 Prospect St., Rosenkranz Hall, Room 334; 432-3574; economics undergraduate registrar (marleen.cullen@yale.edu); economics.yale.edu/undergraduate-program

Economics is much broader than the study of recessions and inflation or stocks and bonds. Economists study decision making and incentives such as how taxes create incentives for labor market and savings behavior. Many current public policy debates concern questions of economics, including causes and consequences of inequality and gender and racial wage gaps; how to address poverty; the impact of immigration and trade on the well-being of a country’s citizens; the cause of the Great Recession; and how to predict future downturns.

Those with economics training find employment in government agencies, nonprofits, and, of course, economic consulting and investment banking. In addition to pursuing advanced degrees in economics, economics majors also go on to do graduate work in law, medicine, and business.

**INTRODUCTORY COURSES**

Introductory courses in microeconomics, macroeconomics, and data analysis and econometrics serve students considering a major in Economics, as well as others who seek an introduction to the subject. 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. ECON 117 introduces students to basic aspects of working with data to answer economic questions, as well as to the fundamentals of statistical analysis. ECON 116 and 117 have microeconomics as a prerequisite. Despite the numbering, students may wish to take ECON 117 before or concurrently with ECON 116, as the data skills taught in ECON 117 may be helpful in ECON 116.

ECON 115, 116, and 117 are lecture courses with accompanying discussion sections. First-year students and sophomores looking for smaller, slightly more discussion-oriented versions of introductory microeconomics and macroeconomics may enter a lottery for admission to ECON 110 and 111. Those with little or no experience in calculus may be better served by ECON 108, which covers microeconomics with greater discussion of quantitative methods and examples. ECON 108, 110, and 115 are similar in substance; ECON 111 and 116 are similar in substance 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 at least two introductory economics courses in the first year. In order to make the introductory courses available to all first-year students and to students majoring in other subjects, the introductory courses do not have a mathematics requirement.

**PLACEMENT AND EXEMPTIONS FOR INTRODUCTORY COURSES**

In the summer before they enter, all first-year students receive, through the University’s electronic bulletin board, a personalized recommendation for a first course in economics, based on application data and AP (or equivalent) exam
scores. In general, students who receive a score of 5 on the Microeconomics or Macroeconomics AP exam and a score of 5 on the AP Calculus BC exam are allowed to place out of the corresponding introductory course and instead enroll in intermediate-level courses (ECON 121 or 125 for microeconomics, ECON 122 or 126 for macroeconomics). Students who have the requisite AP Economics score but not the corresponding AP Calculus score may take a calculus course (e.g. MATH 112, MATH 115, MATH 116, MATH 118, MATH 120 or ENAS 151) and then place out of the corresponding introductory economics course. Students may substitute a score of 7 on the International Baccalaureate higher-level Economics examination or A on the GCE A-level Economics examination for AP test scores of 5 in economics. In addition, a score of 7 on the International Baccalaureate higher-level Mathematics examination or A on the GCE A-level Mathematics examination may be substituted for a qualifying AP Calculus score.

Placing out of introductory courses does not decrease the number of courses required to complete the economics major. Students must substitute courses from which they place out of with higher-level courses.

Because of its emphasis on data analysis, the department recommends that even students with a background in statistics begin their econometrics and data analysis training with ECON 117.

REQUIREMENTS OF THE MAJOR
Students majoring in Economics are required to take twelve term courses. Two of these courses are introductory microeconomics and introductory macroeconomics. All majors must also take the following courses: one term of intermediate microeconomics (ECON 121 or 125) and one term of intermediate macroeconomics (ECON 122 or 126); a course in data analysis and econometrics, generally ECON 117; and one Yale mathematics course. See below for details about the math requirement. The department recommends that students also take ECON 123, a course in econometrics and data analysis at the intermediate level. All of the aforementioned required courses should be completed prior to the senior year. Students who wish to write a senior essay are also required to complete a second semester of econometrics either before or concurrently with writing the senior essay; at least one of the two econometrics courses should include work in data analysis. All majors must also take two courses numbered ECON 400–492, at least one of which must be taken in the senior year.

Subject to approval by the director of undergraduate studies (DUS), students may count toward the major one course related to economics but taught in another field, in addition to the required course in mathematics.

Mathematics Students are advised to meet the mathematics requirement for the major during their first year. To fulfill the requirement, the department recommends that majors take MATH 118 or MATH 120 (or higher). Also acceptable, but less preferred, are MATH 112, 115, 116, ENAS 151, or MATH 110 and 111. Students who intend to pursue a graduate degree in economics should take additional math courses, including linear algebra (MATH 222 or even better, a proof-based course such as MATH 225 or 226) and real analysis (MATH 255 or 256 or 300 or 301).

Data analysis and econometrics Students are strongly advised to take a two-term sequence of data analysis and econometrics courses, especially if they are interested...
in a research experience on or off campus. The statistical analysis of economic data has become central to the work of economists, and the ability to analyze large data sets is a skill that will serve students in the job market both inside and outside of academia. Most students should take ECON 117, followed by 123. Students with a stronger mathematics background, who prefer a more theoretical treatment of the material or who plan to pursue a graduate degree in economics, are encouraged to take either ECON 135 or S&DS 241 and S&DS 242, followed by ECON 136. (Note: S&DS 241 and 242 together count as one course towards the economics major. Further note that neither ECON 135 nor S&DS 241 and 242 fulfill the major’s requirement of one econometrics course as they are courses in probability and statistics that are prerequisites for ECON 136, a course in econometrics. However, either ECON 117 or ECON 123 fulfills the econometrics requirement.) Prospective majors are urged to start their econometrics sequence by the fall of sophomore year.

Intermediate microeconomics and macroeconomics Two course options are available in both microeconomics and macroeconomics. The standard intermediate courses are ECON 121 and 122. Students with a stronger mathematics background who are interested in a more theoretical treatment of the material 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; ECON 121 is not required for 122.

Field courses The department offers a wide selection of upper-level courses in a variety of fields, such as theoretical and mathematical economics, market organization, human resources, finance, international trade, development economics, public finance, health economics, labor economics, inequality, environmental economics, and economic history. These courses are numbered ECON 159 and above. Some field courses have no prerequisites or 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. Note: ECON 001 and 002 are not considered field courses and cannot be counted toward the requirements of the major.

Advanced lecture courses Advanced lecture courses, generally numbered ECON 400–449, are limited-enrollment courses that cover relatively advanced material in more depth than regular field courses. Prerequisites usually include several courses in intermediate microeconomics, intermediate macroeconomics, and econometrics, or a mathematics course such as MATH 120. While these courses vary in approach, they share features of other Economics courses: like field courses, they devote some time to traditional lecturing, and like seminars, they emphasize class interaction, the writing of papers, and the reading of journal articles. Advanced lecture courses may be applied toward the senior requirement.

Seminars Although there is diversity in approaches in the various seminars (courses generally 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. Seminars may be applied toward the senior requirement.

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 enter preference selection before the registration period for these courses; see the department website for instructions. Other majors and nonmajors may enroll in Economics seminars and advanced lecture courses as space permits, but they may not enter preference selection.

**Distinction in the Major** To be considered for Distinction, students must meet the appropriate grade standards as described in this bulletin under Honors and submit a senior essay to the Economics department. Only those majors who submit a senior essay earning a grade of A or A– are eligible for Distinction. Students who fail to submit an essay will not be considered for Distinction. Grade computation for Distinction does not include the introductory micro- and macroeconomics courses, the required mathematics course, or courses taken outside Yale. Economics courses taken beyond the requirements of the major are counted toward the Distinction calculation.

**Credit/D/Fail** Courses taken Credit/D/Fail and Residential College Seminars may not be counted toward the requirements of the major.

**Roadmap** See visual roadmap of the requirements.

**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 taking Yale Economics courses.

**Senior essay** There are four types of senior essays: (1) 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); (2) students may write a two-term essay starting in the fall and continued into the spring 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 ECON 492); (3) students may write a one-term essay in an advanced departmental course (numbered 400–489) taken during the fall term of the senior year; or (4) students may write a two-term essay beginning in an advanced departmental course (numbered 400–489) taken during the fall term, and completed in the spring of the senior year as an independent project under the close and regular supervision of a faculty adviser (ECON 492). Under this final option the instructor of the advanced departmental course taken in the fall term typically serves as the faculty adviser for the full academic year.

Note that the essay 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. Late essays will not be accepted without a dean’s note.

Students are required to complete a second semester of econometrics either before or concurrently with writing the senior essay; at least one of the two econometrics courses should include work in data analysis.

Only those majors who submit a senior essay earning a grade of A or A– are eligible for Distinction in the Major.

Meetings for seniors to discuss the senior essay guidelines and requirements will be held just before the start of the academic year. Time and format are to be announced.
Senior essay prospectus forms are due Monday, October 3, 2022. Students who fail to turn in a prospectus with adviser’s signature by that date will not be permitted to write a senior essay.

ADVISING

The Economics department has faculty representatives/advisers for each residential college. Students majoring in economics should consult with an economics adviser for their college during course enrollment. Questions concerning the major or programs of study may also be directed to the college representative. College representatives can be found on the department website.

Transfer credits Students who take a term abroad or take summer courses outside of Yale may petition the DUS 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 DUS before taking such courses. Courses taken outside of Yale’s Economics department may not be counted toward the major requirements in introductory microeconomics, introductory macroeconomics, intermediate microeconomics, intermediate macroeconomics, econometrics, mathematics, or the senior requirement. See the department website section on transferring credits.

Graduate courses Well-qualified students who have acquired the requisite background in undergraduate courses may, with written permission of the instructor, the DUS, and the director of graduate studies, be admitted to graduate courses and seminars. Descriptions of courses are available on the department website.

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, linear algebra, and real analysis. Please see the department website on Ph.D. program preparation. Students are urged to discuss their plans for graduate work with the DUS as early in their college careers as possible.

REQUIREMENTS OF THE MAJOR

Prerequisites None

Number of courses 12 term courses (incl senior req)

Distribution of courses 2 intro courses, 1 in microeconomics and 1 in macroeconomics;
3 intermediate courses to include micro ECON 121 or 125, intermediate macro ECON 122 or 126, and a course in data analysis and econometrics such as ECON 117; 1 math course; 4 electives (one of which may be a second semester of econometrics)

Substitution permitted 1 related course in another dept, with DUS approval

Senior requirement 2 senior seminar/lectures, numbered ECON 400–491, at least 1 in senior year, as indicated

FACULTY OF THE DEPARTMENT OF ECONOMICS

Professors Joseph Altonji, Donald Andrews, Costas Arkolakis, Orazio Attanasio, Dirk Bergemann, Steven Berry, Xiaohong Chen, Ray Fair, John Geanakoplos, Pinelopi Goldberg, Timothy Guinnane, Philip Haile, Marina Halac, Johannes Horner, Gerald
Jaynes, Yuichi Kitamura, Alvin Klevorick, Samuel Kortum, Naomi Lamoreaux, 
Giovanni Maggi, Konstantinos Meghir, Giuseppe Moscarini, Kaivan Munshi, William 
Nordhaus, Gerard Padró i Miquel, Rohini Pande, Benjamin Polak, Mark Rosenzweig, 
Larry Samuelson, Anna Sanktjohanser, Katja Seim, Robert Shiller, Anthony Smith, 
Aleh Tsyvinski, Edward Vytlacil, Ebonya Washington, Fabrizio Zilibotti

**Associate Professors**  Mitsuru Igami, Ilse Lindenlaub, Michael Peters, Philipp Strack

**Assistant Professors**  Eduardo Dávila, Jose-Antonio Espin-Sanchez, Mira Frick, 
Charles Hodgson, John Eric Humphries, Zhen Huo, Ryota Iijima, Yusuke Narita, 
Cormac O’Dea, Nicholas Ryan, Anna Sanktjohanser

**Senior Lecturers**  Marnix Amand, Michael Boozer, Evangelia Chalioti, William 
Hawkins, Tolga Koker, Guillermo Noguera, Soenje Reiche, María Saez Martí, Rebecca 
Toseland

**Lecturers**  Jaime Arellano-Bover, Daniela Morar, Katerina Simons
Economics and Mathematics

Directors of undergraduate studies: Giovanni Maggi (giovanni.maggi@yale.edu) (Economics), 115 Prospect St., Rosenkranz Hall, Rm. 334; Andrew Neitzke (andrew.neitzke@yale.edu) (Mathematics), DL 425; associate director of undergraduate studies: Miki Havlickova (miki.havlickova@yale.edu) (Mathematics), DL 446

The Economics and Mathematics major is intended for students with a strong 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 (DUSes), 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 numbered above 200 (except MATH 470). These courses must include:

1. One intermediate microeconomics course (ECON 125 is preferred, but ECON 121 is also acceptable) and one intermediate macroeconomics course (ECON 126 is preferred, but ECON 122 is also acceptable).
2. A year of mathematical economics, ECON 351 and one of ECON 350, 417, or 433.
3. Two courses in econometrics, ECON 135 and 136. With permission of the DUS in Economics, S&DS 241 and 242 may be taken instead of ECON 135, in which case they count as one economics course and not as mathematics courses. Neither S&DS 241 nor 242 can be counted toward the major in parallel to ECON 135.
4. **Students in the Class of 2025 and beyond** must complete linear algebra (MATH 225 or 226) and real analysis (MATH 255 or 256). MATH 222 is not recommended as a substitute for MATH 225 or 226, as it does not provide an introduction to proof writing, which is an essential skill for MATH 255 and 256. **Students in the Class of 2024 and previous classes**, may use MATH 300, 301, or 305 to fulfill the real analysis requirement (in place of MATH 255 or MATH 256). They may also use MATH 231 to fulfill the linear algebra requirement (in place of MATH 225 or 226).

A course must be listed with a MATH number to count toward the mathematics requirements — substitutions from other departments are not permitted.

Distinction in the Major To be considered for Distinction in the Major, students must meet minimum grade standards, as specified under "Honors" in The Undergraduate Curriculum, and submit a senior essay in Economics that earns a grade of A or A−. One-term essays may be written in either an Economics department senior seminar or in ECON 491. Two-term senior essays may be written in either an Economics senior
seminar and ECON 492 or in ECON 491 and 492. (The paper must be written in a course or courses taken in the senior year.) For details see Economics. All courses beyond the introductory level in Mathematics and Economics are counted in the computation of grades for Distinction.

**Credit/D/Fail** Courses taken Credit/D/Fail may not be counted toward the requirements of the major.

**SENIOR REQUIREMENT**
Students must take the senior seminar in mathematics, MATH 480 or 481. A senior essay in Economics is optional.

**ADVISING**
Students interested in the major should consult both DUSes, and verify with each that their proposed program meets the relevant guidelines. Registration forms must be signed by both DUSes each term.

**REQUIREMENTS OF THE MAJOR**

**Prerequisites** MATH 120; ECON 110 or 115; ECON 111 or 116

**Number of courses** 12 term courses beyond prerequisites (incl senior req)

**Distribution of courses** 7 courses in econ and 5 in math

**Specific courses required** ECON 121 or 125; ECON 122 or 126; ECON 135; ECON 136;
ECON 350, 417, or 433; ECON 351; MATH 225 or MATH 226; MATH 255 or MATH 256, as specified

**Substitution permitted** S&DS 241 and 242 for ECON 135, with permission of Economics DUS; MATH 300, 301, or 305 may be substituted for MATH 255 or MATH 256. MATH 231 may be used to fulfill the linear algebra requirement, replacing MATH 225 or 226

**Senior requirement** Senior sem in math (MATH 480 or MATH 481); optional senior essay in economics
Education Studies

Executive director: Mira Debs (mira.debs@yale.edu), Rm 408, 493 College St., 432-4631; https://educationstudies.yale.edu/, Program FAQ

Students seeking to engage with Education Studies can pursue one of two pathways alongside their major: the Multidisciplinary Academic Program (MAP), with a focus on research and learning with a cohort of Yale students, or the uncapped Education Studies Certificate.

Any Yale College student interested in education studies may take the introductory survey course, EDST 110, Foundations in Education Studies. This lecture course explores the historical, social, philosophical, and theoretical underpinnings of the field and helps students to understand the critical role of education in society through research, policy, and practice.

EDUCATION STUDIES MULTIDISCIPLINARY ACADEMIC PROGRAM

The Education Studies Multidisciplinary Academic Program (MAP) in Yale College provides a structure for students interested in the research, policy, and practice of education. By virtue of studying education at Yale, students engage in the interdisciplinary study of a primary institution impacting citizenship, governance, social reproduction, child development, and social inequality. Yale courses across the disciplines address these varying aspects of education through two area categories: (1) social contexts and policy and (2) individuals and society.

In the fall of the sophomore year, students who have successfully completed or are currently enrolled in EDST 110 may apply to become a Yale Education Studies Scholar alongside their major course of study. Selected students join a cohort of twenty-five undergraduate peers who study education together over two-and-a-half years through coursework and other events. They are closely guided by faculty, peers, and alumni towards educational opportunities tailored to their individual interests. Education Studies Scholars also gain practical field experience through an appropriate academic-year educational opportunity or summer field experience.

To fulfill the requirements of the program, students must complete six courses including EDST 110, EDST 261; a field experience; two or three electives (depending on senior requirement), with at least one elective in each area category; and one or two senior capstone courses including EDST 400 alone or in combination with EDST 410 or 490. Two of the six courses may overlap with the student’s major. Graduate and professional school courses may count, with approval from the Education Studies director. For a listing of courses in the area categories, see the Education Studies website. You may also search for approved courses in Yale Course Search by searching for the following attributes: EDST: Social Context and EDST: Indv Society.

Transcripts will have notation indicating successful completion of the MAP. Students may not earn both the Education Studies MAP and the Education Studies Certificate.

REQUIREMENTS OF THE MULTIDISCIPLINARY ACADEMIC PROGRAM

Prerequisite EDST 110
Number of courses 6 courses (incl prereq, EDST 261 and senior req)
Distribution of courses 2 or 3 electives (depending on senior req) with at least one elective in each area category

Other requirement Field experience as described on the EDST website

Senior requirement EDST 400 alone or in combination with EDST 410 or 490

CERTIFICATE IN EDUCATION STUDIES

Certificate director: Mira Debs (mira.debs@yale.edu), Rm 408, 493 College St., 432-4631; https://educationstudies.yale.edu/

This certificate, available to all interested Yale Students, provides the opportunity for students to pursue an interdisciplinary study of education to complement their major. Education is a primary institution impacting citizenship, governance, social reproduction, child development, and social inequality. Yale courses across the disciplines address these varying aspects of education through two area categories: (1) social contexts and policy and (2) individuals and society.

To earn the certificate, students must take the prerequisite EDST 110, one course in each of the two area categories, and two electives. No more than two course credits may overlap in the fulfillment of the requirements of the Education Studies certificate or of a major, a simultaneous degree, a multidisciplinary academic program, or another certificate. Additionally, no course credit may be applied toward the requirements of more than two curricular programs. For example, the same course credit may not be used to fulfill the requirements of two certificates and a major. Graduate and professional school courses may count, with approval from the certificate director.

For a listing of courses in the area categories, see the Education Studies Courses webpage. You may also search for approved courses in Yale Course Search by searching for the following attributes: EDST: Social Context and EDST: Indv Society.

Completion Procedure and Advising Once students are enrolled in the prerequisite EDST 110, they can register for the Education Studies Certificate. Students may do so as early as their first year. The declaration form must be submitted no later than the due date for course schedules in the student’s final term of enrollment. Transcripts will have notation indicating successful completion of the certificate. Students may not earn both the Education Studies MAP and the Education Studies Certificate.

REQUIREMENTS OF THE CERTIFICATE

Number of courses 5 term courses

Specific course required EDST 110

Distribution of courses one course credit each of two area categories: (1) social contexts and policy, and (2) individuals and society; 2 EDST electives
Electrical Engineering

**Director of undergraduate studies:** Fengnian Xia  
(fengnian.xia@yale.edu); seas.yale.edu/departments/electrical-engineering

Electrical Engineering broadly encompasses disciplines such as microelectronics, photonics, computer engineering, signal processing, control systems, and communications. Three electrical engineering degree programs are offered, as well as a joint degree between the electrical engineering and computer science departments.

1. The **B.S. in Electrical Engineering**, accredited by the Engineering Accreditation Commission of ABET, Inc., is the flagship degree program and is the most challenging program in electrical engineering. This program is appropriate for highly motivated students who are interested in entering the engineering profession, and who wish for a flexible enough program to consider a variety of other career paths.

Upon graduation, Yale’s B.S. Electrical Engineering (ABET) students are expected to achieve “student outcomes” as defined by ABET and the program. The Electrical Engineering major produces graduates who demonstrate: (1) an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics; (2) an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors; (3) an ability to communicate effectively with a range of audiences; (4) an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts; (5) an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives; (6) an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions; (7) an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

2. The **B.S. in Engineering Sciences (Electrical)** provides similar technical exposure and equivalent rigor as the ABET program, while retaining the flexibility for students to take a broader range of courses than those mandated by the ABET curriculum. The B.S. in Engineering Sciences (Electrical) is suitable for careers in technology and is a popular choice for those choosing academic, industrial, or entrepreneurial career paths.

3. The **B.A. in Engineering Sciences (Electrical)** is suitable for careers outside of technology, including managerial, financial, and entrepreneurial career options.

4. The fourth program is a joint **B.S. in Electrical Engineering and Computer Science**, which offers a unique blend of electrical engineering and computer science courses that retains the rigor of both fields. This degree is a popular choice for those interested in information technology careers.

The program’s educational objectives prepare students for four potential paths. An academic path qualifies graduates to enter a top-tier graduate program conducting research with broad applications or significant consequences, and eventually to teach at an academic or research institution. Graduates following an industrial path can enter
a technical path or a managerial path. An entrepreneurial path allows graduates to bring broad knowledge to a startup company, which can deliver a product or service that meets societal needs. Graduates who elect a nontraditional engineering path might complete a professional program in business, law, or medicine, for which their engineering knowledge will be valuable.

**PREREQUISITES**

All three engineering degree programs require MATH 112 and MATH 115 if applicable, ENAS 151 or MATH 120 or higher, ENAS 130 (CPSC 100 and 112 do not fulfill this requirement), 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 222, MATH 225, MATH 226, MATH 255, or MATH 256. 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 are asked to take a more advanced programming course instead, such as CPSC 201; consult with the director of undergraduate studies (DUS).

For students in the Class of 2023 and subsequent classes, prerequisites taken Credit/D/Fail may not be counted toward the requirements of the major.

**REQUIREMENTS OF THE MAJOR**

Because the introductory courses are common to all three degree programs, students do not usually need to make a final choice before the junior year. Each student’s program must be approved by the DUS.

**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 covering topics in engineering. These courses include:

1. Mathematics and basic science (four term courses): ENAS 194; MATH 222 or MATH 225 or MATH 226; APHY 322 or equivalent; S&DS 238, or S&DS 241, or equivalent.
2. Electrical engineering and related subjects (thirteen term courses): EENG 200, 201, 202, 203, 310, 320, 325, 348, and 481 (the ABET design project senior requirement); and four engineering electives, at least three of which should be at the 400 level. CPSC 365 or CPSC 366, MENG 390, MENG 403, BENG 411, PHYS 430, APHY 458, and all 400-level computer science courses qualify as ABET electives. One of EENG 468 or EENG 469, Advanced Special Projects, also qualify as a 400-level elective.

The introductory engineering courses are designed such that they may be taken concurrently in the sophomore year; for example, in the fall term students may take EENG 200 and EENG 202, followed by EENG 201 and EENG 203 in the spring term. These courses may be taken in any order, with the exception of EENG 203, which requires EENG 200 as a prerequisite. In this case, it would be helpful to take ENAS 194 and/or ENAS 130 in the first year.
A sample ABET-accredited B.S. degree schedule for students who have taken the equivalent of one year of calculus in high school (and thus are not required to take MATH 112 and MATH 115) could include:

First Year: EENG 200, EENG 201, ENAS 151, PHYS 180, and PHYS 181
Sophomore: EENG 202, EENG 203, ENAS 130, ENAS 194, and MATH 222
Junior: EENG 310, EENG 320, EENG 325, EENG 348, S&DS 238, and 1 elective
Senior: APHY 322, EENG 481, and 3 electives

A sample schedule for students who enter into the ABET-accredited B.S. major at the sophomore year could include:

First Year: ENAS 151, ENAS 130, ENAS 194, PHYS 180, and PHYS 181
Sophomore: EENG 200, EENG 201, EENG 202, EENG 203, and MATH 222
Junior: EENG 310, EENG 320, EENG 325, EENG 348, S&DS 238, and 1 elective
Senior: APHY 322, EENG 481, and 3 electives

A sample schedule for students who enter into the ABET-accredited B.S. major in the first year (and are required to take MATH 112 and MATH 115) and only seek to fulfill basic distribution requirements with no engineering courses, could be:

First Year: MATH 112, MATH 115, PHYS 180, PHYS 181, and ENAS 130
Sophomore: ENAS 151, EENG 200, EENG 201, EENG 202, EENG 203, and MATH 222
Junior: ENAS 194, EENG 310, EENG 320, EENG 325, EENG 348, and S&DS 238
Senior: APHY 322, EENG 481, and 4 electives

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., biomedical engineering, mechanical engineering, physics, etc.). It requires thirteen technical term courses beyond the prerequisites, specifically: MATH 222 or MATH 225 or MATH 226; ENAS 194; EENG 200, 201, 202, 203; EENG 471 and/or 472 (the senior requirement), or with permission of the instructor and the DUS, 481; and five or six electives (depending on senior requirement) approved by the DUS, at least three of which must be at the 400 level. All electives listed for the ABET-accredited B.S. major qualify as electives for this degree.

For students who have taken the equivalent of one year of calculus in high school (and thus are not required to take MATH 112 and MATH 115), a sample schedule for the B.S. degree in Engineering Science (Electrical) could be:

First Year: EENG 200, EENG 201, ENAS 151, PHYS 180, and PHYS 181
Sophomore: EENG 202, EENG 203, ENAS 130, ENAS 194, and MATH 222
Junior: 3 electives
Senior: EENG 471 and/or 472, and two or three electives depending on the senior project

The B.S. degree in Engineering Sciences (Electrical) requires fewer specific courses and 4 fewer courses overall than the ABET-accredited degree. Any of the courses required for the ABET-accredited major qualify as electives for this degree, as well as other courses with substantial electrical engineering context, subject to the approval of the DUS. For students entering the major during the sophomore year, or those who need
introductory calculus in their first year, sample schedules are similar to those described
for the ABET-accredited degree program, with the differences in the B.S. Engineering
Sciences (Electrical) degree applied.

The flexibility during the junior and senior years in the schedule above is often used to
accommodate a second major, such as Economics, Applied Physics, Computer Science,
Physics, or Mechanical Engineering.

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, MATH 225, MATH 226 or
ENAS 194; EENG 200, 201, 202, and 471 and/or 472 (the senior requirement); and two
(or three) approved electives.

Credit/D/Fail For students in the Class of 2023 and subsequent classes, courses taken
Credit/D/Fail may not be counted toward the requirements of the major, including the
prerequisites.

SENIOR REQUIREMENT
A research or design project carried out in the senior year is required in all three
programs and must be approved by the DUS. Students take EENG 471 and/or 472,
or 481, present a written report, and make an oral presentation. Students taking
both EENG 471 and 472, Senior Advanced Special Projects, may count one as an
elective. Arrangements to undertake a project in fulfillment of the senior requirement
must be made by the end of the course selection period in the term in which the student
will enroll in the course; by this date, a prospectus approved by the intended faculty
adviser must be submitted to the DUS.

ADVISING AND APPROVAL OF PROGRAMS
All Electrical Engineering and Engineering Sciences majors must have their programs
approved by the DUS. Arrangements to take EENG 471, 472, or 481 are strongly
suggested to be made during the term preceding enrollment in the course. Independent
research courses (EENG 468 or EENG 469) are graded on a Pass/Fail basis, but one (1)
can be counted toward the requirements of the major.

REQUIREMENTS OF THE MAJOR

ELECTRICAL ENGINEERING, B.S.

Prerequisites MATH 112, 115 if needed; ENAS 151 or MATH 120 or higher; ENAS 130
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 MATH 225 or MATH 226;
APHY 322; S&DS 238 or S&DS 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 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 MATH 225 or MATH 226; EENG 200, 201, 202, 203; B.A. – 1 from ENAS 194, MATH 222, MATH 225, or MATH 226; EENG 200, 201, 202

Distribution of courses  B.S. – 5 or 6 electives approved by DUS, 3 at 400 level; B.A. – 2 or 3 electives approved by DUS

Senior requirement  B.S. – one or two-term research or design project (EENG 471 and/or 472 or, with permission of DUS, 481); B.A. – one or two-term research or design project (EENG 471 and/or 472)

FACULTY OF THE DEPARTMENT OF ELECTRICAL ENGINEERING

Professors  †Hui Cao, †James Duncan, Jung Han, Roman Kuc, Tso-Ping Ma, Rajit Manohar, A. Stephen Morse, Kumpati Narendra, †Daniel Prober, Mark Reed, Peter Schultheiss (Emeritus), †Lawrence Staib, †Hemant Tagare, Hongxing Tang, Leandros Tassiulas, J. Rimas Vaišnys, †Y. Richard Yang

Associate Professors  Richard Lethin (Adjunct, Lecturer), Jakub Szefer, †Sekhar Tatikonda, Fengnian Xia

Assistant Professors  Wenjun Hu, Amin Karbasi, Priyadarshini Panda

†A joint appointment with primary affiliation in another department.
Electrical Engineering and Computer Science

Directors of undergraduate studies: Rajit Manohar
(rajit.manohar@yale.edu) (Electrical Engineering), 523 BCT, 432-4306; Y. Richard Yang (yang.r.yang@yale.edu) (Computer Science), AKW 208A, 432-6400

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.

PREREQUISITES

The prerequisites for the major are MATH 112, 115 (these prerequisites may be waived for students who have taken the equivalent of one year of calculus in high school) and ENAS 151 or MATH 120 (or a higher-level course); CPSC 112 (for students without previous programming experience); and PHYS 180 and 181, or 200 and 201. PHYS 170, 171 are acceptable for students taking MATH 112. Acceleration credits may not be used to satisfy prerequisites, and because 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 (DUS) in Electrical Engineering when planning their course schedules.

REQUIREMENTS OF THE MAJOR

B.S. degree program The major requires fifteen term courses beyond the prerequisites: CPSC 201, 202, 223, 323, and 365 or 366; EENG 200, 201, 202, and 203; one from MATH 222, 225, 226, S&DS 238, or S&DS 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 DUSes of both departments. Double-titled courses may be counted either way to fulfill this requirement. CPSC 280 and 490 may not be used as electives. With permission of the DUSes of both departments, one of EENG 468 or 469 may be used as an electrical engineering elective.

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:

<table>
<thead>
<tr>
<th>First-Year</th>
<th>Sophomore</th>
<th>Junior</th>
<th>Senior</th>
</tr>
</thead>
<tbody>
<tr>
<td>EENG 200</td>
<td>CPSC 201</td>
<td>CPSC 202</td>
<td>Senior project</td>
</tr>
<tr>
<td>ENAS 151</td>
<td>EENG 202</td>
<td>CPSC 323</td>
<td>One elective</td>
</tr>
<tr>
<td>PHYS 180</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EENG 201</td>
<td>CPSC 223</td>
<td>CPSC 365 or 366</td>
<td>Two electives</td>
</tr>
<tr>
<td>PHYS 181</td>
<td>EENG 203</td>
<td>One elective</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MATH 222</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Students with no programming experience should take CPSC 112 in the fall of their first 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:

<table>
<thead>
<tr>
<th>First-Year</th>
<th>Sophomore</th>
<th>Junior</th>
<th>Senior</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPSC 112</td>
<td>CPSC 201</td>
<td>CPSC 202</td>
<td>Two electives</td>
</tr>
<tr>
<td>MATH 115</td>
<td>EENG 200</td>
<td>CPSC 323</td>
<td></td>
</tr>
<tr>
<td>PHYS 180</td>
<td>EENG 202</td>
<td>S&amp;DS 241</td>
<td></td>
</tr>
<tr>
<td>EENG 201</td>
<td>CPSC 223</td>
<td>CPSC 365 or 366</td>
<td>Senior project</td>
</tr>
<tr>
<td>MATH 120</td>
<td>EENG 203</td>
<td>One elective</td>
<td>One elective</td>
</tr>
<tr>
<td>PHYS 181</td>
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</tbody>
</table>

For students with no calculus and no programming experience, a typical program would be:

<table>
<thead>
<tr>
<th>First-Year</th>
<th>Sophomore</th>
<th>Junior</th>
<th>Senior</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPSC 112</td>
<td>CPSC 201</td>
<td>CPSC 202</td>
<td>Two electives</td>
</tr>
<tr>
<td>MATH 112</td>
<td>EENG 200</td>
<td>CPSC 323</td>
<td></td>
</tr>
<tr>
<td>PHYS 170</td>
<td>ENAS 151</td>
<td>EENG 202</td>
<td></td>
</tr>
<tr>
<td>EENG 201</td>
<td>CPSC 223</td>
<td>CPSC 365 or 366</td>
<td>Senior project</td>
</tr>
<tr>
<td>MATH 115</td>
<td>MATH 222</td>
<td>EENG 203</td>
<td>One elective</td>
</tr>
<tr>
<td>PHYS 171</td>
<td></td>
<td>One elective</td>
<td></td>
</tr>
</tbody>
</table>

Students who start with MATH 112 may satisfy the physics prerequisite by taking PHYS 170 and 171 in their first year, as shown in the table above. However, because 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.

**Credit/D/Fail** Courses taken Credit/D/Fail may not be counted toward the requirements of the major, including prerequisites.

**SENIOR REQUIREMENT**

The senior project must be completed in CPSC 490 or EENG 471 and/or 472, depending on the adviser’s department, and must be approved by the DUS in each department.

**ADVISING AND APPROVAL OF PROGRAMS**

The entire program of a student majoring in Electrical Engineering and Computer Science must be approved by the DUS in each department.

**Accreditation** Students interested in pursuing an ABET-accredited degree should consider the B.S. program in Electrical Engineering. See Electrical Engineering.

**REQUIREMENTS OF THE MAJOR**

**Prerequisites** MATH 112, 115, and ENAS 151 or MATH 120; CPSC 112 (students without previous programming experience); PHYS 180, 181, or 200, 201 with exceptions as indicated
Number of courses 15 term courses beyond prerequisites (including senior project)
Specific courses required CPSC 201, 202, 223, 323, and 365 or 366; EENG 200, 201, 202, and 203; one from MATH 222, 225, 226, S&DS 238 or S&DS 241
Distribution of courses 4 additional 300- or 400-level electives, 2 in electrical engineering, 2 in computer science
Substitution permitted MATH 244 for CPSC 202; advanced courses in other depts, with permission of DUS in each department
Senior requirement Independent project (CPSC 490 or EENG 471 and/or 472) approved by DUS in each department
Energy Studies

Program director: Michael Oristaglio (michael.oristaglio@yale.edu); earth.yale.edu/energy-studies

ENERGY STUDIES MULTIDISCIPLINARY ACADEMIC PROGRAM

Energy Studies is one of four multidisciplinary academic programs in Yale College. The curriculum is designed to provide select undergraduates with the broad knowledge and skills needed for advanced studies, leadership, and success in energy-related fields. The course of study is divided into three tracks—Energy Science and Technology, Energy and Environment, and Energy and Society—and requires the completion of two courses in each of the three tracks, plus a senior capstone project, which can be done through independent study, a summer internship, or a senior project in the student’s major. The Senior Capstone Seminar, ENRG 400, offered in the spring term, allows students to complete the capstone in a credited Yale College course.

Admission to the Energy Studies Undergraduate Scholars program is by application in the fall term of sophomore year. Energy Studies Scholars must complete the requirements of a Yale College major. Yale College does not offer a major in energy studies. For additional information, visit the program website.

Credit/D/Fail Only one course taken Credit/D/Fail or one independent study course graded Pass/Fail may be counted toward the program.

REQUIREMENTS OF THE PROGRAM

Prerequisites None

Number of courses 6 term courses

Distribution of courses At least two courses in each of the three tracks of Energy Studies listed above, and no more than two required courses from a student’s major can be used to satisfy the six-course requirement

Senior requirement Senior capstone project, as indicated
Engineering

Dean of the School of Engineering & Applied Science: Mitchell Smooke, 105 17 HLH, 432-4200, engineering@yale.edu; seas.yale.edu

Engineering programs are offered in the departments of Biomedical Engineering, Chemical and Environmental Engineering, Computer Science, 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 and applied science 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 two majors and/or careers in fields requiring less comprehensive technical knowledge. Such non-ABET programs include the B.S. in Biomedical Engineering, Computer Science, or Environmental Engineering and the B.S. in Engineering Sciences—Chemical, Electrical, or Mechanical—as well as the B.A. in Computer Science or 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 that 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 Applied Mathematics, Biomedical Engineering, Chemical Engineering, Computer Science, Electrical Engineering, Engineering and Applied Science, Environmental Engineering, and Mechanical Engineering.
Engineering and Applied Science

Director of undergraduate studies: Vincent Wilczynski
(vincent.wilczynski@yale.edu), 107 BCT, 436-5971

Courses in Engineering and Applied Science fall into three categories: those intended primarily for students majoring in one of the several engineering and applied science disciplines; those designed for students majoring in subjects other than engineering, the applied sciences, and the natural sciences; and those designed to meet common interests of students majoring in engineering, the applied sciences, or the natural sciences.

In the first category, the departments of Applied Physics, Biomedical Engineering, Chemical and Environmental Engineering, Computer Science, Electrical Engineering, and Mechanical Engineering and Materials Science offer courses intended primarily for majors in engineering and applied science disciplines. Courses in these departments may also be relevant for students with appropriate backgrounds who are majoring in Chemistry, Physics, Biology, Earth and Planetary Studies, and Mathematics. For information about majors in engineering and their related courses, see Applied Physics, Biomedical Engineering, Chemical Engineering, Computer Science, Electrical Engineering, Environmental Engineering, and Mechanical Engineering.

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, the applied sciences, and the natural sciences; and topics common to students majoring in engineering, the applied sciences, and the natural sciences. Courses for nonscience 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.
English Language and Literature

**Director of undergraduate studies:** Stefanie Markovits (stefanie.markovits@yale.edu) (Sp 2022); Ruth Bernard Yeazell (ruth.yeazell@yale.edu) (F 2022, Sp 2023), (ruth.yeazell@yale.edu) 107 LC, 432-2224; associate director of undergraduate studies: TBA, 107 LC, 432-2224; registrar: Erica Sayers (erica.sayers@yale.edu), 106 LC, 432-2226; assistant registrar: Jane Bordiere (jane.bordiere@yale.edu), 107 LC, 432-2224; english.yale.edu/welcome-english-major

The undergraduate program in English cultivates students' powers of argument and analysis while developing their understanding of important works of English, American, and world literatures in English. Courses offered by the department are designed to teach students foundational research and writing skills; to provide historical perspectives from which to read and analyze literary works; and to deepen students' insight into their own experience. For students interested in creative writing, the department offers an array of courses taught by renowned professional writers in all of the major genres, including fiction, poetry, play and film writing, nonfiction prose, and journalism.

The ability to write well remains a rare but prized skill in almost every domain of our world, and English majors go on to careers in many fields of endeavor. The analytic talents and the writing and speaking skills honed in the major can lead graduates to careers in fields such as advocacy, publishing, teaching, the arts, law, venture capital, medicine, and policy making.

**COURSES FOR NONMAJORS AND MAJORS**

All English courses are open to both majors and nonmajors, although advanced seminars are intended primarily for junior and senior majors.

**Introductory courses** English courses numbered from ENGL 114–130 are introductory and are open to all students in Yale College. Students planning to elect an introductory course in English should refer to the department website for information about preregistration. Once registered, students must attend the first and all subsequent course meetings for that particular section until the end of the Add/Drop period in order to retain a place. Students who miss a class meeting during this period without informing the instructor beforehand will have their places filled from the waiting list.

**Advanced courses** Advanced courses are open to upper-level students; the faculty recommends that students both within and outside the major prepare for such work with two terms of introductory English. Sophomores and juniors are encouraged to enroll in lecture courses in order to gain broad perspectives in preparation for more focused study. Seminars offer more intensive treatment of their topics, which are also often more specialized. While both lectures and seminars are frequently offered more than once, students should not expect the same courses to be offered from one year to the next.

**Writing courses** Besides introductory courses that concentrate on the writing of expository prose (ENGL 114, 115, 120, and 121), the English department offers a number of creative writing courses. The introductory creative writing course, ENGL 123, is open to any student who has not taken an intermediate or advanced course in the writing of fiction, poetry, or drama. Interested students must preregister for ENGL 123, but
they need not submit a writing sample to gain admission. Many of the more advanced creative writing courses require an application in advance, with admission based on the instructor’s judgment of the student’s work. Application details and forms for these courses are available on the department website. Students with questions about this process should consult the department registrar. Students may in some cases arrange a tutorial in writing (ENGL 487), 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.

**FOUNDATIONAL COURSES**

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 American and world anglophone literature. All majors are accordingly required to take three of the four foundational courses from ENGL 125, 126, 127, 128. Prospective English majors are strongly encouraged to complete these requirements by the end of the sophomore year. Those who have not enrolled in the Directed Studies program should also consider taking both ENGL 129 and 130, foundational courses in the European literary tradition.

If, due to a late change of major or other circumstance, it is impossible to take three foundational courses, students may satisfy the requirements of the major by substituting for one foundational course (1) DRST 001 and 002, (2) ENGL 129 and 130, or (3) two advanced courses that deal substantially and intensively with similar material. All substitutions require permission from the director of undergraduate studies (DUS).

**REQUIREMENTS OF THE MAJOR**

At least fourteen courses are required for the major, including the senior requirement. 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 foundational courses chosen from ENGL 125, 126, 127, and 128; (2) at least one course in each of the following four historical periods, as indicated in the course listings: Medieval, Renaissance, 18th/19th century, 20th/21st century; (3) at least one seminar in both the junior and the senior years.

A student whose program meets these requirements may, with permission of the DUS, count as electives toward the major as many as two courses in other departments. One of these courses should normally be a literature course in English translation or in another language, and neither may be counted toward any requirement of the major. Certain Residential College Seminars, with permission of the DUS, may also be substituted for electives in the major.

A student may count up to five introductory courses and up to two creative writing courses toward the English major. ENGL 123 counts towards the introductory rather than towards the creative writing limit.

**Library requirement** Each English major must meet with Yale’s Librarian for Literature in English or another research librarian within the first four weeks of the term during
which the student is fulfilling the first of the two-term senior requirement for the major. Workshops will be offered to fulfill this requirement.

Credit/D/Fail Courses taken Credit/D/Fail may be counted toward the requirements of the major, but they may affect whether Distinction in the Major is granted.

THE WRITING CONCENTRATION

The writing concentration is an intensive track for English majors who want more sustained work in creative writing. While there are many ways to pursue creative writing at Yale and within the English department, the writing concentration provides a structure for creative work and a community of support that many writers find rewarding. The writing concentration is not a separate degree or certificate; it is a part of the English major and builds on the wealth of its literary offerings. It aims to give English majors with demonstrated interest and achievement in writing an opportunity to plan the writing courses they take in a coordinated way and to do advanced work in tutorial. The writing concentration accepts students with demonstrated commitment to creative writing at the end of the junior year or, occasionally, in the first term of senior year.

Students who enter the writing concentration must fulfill the same requirements as all English majors, except that they count four creative writing courses toward the major, including ENGL 489, a tutorial in which students produce a single sustained piece of writing or a portfolio of shorter works. It is expected that senior applicants will have completed by the end of the fall term the following: (1) at least two creative writing courses numbered 451 or higher, with at least one of these courses in the genre in which they plan to complete ENGL 489 (i.e., poetry, fiction, nonfiction, or drama) and (2) one course in another genre, which may include a creative writing course numbered 131 or higher. Creative writing concentrators must complete at least eleven literature courses in addition to their creative writing courses, for a total of fifteen courses. All courses numbered 130 or below count as literature courses. Residential College Seminars are not acceptable for credit toward the writing concentration, except by permission of the DUS. The writing concentration senior project may be offered in partial fulfillment of the senior requirement. Concentrators should fulfill the senior library requirement in the term in which they do the literature component of their senior requirement.

Proposals for the writing concentration should be submitted to the English department office in 107 LC or online as directed on the department website, during the designated sign-up period in the term before enrollment is intended.

SENIOR REQUIREMENTS

Seniors must complete a two-course senior requirement consisting of one of the following combinations: (1) two senior seminars; (2) a senior seminar and a one-term senior essay; (3) a two-term senior essay, with permission of the DUS. For students in the writing concentration, the senior requirement is a senior seminar or one-term senior essay and ENGL 489, the senior project in the writing concentration. Each English major must make an appointment to meet with Yale’s Librarian for Literature in English or another research librarian within the first four weeks of the term during which the student is fulfilling the first part of the two-term requirement for the major. A junior seminar in which the student, with the permission of the DUS and of the
instructor, fulfills the senior requirement may be counted as a senior seminar. 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.

**Senior seminar** Senior seminars are designated “Senior Seminar” in the course listings, but they are open to interested juniors, as well. The final essays written for senior seminars are intended to provide an appropriate culmination to the student’s work in the major and in Yale College. Such essays should rest on significant independent work and should be of substantial 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. Senior seminars may only be counted toward the requirement beginning in the sixth semester of a student’s course of study.

**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. Writing a senior essay provides a structure for English majors who want the opportunity to explore a research topic in a more sustained and intensive way, as well as a community of support that many majors find rewarding. It should ordinarily be written 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 two-term essays through application to the DUS. 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 and the senior writing concentration project must take a seminar during their senior year, but it need not be a senior seminar.

Prospectuses and applications for senior essays should be submitted to the office of the English department in 107 LC or online as directed on the department website, during the designated sign-up period in the term before enrollment is intended.

**ADVISING**
Students planning a program of study in English are strongly encouraged to consult a faculty adviser in the English department, the departmental representative in their residential college, or the DUS or Associate DUS for advice about their course choices.

In the fall of the junior year, each English major is formally assigned or chooses a faculty adviser from the English department, and in consultation with that adviser completes a statement outlining progress in the major. Course schedules for all majors should be discussed with and approved by their faculty advisers. The DUS and the Associate DUS can also discuss and approve schedules, if necessary.

**Individual programs of study** In exceptional cases, a student whose interests and aims are well defined may, in consultation with the DUS, 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 Comparative Literature; Directed Studies; American Studies; African American Studies; Ethnicity, Race, and Migration; Theater and Performance Studies; and Women’s, Gender, and Sexuality Studies.

**Graduate school** Students considering graduate work in English should be aware that a reading knowledge of certain classical and modern European languages is often
required for admission to graduate study, and that a course orienting them to critical theory can be especially helpful preparation.

Roadmap  See visual roadmap of the requirements.

REQUIREMENTS OF THE MAJOR

Number of courses  
Standard major — 14 courses (incl senior req); Writing concentration — 15 courses (incl senior req)

Distribution of courses  3 courses chosen from ENGL 125, 126, 127, and 128; 1 course in each of four historical periods as specified (intro courses do not fulfill this requirement); 1 junior seminar; up to 5 courses numbered ENGL 114–130; up to 2 creative writing courses; Writing concentration — same, except 4 creative writing courses including at least 2 numbered 451 or higher, one in same genre as ENGL 489; and 1 in another genre, numbered 131 or higher; at least 11 literature courses

Substitutions permitted  DRST 001 and 002 or ENGL 129 and 130 or two upper-level courses with overlapping material may substitute for one foundational course; up to 2 relevant upper-level courses in other departments may substitute for electives in the major; Residential College Seminars may substitute for electives in the major; all substitutions require DUS permission

Senior requirement  Standard major — 2 senior sems, or 1 senior sem and 1 senior essay (ENGL 490), or a two-term senior essay (ENGL 490, 491); Writing concentration — senior sem or senior essay, and ENGL 489. All seniors must meet with a research librarian in the first term of their senior requirement.

FACULTY OF THE DEPARTMENT OF ENGLISH

Professors  Jessica Brantley, Leslie Brisman, David Bromwich, Ardis Butterfield, Jill Campbell, Joe Cleary, Jacqueline Goldsby, Langdon Hammer, Margaret Homans, Caeltan Iheka, Jonathan Kramnick, Stefanie Markovits, Feisal Mohamed, Stephanie Newell, Catherine Nicholson, John Durham Peters, Caryl Phillips, Marc Robinson, Caleb Smith, Katie Trumpener, Shane Vogel, Michael Warner, Ruth Yeazell

Associate Professors  Marta Figlerowicz, Ben Glaser, Emily Thornbury, Sunny Xiang, R. John Williams

Assistant Professors  Anastasia Eccles, Marcel Elias, Alanna Hickey, Jonathan Howard, Elleza Kelley, Naomi Levine, Ernest Mitchell, Priyasha Mukhopadhyay, Joseph North, Jill Richards

Professors in the Practice  Michael Cunningham, Anne Fadiman, Louise Glück, Donald Margulies

Senior Lecturers  James Berger, Richard Deming, Meghan O’Rourke, Cynthia Zarin

Lecturers  Felisa Baynes-Ross, Steven Brill, Alan Burdick, Lincoln Caplan, Maximillian Chaoulideer, Danielle Chapman, Alison Coleman, Susan Dominus, Andrew Ehrgood, Craig Eklund, Greg Ellermann, Randi Epstein, Amy Gaige, Lindsay Gellman, Rona Johnston Gordon, Derek Greene, Jacob Halpern, Rosemary Jones, Heather Klemann, Verlyn Klinkenborg, Timothy Kreiner, Sarah Mahurin, Pamela Newton, Mark Oppenheimer, Barbara Riley, Timothy Robinson, Karin Roffman, Madeleine Saraceni, Pamela Schirmeister, Adam Sexton, Kim Shirkhani, Emily Skillings, R. Clifton Spargo,
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, Earth and Planetary Sciences and Urban Studies. The program in 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 the School of Public Health, the School of the Environment, the Law School, and the School of Management.
Environmental Engineering

**Director of undergraduate studies:** John Fortner (john.fortner@yale.edu); seas.yale.edu/departments/chemical-and-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 addresses broad environmental issues, including the safety of drinking water, groundwater protection and remediation, wastewater treatment, indoor and outdoor air pollution, climate change, 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.

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 designed 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**

**B.A. degree program in Engineering Sciences (Environmental)** The B.A. degree program requires MATH 112 and 115; a two-term lecture sequence in chemistry; and PHYS 170, 171.

**B.S. degree program in Environmental Engineering** The B.S. degree program has the following prerequisites in mathematics and basic sciences: MATH 112, 115; MATH 120 or ENAS 151; ENAS 194; a two-term lecture sequence in chemistry, with corresponding labs; PHYS 180, 181; and BIOL 101 and 102 or BIOL 103 and 104.

**REQUIREMENTS OF THE MAJOR**

**B.A. degree program** The B.A. degree program requires nine term courses beyond the prerequisites, including the senior requirement. Students take ENVE 120, 360, and either ENVE 373 or 377. Five electives must be chosen in consultation with the director of undergraduate studies (DUS).

**B.S. degree program** 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; ENVE 315 or 448; EVST 444 or ENVE 438; and MENG 361 or ENAS 646. At least three technical electives must be chosen in consultation with the DUS.

**Credit/D/Fail** No course taken Credit/D/Fail may count toward the major, including prerequisites.

**SENIOR REQUIREMENT**

**B.A. degree program** Students in the B.A. program must pass ENVE 416 or ENVE 490 in their senior year.

**B.S. degree program** Students in the B.S. program must pass ENVE 416 or ENVE 490 in their senior year.

**REQUIREMENTS OF THE MAJOR**

**ENGINEERING SCIENCES (ENVIRONMENTAL), B.A.**

**Prerequisites** MATH 112, 115; two-term lecture sequence in chemistry; PHYS 170, 171

**Number of courses** 9 term courses beyond prereqs (incl senior req)

**Specific courses required** ENVE 120; 360; and ENVE 373 or 377

**Distribution of courses** 5 electives approved by DUS

**Senior requirement** ENVE 416 or ENVE 490

**ENVIRONMENTAL ENGINEERING, B.S.**

**Prerequisites** MATH 112, 115; MATH 120 or ENAS 151; ENAS 194; two-term lecture sequence in chemistry, with labs; PHYS 180, 181; BIOL 101 and 102 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 444 or ENVE 438, and MENG 361 or ENAS 646

**Distribution of courses** 3 technical electives approved by DUS

**Senior requirement** ENVE 416 or ENVE 490

**FACULTY ASSOCIATED WITH THE PROGRAM IN ENVIRONMENTAL ENGINEERING**

**Professors** Paul Anastas (Forestry & Environmental Studies), Michelle Bell (Forestry & Environmental Studies), Ruth Blake (Geology & Geophysics), Menachem Elimelech (Chemical & Environmental Engineering), Edgar Hertwich (Forestry & Environmental Studies), Edward Kaplan (School of Management), Jaehong Kim (Chemical & Environmental Engineering), Jordan Peccia (Chemical & Environmental Engineering), Lisa Pfefferle (Chemical & Environmental Engineering), Julie Zimmerman (Chemical & Environmental Engineering)

**Associate Professors** John Fortner (Chemical & Environmental Engineering), Drew Gentner (Chemical & Environmental Engineering)
Environmental Studies

Directors of undergraduate studies: Michael Fotos (michael.fotos@yale.edu) for B.A. students, Kealoha Freidenburg (kealoha.freidenburg@yale.edu) for B.S. students; www.yale.edu/evst

Environmental Studies offers the opportunity to examine human relations with their environments from diverse perspectives. The major encourages interdisciplinary study in (1) social sciences, including anthropology, political science, law, economics, and ethics; (2) humanities, to include history, literature, religion, and the arts; and (3) natural sciences, such as biology, ecology, human health, geology, and chemistry. Students work with faculty advisers and the directors of undergraduate studies (DUS) to concentrate on some of the most pressing environmental and sustainability problems of our time: energy and climate change, food and agriculture, urbanism, biodiversity and conservation, human health, sustainable natural resource management, justice, markets, and governance.

Students may pursue either a B.A. or a B.S. degree within Environmental Studies. The B.A. program is intended for students who wish to concentrate in the social sciences and humanities. The B.S. program encourages students to focus in the natural sciences, especially fields such as environmental health and medicine, ecology, and energy and climate change. Both degree programs culminate in a senior essay project that is commonly preceded by independent summer research.

Students must declare a major in Environmental Studies before the end of the second term of junior year.

PREREQUISITES

The B.A. degree program has no prerequisites.

The B.S. degree program has prerequisites in mathematics, chemistry, life sciences, and natural science laboratory or field science. The prerequisites include a term course in mathematics, physics, or statistics selected from MATH 112 or higher (excluding MATH 190), or PHYS 170 or higher, or S&DS 101 or higher; the two-term lecture sequence in chemistry or, for students qualifying for advanced placement in chemistry, one term of CHEM 170 or CHEM 167 or higher; the two-credit BIOL sequence BIOL 101, 102, 103 and 104, or EPS 125; and a natural science laboratory or field course focusing on research and analytic methods.

Students are advised to take chemistry and biology during the first year before enrolling in the EVST core courses in the natural sciences. It is recommended that students complete the prerequisites by the end of their sophomore year, although this is not required.

REQUIREMENTS OF THE MAJOR

B.A. degree program The B.A. degree requires at least fourteen course credits, consisting of the core requirements, the concentration, and the senior requirement.

B.S. degree program In addition to the prerequisites, the B.S. degree requires at least twelve course credits, consisting of the core requirements, the concentration, and the two-term senior requirement.
B.A. core courses One course in statistics or mathematics selected from S&DS 101 or higher, or MATH 112 or higher; two core courses in the social sciences or humanities and three core courses in the natural sciences. Students may select core courses from among the list of approved core courses posted on the environmental studies website or by searching Yale Course Search (YC EVST: Core BA Natural Scie and YC EVST: Core Human/Social Scie). Completing one course in each core area is recommended before the end of the sophomore year.

B.S. core courses Two core courses in the humanities or social sciences and two natural science core courses from among the list of approved core courses posted on the environmental studies website or by searching Yale Course Search (YC EVST: Core BA Natural Scie and YC EVST: Core Human/Social Scie). Completing one course in each area is recommended before the end of the sophomore year.

Areas of concentration Students plan their concentration in consultation with the DUS and the student’s adviser. A concentration is defined as six courses that provide analytical depth in a particular environmental problem or issue of interest, as well as disciplinary expertise. For the B.A. degree, one of these six courses must be an advanced seminar (200 level or higher) that exposes students to primary literature, extensive writing requirements, and experience with research methods. For the B.S. degree, two of the six courses must provide interdisciplinary context to the concentration and three of the six courses must have the science (SC) distributional designation. Of the three SC-designated concentration courses in the B.S. degree program, at least two must have departmental numerical ratings of 125 or higher. Concentrations include biodiversity and conservation, climate change and energy, environmental humanities, environmental justice, environmental policy, food and agriculture, human health and environment, sustainability and natural resources, and urban environments. Students also have the opportunity to design a unique concentration within the major, in consultation with the DUS.

Credit/D/Fail No course taken Credit/D/Fail may be counted toward the major, including prerequisites.

Roadmap See visual roadmap of the requirements.

SENIOR REQUIREMENT
In the junior year, students consult with their advisers on the design of their senior essay project.

B.A. degree program For the B.A. degree, students most often complete one term of EVST 496, a colloquium in which they write their senior essay. Students writing the one-term essay must also complete an additional advanced seminar in the environment. The additional advanced seminar is in addition to the six-course concentration requirement. Two-term senior research projects require the permission of the DUS.

B.S. degree program For the B.S. degree, students complete two terms of EVST 496.

ADVISING
Summer Environmental Fellowship During the spring term, EVST majors may apply for the Summer Environmental Fellowship to gain experience in the field through research or internships in an area pertinent to their academic development or their senior essay project. Sophomores and juniors may arrange internships with nonprofit
organizations, government agencies, or corporations. Rising seniors typically focus on research for their senior essay. Although the summer program is optional, many students take advantage of this opportunity with some financial support from the program.

**REQUIREMENTS OF THE MAJOR**

**Prerequisites**
- B.A. — no prerequisites;
- B.S. — one statistics, math, or physics course from MATH 112 or higher (excluding MATH 190), or PHYS 170 or higher, or S&DS 101 or higher; two-term lecture sequence in chemistry, or CHEM 170 or 167 or higher; BIOL 101, 102, 103 and 104, or EPS 125; and one natural science lab or field course focusing on research and analytical methods.

**Number of courses**
- B.A. — at least 14 course credits, including the senior req;
- B.S. — at least 12 course credits, beyond prereqs and incl the senior req.

**Specific courses required**
- B.A. — 6 core courses, as specified;
- B.S. — 2 core courses in humanities and social sciences and 2 core courses in natural sciences, as specified.

**Distribution of courses**
- B.A. — 6 courses in area of concentration, including 1 adv seminar as specified;
- B.S. — 6 courses in area of concentration, 3 of which must have SC designation with 2 of the 3 numerically rated at 125 or higher, and 2 must provide interdisciplinary context as specified.

**Senior requirement**
- B.A. — one term senior essay and an adv seminar in the environment or, with petition to the DUS before the end of the junior year, a two-term research project;
- B.S. — two-term research project.

**FACULTY ASSOCIATED WITH THE PROGRAM OF ENVIRONMENTAL STUDIES**

**Professors**
- Mark Ashton (School of the Environment), Michelle Bell (School of the Environment), Gaboury Benoit (School of the Environment), Graeme Berlyn (School of the Environment), Ned Blackhawk (History and American Studies), Mark Bradford (School of the Environment), Derek Briggs (Earth and Planetary Sciences), Gary Brudvig (Chemistry, Molecular Biophysics & Biochemistry), Ingrid Burke (School of the Environment), Susan Clark (School of the Environment, Adjunct), Deborah Coen (History), Michael Donoghue (Ecology & Evolutionary Biology, School of the Environment), Michael Dove (School of the Environment, Anthropology), Robert Dubrow (School of Public Health), Anna Dyson (Architecture, School of Environment), Keller Easterling (Architecture), Menachem Elimelech (Chemical & Environmental Engineering), Daniel Esty (School of the Environment, Law School), Eduardo Fernandez-Duque (School of the Environment), Walter Jetz (Ecology and Evolutionary Biology, School of the Environment), Ben Kiernan (History), Matthew Kotchen (School of the Environment, Economics), Douglas Kysar (Law School), William Lauenroth (School of the Environment), Xuhui Lee (School of the Environment), Robert Mendelsohn (School of the Environment, Economics), Alan Mikhail (History), Jeffrey Park (Earth and Planetary Sciences), Peter Perdue (History), Stephen Pitti (History, American Studies), Alan Plattus (Architecture), David Post (Ecology & Evolutionary Biology), Jeffrey Powell (Ecology & Evolutionary Biology, School of the Environment), Daniel Prober (Physics, Physics & Electrical Engineering), Peter Raymond (School of the Environment), Paul Sabin (History), James Saiers (School of the Environment), Oswald Schmitz (School of the Environment, Ecology & Evolutionary Biology), James Scott (Political Science, Anthropology), Karen Seto (School of the Environment), Kalyanakrishnan Sivaramakrishnan (Anthropology, School of the Environment), David Skelly (School of the Environment, Ecology &
Evolutionary Biology), Stephen Stearns (Ecology & Evolutionary Biology), Peter Swenson (Political Science, Institution for Social and Policy Studies), Dorceta Taylor (School of the Environment), Charles Tomlin (School of the Environment) (Visiting), Gerald Torres (School of the Environment, Law), Paul Turner (Ecology & Evolutionary Biology), John Wargo (School of the Environment), John Warner (History of Medicine, American Studies, History), Michael Warner (English, American Studies), Harvey Weiss (Near Eastern Languages & Civilizations, Anthropology), Robert Wyman (Molecular, Cellular, & Developmental Biology), Carl Zimmer (Molecular Biophysics and Biochemistry, Adjunct) Julie Zimmerman (Chemical & Environmental Engineering)

**Associate Professors** Laura Barraclough (American Studies), Craig Brodersen (School of the Environment), Marian Chertow (School of the Environment), Kenneth Gillingham (School of the Environment, Economics, School of Management), Jennifer Raab (History of Art), Elihu Rubin (Architecture), Carla Staver (Ecology and Evolutionary Biology), David Vasseur (Ecology & Evolutionary Biology)

**Assistant Professors** Anjelica Gonzalez (Biomedical Engineering), Krystal Pollitt (Engineering and Applied Science), William Rankin (History, History of Science)

**Senior Lecturers** Shimon Anisfeld, Carol Carpenter, Amity Doolittle, John Grim, Mary Evelyn Tucker, Marta Wells

**Lecturers** Alan Burdick, Ian Cheney, Mary Beth Decker, Marlyse Duguid, Michael Fotos, Kealoha Freidenburg, Gordon Geballe, Robert Klee, Linda Puth, Catherine Skinner
Ethics, Politics, and Economics

**Director of undergraduate studies:** Bonnie Weir (bonnie.weir@yale.edu), 115 Prospect St.; epe.yale.edu

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.

**INTRODUCTORY REQUIREMENTS**

**Students in the Class of 2023** may register for the major upon completion of six out of the eight introductory requirements by submitting their academic record to the EP&E registrar.

**Students in the Class of 2024 and subsequent classes** may register for the major upon completion of eight introductory requirements by the end of their fourth, or the beginning of their fifth term of enrollment. Students should submit their academic record to the EP&E registrar to declare the major.

Introductory courses required to declare the Ethics, Politics, and Economics major include the following:

1. The Ethics course PHIL 175 or Directed Studies*

2. A course in Other Perspectives, from a disciplines such as Anthropology; Ethnicity, Race, and Migration; History; Sociology; Women’s, Gender, and Sexuality Studies; or Directed Studies*

3. A course in Political Philosophy, choosing from PHIL 178, PLSC 114, PLSC 118, PLSC 108 or Directed Studies*

   *Students completing two full terms of Directed Studies fulfill the first three introductory requirements.

4. A Political Science introductory course in one of the following Political Science subfields: international relations (PLSC 111), comparative politics (PLSC 116), or American politics (PLSC 113)

5. A course in Introduction to Microeconomics, choosing from ECON 108, ECON 110 or ECON 115

6. A course in Introduction to Macroeconomics, choosing from ECON 111 or ECON 116
7. A course in Econometrics, choosing from ECON 117, 123, 135, GLBL 121, S&DS 230, or S&DS 238

8. A course in Game Theory, choosing from EP&E 220, 231, 295, 297, or ECON 159

REQUIREMENTS OF THE MAJOR

Students in the Class of 2023  With the approval of the director of undergraduate studies (DUS), the following changes to the requirements of the major may be fulfilled by students who declared their major under previous requirements.

Students in the Class of 2024 and subsequent classes must take fifteen term courses, including 3 core courses in two of three core areas, one of which must be EP&E 215, EP&E 216, or EP&E 217; three concentration area courses (including the senior requirement) which comprise a student’s individual area of concentration; and ECON 121 or 125. The concentration is developed in consultation with the DUS and should culminate in a senior essay written in the area defined by the concentration.

Core courses  The major requires that students take three core courses, EP&E 215, EP&E 216, or EP&E 217, and two additional core courses from the major’s three core areas (Ethics, Politics, Economics), one of which must be an advanced seminar anchored in at least two of the major’s three core areas of ethics, politics, or economics. The DUS can offer guidance regarding appropriate courses to fulfill this requirement. The approved core courses, specified annually, can be found on a list of approved EP&E core courses on the EP&E website and by searching Yale Course Search for attributes: YC EP&E Ethics Core, YC EP&E Politics Core; YC EP&E Economics Core.

The Ethics core draws from courses on normative thinking from philosophy and political science (theory only).

The Politics core includes Political Science courses.

The Economics core includes Economics courses.

Areas of concentration  Each student defines an area of concentration in consultation with the DUS. 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 three courses appropriate to the theme, including the seminar or independent study course in which the senior essay is written (see “Senior Requirement” below). In designing the area of concentration, students are encouraged to include seminars from other departments and programs. The DUS 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, and civil society and its normative implications. However, students may wish to frame their own concentration more precisely.

**Credit/D/Fail** Students admitted to the major may take one of their Ethics, Politics, and Economics courses Credit/D/Fail, excluding the seminar in which the senior essay is written. Such courses count as non-A grades in calculations for Distinction in the Major.

**SENIOR REQUIREMENT**

A senior essay is required for the major and should constitute the 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 DUS. 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 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. Students are encouraged to incorporate analysis using the tools of all three of the major’s fields.

Senior essays written in the fall term are due in early December. Senior essays written in the spring term and yearlong essays are due in mid-April. One-term essays are normally expected to be 40–50 pages in length; yearlong essays are normally expected to be 80–100 pages in length.

**ADVISING**

**Graduate work** 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 and 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. EP&E requires that graduate and professional school courses carry one, full Yale College course credit, and it is important to note that not all such courses yield a full course credit in Yale College. See Academic Regulations, section L, Special Academic Arrangements, “Courses in the Yale Graduate and Professional Schools.”

**Roadmap** See visual roadmap of the requirements.

**REQUIREMENTS OF THE MAJOR**

**Introductory requirements** 8 introductory courses as indicated

**Number of courses** 15 (incl intro reqs and senior req)

**Specific courses required** EP&E 215, 216, or 217; ECON 121 or ECON 125

**Distribution of courses** 3 core courses (one of which is EP&E 215, 216, or 217),
including 2 seminars in 2 of the 3 core areas, one of which must be an advanced
seminar; 3 concentration courses including the senior req course in area of concentration defined by student in consultation with DUS

**Senior requirement** Senior essay in area of concentration (in an adv sem or in EP&E 491 or in EP&E 492 and 493)

**FACULTY ASSOCIATED WITH THE PROGRAM OF ETHICS, POLITICS, AND ECONOMICS**


**Senior Lecturer** Boris Kapustin (*Political Science*)

**Lecturers** Elaine Dezenski (*Global Studies*), Michael Fotos (*Political Science*), Karen Goodrow (*Political Science*), Stephen Latham (*Political Science*)
Ethnicity, Race, and Migration

**Director of undergraduate studies:** Zareena Grewal (zareena.grewal@yale.edu), 108 WLH, 436-8168, erm.yale.edu

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.

**Requirements of the Major**
Students must complete twelve term courses in Ethnicity, Race, and Migration, including the senior requirement. These twelve normally include ER&M 200, an introductory course on the issues and disciplines involved in the study of ethnicity, race, and migration. In the junior year, all majors are required to take ER&M 300, a seminar that introduces majors to scholarship in ethnic studies, postcolonial studies, and cultural studies. Students may take up to two courses required for the major in other departments, if the courses have content related to topics of ethnicity, race, and migration.

**Area of concentration** In consultation with the director of undergraduate studies (DUS), each student defines an area of concentration consisting of six term courses, one of which must be a methods course; these concentration courses do not include the senior essay or project. Advanced work in a language related to a student’s area of concentration is advised.

**Credit/D/Fail** No more than two courses taken Credit/D/Fail may be counted toward the major with permission of the DUS.

**Roadmap** See visual roadmap of the requirements.

**Senior Requirement**
There are two options for the senior requirement. Majors may choose a yearlong senior essay or project and take the senior colloquium (ER&M 491) on theoretical and methodological issues in the fall and then complete the requirement by writing a senior essay in the senior project seminar (ER&M 492) during the spring term. Alternatively, students may take two upper-level ER&M seminars, and in one of the seminars, with the instructor’s approval, write a final paper of 30–35 pages in addition to completing other course requirements. These seminars may be taken during either the fall or spring term.

**Advising**
Prospective majors should consult the DUS early in their academic careers to discuss an individual plan of study. Enrollment in the major requires permission of the DUS prior to the beginning of the fall term of the junior year.

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.

STUDY 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 DUS 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, ER&M 300
Distribution of courses 6 courses in the area of concentration, 1 of which must be a methods course; 2 additional courses with ER&M content and DUS approval
Senior requirement Senior colloq (ER&M 491) and senior essay or project (ER&M 492); or senior essay in upper-level seminar and one additional upper-level seminar

FACULTY ASSOCIATED WITH THE PROGRAM OF ETHNICITY, RACE, AND MIGRATION

Professors Laura Barraclough (American Studies), Ned Blackhawk (History, American Studies), Alicia Schmidt Camacho (Ethnicity, Race, and Migration, American Studies), Michael Denning (American Studies, English), Fatima El-Tayeb (Ethnicity, Race and Migration, Women's, Gender, & Sexuality Studies), Roderick Ferguson (American Studies, Women's, Gender, & Sexuality Studies), Daniel Martínez HoSang (American Studies, Ethnicity, Race, and Migration), Matthew Jacobson (American Studies, African American Studies, History), Gilbert Joseph (History), Grace Kao (Sociology), Lisa Lowe (American Studies), Mary Lui (American Studies, History), Stephen Pitti (History, American Studies), Ana Ramos-Zayas (American Studies, Ethnicity, Race, and Migration, Women's, Gender, & Sexuality Studies), Kalindi Vora (Ethnicity, Race and Migration, Women's, Gender, & Sexuality Studies)

Associate Professors Zareena Grewal (American Studies, Ethnicity Race & Migration), Albert Laguna (American Studies, Ethnicity, Race, and Migration), Daniel Magaziner (History)

Assistant Professors Tarren Andrews (Ethnicity, Race, and Migration), Leigh-Anna Hidalgo (Ethnicity, Race, and Migration), Hi’ilei Hobart (Ethnicity, Race, and Migration), Sunny Xiang (English)

Lecturers Aaron Carico (American Studies, African American Studies), Ximena Lopez Carillo (Ethnicity, Race, and Migration), Leah Mirakhhor (American Studies, Ethnicity, Race, and Migration), Joanna Radin (History of Science & Medicine, History, Anthropology, American Studies, Ethnicity, Race, and Migration), David Simon (Political Science), Quan Tran (American Studies, Ethnicity, Race, and Migration)
Visiting Lecturer Gary Okihiro (*Ethnicity, Race, and Migration, American Studies*)
Film and Media Studies

**Director of undergraduate studies:** Katerina Clark (katerina.clark@yale.edu) [Sp 2022]; film and media studies

The major in Film and Media Studies focuses on the history, theory, criticism, and production of cinema and other moving-image media. Courses examine cinema and the broader landscape of audiovisual media as significant modern art forms, and the contributions of moving-image media as cultural and communicative practices of enduring social significance. As an interdisciplinary program centered in the humanities, Film and Media Studies offers students latitude in defining their course of study within the framework established by the Film and Media Studies Committee. With this freedom comes the responsibility of carefully planning a coherent and well-focused program. Because of the special demands of Film and Media Studies and the diversity of its offerings, potential majors are encouraged to consult the director of undergraduate studies (DUS) early in their academic careers.

**PREREQUISITE**

Students normally take FILM 150 in their first or second year. This course is useful preparation, and in some cases a prerequisite for other courses in the major.

**REQUIREMENTS OF THE MAJOR**

The Film and Media Studies major consists of twelve term courses, including the prerequisite and the senior requirement. Students are required to take FILM 160 and FILM 320, preferably by the end of their sophomore year. In addition, students are required to take one upper-level course in the study of representative films from a non-American national cinema (e.g. German expressionist cinema, Italian cinema, or world cinema) and one upper-level course in critical studies: these are designated by attributes (World Cinema, Critical Studies) in Yale Course Search. Students also must take at least one course on the creative process in film, designated by the attribute Production in Yale Course Search. Courses taken outside the Film and Media Studies department do not count toward the major without the permission of the DUS. Admission to senior-level seminars is at the instructor’s discretion, but the Film and Media Studies program ensures that every senior major gains admission to the required number of seminars.

**The intensive major** Students of substantial accomplishment and commitment to film and media 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. The intensive major in Film and Media Studies is intended for students who are not pursuing two majors. Students must request approval from the Film and Media Studies Committee at the end of their junior year by submitting a proposal that outlines their objectives and general area of study.

**Credit/D/Fail** No more than one course taken Credit/D/Fail may be counted toward the major with permission of the DUS.

**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. The senior requirement requires both critical writing and writing in images. Those undertaking creative senior projects should be expected to produce a paper of approximately fifteen pages in which the student discusses such questions as the genre to be used in the project, existing precedents for the topic, and his or her strategy in working on the project. Those undertaking to fulfill the senior requirement by writing a senior essay should additionally take a course in which they are expected to do, minimally, a small production assignment.

Majors graduating in December must submit their senior essays or senior projects to the DUS by Friday, December 9, 2022; those graduating in May, by Friday, April 28, 2023. A second reader assigned by the DUS participates in evaluating the essays and/or projects.

**Preparation for a senior project** Those students hoping to produce a film script or video as their senior project should make sure that they have taken enough courses in video production and screenwriting to be accepted into an advanced course in screenwriting or production. Senior creative projects in Film and Media Studies must be produced in conjunction with one such upper-level course. Students often start by completing FILM 161, 162 by the end of their sophomore year, and continue with FILM 355, 356 by the end of their junior year, to prepare for FILM 455, 456 or 483, 484 in their senior year. Those students interested in screenwriting often begin with FILM 350. Students interested in filmmaking should also take courses in screenwriting, and vice versa. Some production courses are available in the summer program in Prague.

**Senior project** Students who wish to complete a senior project as an alternative to an essay must petition the Film and Media Studies Committee for approval of their project at the end of the junior year. Projects might include writing a screenplay in Advanced Screenwriting (FILM 487, 488) 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 twelve courses required for the major, because FILM 493 or 494 does not count toward the twelve 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 and Media 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 twelve courses required for the major.

**Preparation for a senior essay** Students in their senior year may prefer to write a senior essay rather than work on a creative project. To prepare, they should take advantage of the variety of courses in film and media history, criticism and theory offered by the program, including such topics as American independent cinema, film theory, and African American cinema.
Senior essay 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. 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 previous coursework at Yale College. The student intending to write a senior essay should submit a brief prospectus, approved by the proposed faculty adviser, to the DUS by the end of reading week in their junior year. If this petition is approved, the student should plan to submit an updated and elaborated prospectus for final approval by the DUS during the first two weeks of the first term of senior year. In researching and writing the essay, the student should consult regularly with the seminar instructor or adviser, supplying preliminary drafts as appropriate, and may consult with other faculty members as well.

ADVISING

Foreign languages Study of relevant languages is urged for all Film and Media 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.

REQUIREMENTS OF THE MAJOR

Prerequisite FILM 150
Number of courses 12 term courses (incl prereq and senior req)
Specific courses required FILM 160 and FILM 320
Distribution of courses 1 upper-level national or world cinema course as specified; 1 upper level critical studies course; 1 production course
Senior requirement For senior essay — 2 terms of senior-level seminars, or 2 terms of senior essay (FILM 491, 492), or 1 term of each; for senior project — 2 terms of senior project in FILM 455, 456, or 483, 484, and either FILM 493 or 494, for a total of 13 term courses; or 2 terms of senior project in FILM 487, 488; or 2 terms of senior project in FILM 493, 494 with approved petition
Intensive major Both senior project in production and senior essay

FACULTY ASSOCIATED WITH THE PROGRAM OF FILM AND MEDIA STUDIES

Professors *Dudley Andrew (Comparative Literature, Film & Media Studies, Emeritus), *Francesco Casetti (Humanities, Film & Media Studies), *Katerina Clark (Comparative Literature, Slavic Languages and Literatures), *Aaron Gerow (East Asian Languages and Literatures, Film & Media Studies), *John MacKay (Film & Media Studies, Slavic Languages and Literatures), *Millicent Marcus (Italian), *Charles Musser (American Studies, Film & Media Studies), Fatima Naqvi (German), *John Durham Peters (English, Film & Media Studies), *Katie Trumpener (Comparative Literature, English), Laura Wexler (American Studies, Women's, Gender, and Sexuality Studies)
**Associate Professors** Marta Figlerowicz (*Comparative Literature, English*), Moira Fradinger (*Comparative Literature*), Zareena Grewal (*Ethnicity, Race, & Migration*), Brian Kane (*Music*), *R. John Williams* (*English*)

**Assistant Professor** Marijeta Bozovic (*Slavic Languages and Literatures, Film & Media Studies, Women's, Gender, and Sexuality Studies*)

**Senior Lecturer** Marc Lapadula (*Film & Media Studies*)

**Lecturers** Jonathan Andrews (*Art, Film & Media Studies*), Oksana Chefranova (*Film & Media Studies*), Nicholas Forester (*Film & Media Studies*), Thomas Allen Harris (*African American Studies, Film & Media Studies*), Camille Thomasson (*Film & Media Studies*)

**Senior Lectors** Krystyna Illakowicz (*Slavic Languages and Literatures*), Karen von Kunes (*Slavic Languages and Literatures*)

*Member of the Film and Media Studies Advisory Committee.*
First-Year Seminar Program

The First-Year Seminar program offers a diverse array of courses open only to first-year students and designed with first-year students 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 for First-Year 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 apply, or who do not secure a space through the lottery, may be considered for placement at the instructor’s discretion if space becomes available. Information regarding application procedures may be found on the program website.
French

**Director of undergraduate studies:** Thomas C. Connolly, (thomas.c.connolly@yale.edu) [Sp 2022] 320 York St., Rm. 385; Christophe Schuwey (christophe.schuwey@yale.edu) [F 2022 and Sp 2023], 320 York St.; Language program director: Candace Skorupa, (candace.skorupa@yale.edu) 320 York St., Rm. 339; 432-2765; french.yale.edu

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 French-language literatures, arts, and cultures 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, medicine, religion, politics, business, translation, 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 and culture can open doors to various professions. The French major provides ideal preparation for careers in a wide range of fields from law and diplomacy to journalism, teaching, academia, publishing, and the arts. Recent graduates have gone on to selective law schools, medical schools, and graduate programs in French and Comparative Literature. Others work in business, government, primary and secondary education, 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 (DUS). Regulations concerning the completion of two majors can be found in the Academic Regulations, section L, Special Academic Arrangements.

**COURSE NUMBERING**

**Group A courses** (FREN 110–159) This group consists of language courses that lead to courses counting toward the major. Preregistration is required for all Group A courses except FREN 125 and 145. FREN 121 (the stand-alone L2) is offered only during the fall term. For this reason, students placed into L1 or L2 who were not enrolled in a fall-term course will have to wait until the next fall to enroll. For further details, students should consult Candace Skorupa, (candace.skorupa@yale.edu) the language program director (LPD).

**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. FREN 160 and 170 are gateway courses that prepare students for courses numbered FREN 200 and above. 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.

**LANGUAGE PLACEMENT PROCEDURES**

The departmental placement exam in French is accessible online. Dates and information for the exam will be available on the French department website, in the Calendar for the Opening Days of College, and on the Center for Language Study website. Placement exam results remain valid for one year.

All students who have not yet studied French at Yale (except those who have had no previous exposure to French whatsoever) are expected to take the departmental placement exam. Students who studied abroad over the summer with non-Yale programs must take the placement exam to be eligible to receive credit for their work.

Students who earned superior scores on standardized tests may be eligible to enroll in a course designated L5. The department strongly recommends, however, that advanced students of French take the departmental placement exam in order to be directed to the most appropriate courses. Students who earned a score of 5 on the Advanced Placement exam, a score of 6 or 7 on the advanced-level International Baccalaureate (IB) exam, a rating of C1 on the CEFR European test, or an A or B on the GCE A-level exam are normally placed into a course at the 150 level and above.

**PREREQUISITE**

The prerequisite may be fulfilled by taking FREN 150, which should be taken during the first or second year. In consultation with the DUS, students may instead choose to select a course numbered 200-449 to fulfill the prerequisite. Prospective majors are strongly encouraged to take at least one literature course numbered 170 or above before the end of the second year.

**REQUIREMENTS OF THE MAJOR**

**The standard major**  The standard major consists of ten term courses numbered 160 or above, including a one-term senior essay (see below). One of these ten courses must be FREN 170 which should be completed early in a candidate’s studies or, in consultation with the DUS, an equivalent course from the 200–449 range; at least four must be Group B courses numbered 200 or above. Students may count no more than two courses in the FREN 180–199 range (unless they opt for the translation track, see below). No more than two courses conducted in English (Group C) may count toward the major. With prior approval of the DUS, 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 DUS may grant exceptions to this limit for students who spend two academic terms in an approved study abroad program. Relevant first-year seminars may count toward the major, with permission of the DUS.
French

The intensive major  The intensive major is designed for students who wish to undertake a more concentrated study of literature and culture in French. It is recommended for students considering graduate study in French or in a related field. 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. The requirement of FREN 170 (or an equivalent 200–449 course), and the stipulations for courses in the 180–199 range, courses conducted in English, and courses taken outside the department are identical to those for the standard major.

Period requirement for students in the class of 2025 and beyond  A minimum of one of the ten courses toward the major, or one of the twelve courses toward the intensive major, must deal predominantly with materials from the period preceding 1800. The pre-1800 course may be either a Group B (taught in French) or a Group C course (taught in English). This requirement applies to all French majors, including those who opt for the standard or intensive translation track.

Translation track  Students may elect to pursue the translation track within the French major. Translation track majors are expected to take a minimum of two courses in French translation as two of the ten credits required for the standard major, or twelve credits required for the intensive major. Within the department, this requirement can be fulfilled by taking FREN 191 and 192. Students who opt for the translation track may in this case take up to four courses numbered 180–199, rather than the standard two courses. For their senior requirement, translation track students undertake a literary translation project of similar length to the senior essay (see below).

Credit/D/Fail  One required course taken Credit/D/Fail may be counted toward the major (excluding the senior essay requirement).

SENIOR REQUIREMENT

All majors must write a senior essay showing evidence of careful reading, appropriate 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 DUS by April 18, 2022 (fall-term essay), or November 4, 2022 (spring-term essay). A one-page prospectus and bibliography are due September 16, 2022 (fall term), or January 27, 2023 (spring term). A rough draft must be submitted to the adviser by October 31, 2022 (fall term), or March 27, 2023 (spring term). Two copies of the final essay are due in the department by December 2, 2022 (fall term), or April 21, 2023 (spring term).

Students electing a two-term essay  must select their subject and adviser by the end of the junior year and enroll in FREN 493 and FREN 494 during the senior year. The essay should be around 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 DUS by April 18, 2022. A one-page prospectus and bibliography are due September 16,
2022. Students must submit an initial rough draft to their adviser by January 27, 2023, and a complete draft by March 27, 2023. Two copies of the final essay are due in the department by April 21, 2023.

**Translation track majors undertake a literary translation project** of similar length to the senior essay, working with a member of the French department ladder faculty. The senior translation project should include a critical introduction, of a length to be determined by the student in consultation with the directing faculty member. The same submission dates as the one-term essay and the two-term essay apply to the senior translation project. Translation track students should sign up for FREN 492 for the single-term essay or for FREN 495 and 496 for the two-term essay, in the fall and spring terms respectively. Materials submitted for the translation essay cannot be the same as the materials submitted for any translation courses that count toward the major.

**ADVISING**

All students in the major are encouraged to take as many advanced courses as possible from all historical periods, covering as many genres and critical approaches as possible. As stipulated above, all majors in the Class of 2025 and beyond are also required to take at least one pre-1800 course. Candidates for the major should make contact with the DUS as early as the beginning of the sophomore year and no later than the fall term of the junior year. Students planning to study abroad or to petition for completion of two majors should contact the DUS during the sophomore year.

**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 courses from other departments. Close consultation with the relevant departmental advisers is required. Candidates for the Special Divisional Major should consult the DUS in French by the fall term of the junior year.

**Study abroad** Students are encouraged to spend a term or a year abroad, for which appropriate course credit is granted. With prior approval of the DUS, summer study abroad may also receive course credit. Further information may be obtained from the Center for International and Professional Experience, from Yale Study Abroad, and from French Department’s Study Abroad Coordinator, Constance Sherak (constance.sherak@yale.edu).

**REQUIREMENTS OF THE MAJOR**

**Prerequisite** FREN 150 or equivalent as approved by the DUS

**Number of Courses** *Standard major and translation track*—10 term courses numbered 160 or above (including senior essay); *Intensive major*—12 term courses numbered 160 or above (including senior essay)

**Specific Course Required** FREN 170 or equivalent

**Distribution of courses** *Standard major*—at least 4 courses in Group B numbered 200 or above; no more than 2 courses numbered FREN 180–199; no more than 2 courses conducted in English; one pre-1800 course; *Intensive major*—same as standard, plus 1 addtl Group B course numbered 200 or above; *Translation track (both standard and*
intensive) — same as standard, except min of 2 translation courses and no more than 4 courses numbered FREN 180–199

**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);  
*Translation track* — one-term literary translation essay (FREN 492);  
*Intensive major* — one-term (FREN 491) or two-term senior essay in French or English (FREN 493, 494);  
*Translation track, Intensive major* — one-term senior essay (FREN 492) or two-term literary translation essay (FREN 495, 496)

**CERTIFICATE OF ADVANCED LANGUAGE STUDY**

The French Department offers a Certificate of Advanced Language Study to Yale College undergraduates including French majors.

**REQUIREMENTS**

Students seeking to earn the Certificate of Advanced Language Study in French are required to take four courses beyond the L4 level, at least two of which must be Yale courses designated as L5. Additionally, the French Department requires that a minimum of one of the four required courses be a French Department course listed at the 200-level or above. All courses must be taken for a letter grade, and students must achieve a grade of B or above. With the approval of the DUS, one advanced non-L5 course, conducted in the target language, such as an independent study course or a graduate seminar may count toward certification requirements.

The DUS may also approve the substitution of up to two credits earned during study abroad and taught in the target language to count toward the certificate requirements. If the DUS approves courses taken outside of Yale for inclusion in the certificate requirements, students must take the necessary steps to ensure those courses appear on their transcript.

No courses taken Credit/D/Fail may be counted toward the requirements of the certificate. *(Please note that this rule does not apply to courses awarded a universal pass in Spring 2020.)*

If a student has fulfilled these requirements, they are invited to complete the Declaration of Candidacy for a Certificate Form using this Qualtrics Survey. Once completed, the form sends notification emails to the certificate adviser(s) and to the Yale University Registrar’s Office so that the student’s Degree Audit can be updated with the Certificate of Advanced Language Study in French.

The French DUS, Thomas C. Connolly (thomas.c.connolly@yale.edu), advises students on the certification process and certifies to the University Registrar’s Office that students have completed the stated requirements before the end of eight terms of study. The Certificate of Advanced Language Study, once certified, is listed on the student transcript.

If you have any questions, please contact the French DUS Thomas C. Connolly (thomas.c.connolly@yale.edu) or the French Department Registrar Bethany Hayes (bethany.hayes@yale.edu).
FACULTY OF THE DEPARTMENT OF FRENCH

Professors R. Howard Bloch, Marie-Hélène Girard (Visiting), Alice Kaplan, Pierre Saint-Amand, Maurice Samuels

Associate Professors Morgane Cadieu, Thomas C. Connolly

Assistant Professors Jill Jarvis, Christophe Schuwey

Senior Lecturers Lauren Pinzka, Maryam Sanjabi

Senior Lectors Soumia Koundi, Matuku Ngame, Françoise Schneider, Constance Sherak, Candace Skorupa

Lector Léo Tertrain
German Studies

**Director of undergraduate studies:** Theresa Schenker (theresa.schenker@yale.edu), HQ 354, 432-6401; **Language Program Director:** Theresa Schenker (theresa.schenker@yale.edu), HQ 353, 432-6401; german.yale.edu

The major in German Studies covers a broad tradition of more than five centuries in Germany, Austria, Switzerland, and neighboring lands. Students gain deep competence in the German language while also reading celebrated literature, analyzing distinctive artworks in many media, deducing intensive theories, and exploring political, linguistic, and cultural histories. The German faculty works closely with undergraduates to develop their special areas of interest within the rich currents of German culture.

German language courses emphasize listening, speaking, reading, and writing in interaction with authentic cultural materials. The curriculum also introduces students to the basic questions and methods of literary criticism, with a focus on rigorous reading practices for a wide range of works from different genres, disciplines, and historical moments.

German Studies courses are diverse in their topics and highly relevant to other fields of study today. Pioneers in philosophy, political theory, sociology, psychology, history, classical philology, the visual arts, architecture, and music wrote and thought in German, as did founders of the modern natural and practical sciences. Majors discover Kant, Goethe, Beethoven, Einstein, Freud, Kafka, Arendt, and many other thinkers and writers who laid the groundwork for modernity and still hold keys to understanding it.

Germany is the fourth-largest economy in the world, and German is the first language of over 95 million people worldwide. Students with a foundation in the language, literature, history, and intellectual revolutions of Germany are prepared to enter a wide variety of vocations. Majors have gone on to postgraduate study in Germany and the United States, and many have entered top-tier law schools and graduate programs. Recent graduates work in fields as diverse as environmental policy, journalism, arts management, consulting, and engineering, as well as in governmental and nongovernmental organizations and businesses.

**PREREQUISITES**

Prerequisite to the major are first- and second-year German or the equivalent.

**COURSE NUMBERING**

**Group A courses** Courses in Group A (GMAN 110–159) correspond to Yale's L1 to L5 designation of elementary, intermediate, and advanced language courses.

**Group B courses** Courses in Group B (GMAN 160-level and 170-level) are advanced L5 courses. Readings are in German, and the language of instruction is German. There is no restriction on the number of Group B courses that may count toward the major, provided all requirements are met.

**Group C courses** Courses in Group C (above GMAN 200) are all other courses. The language of instruction is typically English, but readings may be in German and/or English. Course level and prerequisites vary according to the expectations of the instructors.
PLACEMENT PROCEDURES
An online placement examination will be accessible July 1 through August 15, 2022. See the department website for details. Students wishing to take the placement exam in January should sign up with the language director by December 1, 2022. Students may also consult with the director of undergraduate studies (DUS) 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
The major in German Studies consists of ten term courses, including the senior essay. All majors must complete at least one GMAN course numbered in the 150s, one in the 160s, and one in the 170s, plus six additional courses—four in the area of concentration and two electives—from Groups B and C, numbered GMAN 160 and above. With permission of the DUS, some substitutions and exceptions may be possible.

Areas of concentration Each German Studies major selects an area of concentration from five choices: (1) literature, (2) media and media theory, (3) history and politics, (4) critical thought, and (5) aesthetics and the arts. The literature concentration gives students access to worlds of thought and action. Students learn to read critically poetry, novels, plays, short stories, aphorisms, songs, and other genres. Courses fulfilling the literature concentration include at least one course each in nineteenth- and twentieth-century literature. The concentration in media and media theory explores a vibrant tradition of experimentation in new cultural forms and media in the nineteenth and twentieth centuries. Students investigate photography, radio, film, television, and computer media alongside landmark works in media theory. The history and politics concentration focuses on world-altering historical events and thought-altering theories of history from the Germanic tradition. Students become familiar with explosive political and social events, including the emancipation of the Jews and the Holocaust, the world wars, unification and reunification, and concepts and models for development in economy, social welfare, law, and environmental policies. The concentration in critical thought focuses on traditions of theoretical reflection on society, history, art, and language. Students become familiar with authors such as Kant, Hegel, Marx, Nietzsche, Freud, Benjamin, and Habermas. The aesthetics and the arts concentration surveys the rich Germanic traditions in the visual and musical arts, as well as the philosophical study of art beginning in eighteenth-century Germany.

Credit/D/Fail A maximum of two courses taken Credit/D/Fail may count toward the major, with permission of the DUS.

SENIOR REQUIREMENT
Seniors in the standard German Studies major enroll in GMAN 492, a guided senior essay tutorial course. Students meet biweekly with the DUS 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 DUS by September 8, 2022; a three-page prospectus and a bibliography are due by September 22. A rough draft must be submitted to the adviser by November 3. The completed essay, due on December 8, 2022, is judged by the faculty adviser and a second reader.

**Intensive major** 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 GMAN 492 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 DUS by October 22, 2022. The student must submit a draft of at least fifteen pages of the essay by December 1, 2022, to receive credit for the first term of the course. The second term, GMAN 493, is devoted to completing the essay, which should be substantial (between fifty and sixty pages); the completed essay must be submitted by April 13, 2023. The senior essay is judged by the faculty adviser and a second reader.

**ADVISING**
Candidates for the major in German Studies should consult the DUS.

**Graduate courses** 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 on the German department website or from the office of the director of graduate studies.

**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 Academic Regulations, section K, Special Academic Programs, “Year or Term Abroad.” Students who study abroad for one term may count up to two courses toward the major, with approval of the DUS. Students who study abroad for an academic year may count up to four courses toward the major, with approval of the DUS.

**REQUIREMENTS OF THE MAJOR**

**Prerequisites** First- and second-year German or equivalent

**Number of courses** 10 (incl senior req)

**Distribution of courses** At least 1 GMAN course in the 150s, at least 1 in the 160s, and at least 1 in the 170s; 4 courses in area of concentration and 2 electives (numbered GMAN 160 and above) from Groups B and C; Literature concentration — at least 1 course each in 19th- and 20th-century literature
Substitution permitted  With DUS approval, some substitutions and exceptions may be possible

Senior requirement  Senior essay tutorial (GMAN 492)

Intensive major  Two-term senior essay (GMAN 492 and 493)

CERTIFICATE OF ADVANCED LANGUAGE STUDY

The Department of Germanic Languages and Literatures offers a Certificate of Advanced Language Study in German. A certificate adviser, typically the director of undergraduate studies (DUS), advises students on the certification process and certifies to the University Registrar’s Office that students have completed the stated requirements before the end of eight terms of study. The Certificate of Advanced Language Study, once certified, is listed on the student transcript.

REQUIREMENTS

Students seeking to earn the certificate are required to take four courses beyond the L₄ level in their chosen language, at least two of which must be Yale courses designated as L₅. All courses must be taken for a letter grade, and students must achieve a grade of B or above. With the approval of the certificate adviser, one advanced non-L₅ course, conducted in the target language, such as an independent study course, a graduate seminar, or an advanced seminar may count toward certification requirements.

The certificate adviser may allow one “language across the curriculum” (LxC) course, which ordinarily is an advanced seminar with an additional weekly discussion section in the target language, to count toward the certification requirements. The adviser may also approve the substitution of up to two credits earned during study abroad and taught in the target language to count toward the certificate requirements. If the adviser approves courses taken outside of Yale for inclusion in the certificate requirements, students must take the necessary steps to ensure those courses appear on their transcripts.

Credit/D/Fail  No courses taken Credit/D/Fail may be counted toward the requirements of the certificate.

FACULTY OF THE DEPARTMENT OF GERMANIC LANGUAGES AND LITERATURES

Professors  Rüdiger Campe, Fatima Naqvi, Paul North, Brigitte Peucker, Kirk Wettters (Chair)

Assistant Professor  Katrin Truestedt

Senior Lectors II  Marion Gehlker, Theresa Schenker

Affiliated Faculty  Jeffrey Alexander (Sociology), Jennifer Allen (History), Seyla Benhabib (Political Science), David Cameron (Political Science), Paul Franks (Philosophy, Judaic Studies), Gundula Kreuzer (Music), Patrick McCreless (Music), Steven Smith (Political Science), David Sorkin (History), Nicola Suthor (History of Art), Katie Trumpener (Comparative Literature, English), Jay Winter (History)
Global Affairs

Director of undergraduate studies: Sigríður Benediktsdóttir, (sigridur.benediktsdottir@yale.edu) 202 Horchow Hall, 432-3418; jackson.yale.edu/academics/the-global-affairs-major/

The Global Affairs major prepares Yale students for global citizenship and service by enhancing their understanding of the world around them. Students in this interdisciplinary major develop expertise in contemporary global affairs that is strongly grounded in the social sciences.

Students in the Global Affairs major have the flexibility to shape their own curriculums according to their interests and ambitions. In the past, students have concentrated their coursework on economic development and poverty, global health, global climate policy, international relations, and foreign policy and diplomacy, with topics relevant to national and human security.

COURSES FOR NONMAJORS
Most Global Affairs courses are open to both majors and nonmajors. If a Global Affairs course requires an application, the application will be posted on the Jackson School of Global Affairs website.

PREREQUISITES
There are no prerequisites for the Global Affairs major. However, students interested in applying to the major are strongly encouraged to complete the following required introductory economics sequence (ECON 108, 110, or 115; and ECON 111 or 116) and work toward the language requirement early in their course planning. An introductory analysis course such as GLBL 121 is also suggested. These courses are all required for the major and progress towards completing them, at the time of application, will be considered.

REQUIREMENTS OF THE MAJOR
Thirteen term courses are required for the major in addition to a language requirement. Introductory courses in microeconomics (ECON 108, 110, or 115) and macroeconomics (ECON 111 or 116) are required, as is one intermediate course in either microeconomics or macroeconomics (ECON 121, 122, 125 or 126). All majors must take the core courses GLBL 225 and 275, and two courses in quantitative analysis, GLBL 121 and 122. GLBL 121 is recommended but can be replaced by other analysis courses including ECON 117 and S&DS 100–106, with approval of the director of undergraduate studies (DUS). Majors also take four electives and one methods course chosen from an approved group of courses in the departments of Global Affairs, History, Political Science, Economics, and other social science departments; and GLBL 499, Senior Capstone Project. For information about which courses qualify as electives, see the course matrix on the Jackson School of Global Affairs website and the course listings in Yale Course Search.

Language requirement Global Affairs majors are required to take a course designated L5 in a modern language other than English. In exceptional cases, a demonstration of proficiency can fulfill this requirement.
Credit/D/Fail  Courses taken Credit/D/Fail may not be applied to the requirements of the major, with the exception that a grade of Credit in an L5 language course may be used to demonstrate proficiency in a foreign language.

Roadmap  See visual roadmap of the requirements.

SENIOR REQUIREMENT
In the fall term of the senior year, majors must complete a capstone project in GLBL 499. Small groups of students are each assigned to a policy task force in which they apply their academic training in the social sciences to a specific problem relevant to global affairs. Each task force presents its findings and recommendations to a real-world client such as a government agency, a nongovernmental organization or nonprofit group, or a private-sector organization in the United States or abroad.

ADVISING AND APPLICATION TO THE MAJOR
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. The call for applications is posted each year on the Jackson School of Global Affairs website, circulated through the residential college deans’ offices, and noted on the Advising Resources website. For application information, visit the Jackson School of Global Affairs website.

Internships  Students in the major are encouraged to take a summer internship in the field of global affairs after their junior year. The Jackson School Career Services Office can help students find appropriate internships.

STUDY ABROAD
Global Affairs majors who plan to study abroad should consult the director of undergraduate studies (DUS) to devise a course of study prior to the term abroad.

REQUIREMENTS OF THE MAJOR
Prerequisites  None
Number of courses  13 (incl senior req; excluding lang req)
Specific courses required  ECON 108, 110, or 115; ECON 111 or 116; ECON 121, 122, 125, or 126; GLBL 225; GLBL 275; GLBL 121; GLBL 122
Distribution of courses  4 approved electives and 1 methods course
Language requirement  Advanced ability (L5) in 1 modern lang other than English
Substitution permitted  With DUS approval, GLBL 121 may be replaced by other analysis courses including ECON 117 and S&DS 100–106
Senior requirement  Senior capstone project in GLBL 499

FACULTY ASSOCIATED WITH THE PROGRAM OF GLOBAL AFFAIRS
Professors  David Engerman (History), John Gaddis (History), Jacob Hacker (Political Science), Oona Hathaway (Law), Robert T. Jensen (School of Management), Amy Kapczynski (Law, Global Health), Paul Kennedy (History), James Levinsohn (Director) (School of Management), A. Mushfiq Mobarak (School of Management), Samuel Moyn (Law), Catherine Panter-Brick (Anthropology), Peter Schott (Economics, School of Management), Ian Shapiro (Political Science), Timothy Snyder (History), Jing Tsu (East Asian Languages and Literatures), Aleh Tsyvinski (Economics), Arne Westad
(History), Steven Wilkinson (Political Science), Ernesto Zedillo (International Economics & Politics)

**Associate Professors** Alexandre Debs (Political Science), Kaveh Khoshnood (School of Public Health), Jason Lyall (Political Science), Nuno Monteiro (Political Science), Marci Shore (History), Jonathan Wyrtzen (Sociology, International Affairs)

**Assistant Professors** Lorenzo Caliendo (Economics, School of Management), Zack Cooper (School of Public Health), Gregg Gonsalves (School of Public Health), Lloyd Grieger (Sociology), Alice Miller (School of Public Health, Law), Thania Sanchez (Political Science), Kristina Talbert-Slagle (School of Medicine, Global Health)

**Senior Lecturers** Marnix Amand, Sigríður Benediktsdottir, Charles Hill (International Security Studies), Asha Rangappa, Justin Thomas

**Lecturers** Michael Brenes, Christopher Fussell, William Casey King, Nicholas Lotito (Political Science), Alice Miller (Public Health, Law), Jaimie Morse, Nathaniel Raymond, Daniel Steinmetz-Jenkins, Edward Wittenstein

**Senior Fellows** Eric Braverman, David Brooks, Howard Dean, Janine di Giovanni, Robert Ford, Clare Lockhart, Stanley McChrystal, Rakesh Mohan, David Rank, Stephen Roach, Emma Sky
Global Health Studies

Program director: Catherine Panter-Brick; (catherine.panter-brick@yale.edu) Global Health Studies Program

GLOBAL HEALTH STUDIES MULTIDISCIPLINARY ACADEMIC PROGRAM

The Global Health Studies program prepares students to critically engage with global health and its multifaceted issues in present-day societies. Global health is an interdisciplinary field, and as such, students develop a sophisticated understanding of the roles of politics, history, and economics, engage with the insights of anthropology, ethics, law, and sociology, and relate this knowledge to public health and the biomedical sciences. They complete interdisciplinary coursework across global health competency areas to gain a broad understanding of global health research, practice, and leadership. Students choose a major in another department and expand their education with courses offered by Global Health Studies.

Students who apply to the program, typically in the fall of their sophomore year, become Global Health Scholars. They complete interdisciplinary coursework across four of the six global health competency areas: Biological & Environmental Influences on Health (YC GLHTH: Bio & Env Influences); Health & Societies (YC GLHTH: Health & Societies); Historical Approaches (YC GLHTH: Hist Approaches); Performance, Representation & Health (YC GLHTH: Perf, Rep & Health); Political Economy & Governance in Health (YC GLHTH: Polit Econ & Govern); and Understanding & Interpreting Quantitative Data (YC GLHTH: Quantitative Data). Scholars can search for courses satisfying a competency area in Yale Course Search by clicking the drop-down menu entitled, "Any Course Information Attribute" and searching for the attribute as listed in parentheses after the competency title. Moreover, in the summer after junior year, Scholars can apply for funding support to pursue mentored experiential learning projects (such as internships, archival work, or field-based research). During their senior year, they enroll in a colloquium course which meaningfully integrates the skills and knowledge acquired throughout the program. To fulfill the requirements of the program, students must complete the global health introductory lecture course (HLTH 230), senior colloquium (HLTH 490), and four elective courses that fulfill four of the global health competency areas.

Qualified undergraduates may take graduate courses at the School of Public Health, subject to restrictions on graduate and professional school enrollment described in Academic Regulations, section L, Special Academic Arrangements. Further information about these courses can be found in the School of Public Health online bulletin. For information about the five-year B.A.–B.S./M.P.H. program offered jointly with the School of Public Health, see Public Health.

REQUIREMENTS OF THE PROGRAM

Prerequisite  None
Number of courses  6 courses (incl senior req)
Specific course required  HLTH 230
Distribution of courses  4 electives to achieve four of the six global health competencies as indicated
Senior requirement  HLTH 490, Senior colloquium
Hellenic Studies

Chair: John Geanakoplos (john.geanakoplos@yale.edu), 30 Hillhouse Ave., 432-3397; Director: George Syrimis (george.syrimis@yale.edu), 34 Hillhouse Ave., 432-9342; http://hsp.macmillan.yale.edu

Hellenic Studies is a program of the European Studies Council. 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, Comparative 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 program director of the Hellenic Studies program.

FACULTY ASSOCIATED WITH THE PROGRAM OF HELLENIC STUDIES

Professor  John Geanakoplos (Economics)

Lecturers  Paris Aslanidis (Political Science), George Syrimis (Comparative Literature)

Senior Lector  Maria Kaliambou (Language and Folklore)
History

**Director of undergraduate studies:** Mark Peterson (mark.a.peterson@yale.edu), 190 York St., 432-2724; history.yale.edu

The History major is for students who understand that shaping the future requires knowing the past. History courses explore many centuries of human experimentation and ingenuity, from the global to the individual scale. History majors learn to be effective storytellers and analysts, and to craft arguments that speak to broad audiences. They make extensive use of Yale's vast library resources to create pioneering original research projects. Students of history learn to think about politics and government, sexuality, the economy, cultural and intellectual life, war and society, and other themes in broadly humanistic—rather than narrowly technocratic—ways.

History is one of Yale College’s most popular and intellectually diverse majors, encompassing nearly every region and time period of the global past. The study of history is excellent preparation for careers in many fields, including law, journalism, business and finance, education, politics and public policy, social activism, and the arts.

**COURSE NUMBERING**

Courses numbered HIST 001–099 are First-Year Seminars, with enrollment limited to eighteen. Remaining course numbers are organized by region, not by rigor or difficulty. Courses numbered in the 100s explore the history of the United States or Canada; those in the 200s, Europe, Russia, and Britain; and those in the 300s, Africa, Asia, Latin America, and the Middle East. Courses numbered in the 400s address global topics. Courses whose numbers end with the letter “J” are departmental seminars; all departmental seminars are available for preregistration by History majors and are capped at fifteen students.

**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.

**REQUIREMENTS OF THE MAJOR**

Ten term courses in History are required, including prerequisites, and in addition to the senior essay.

Upon declaration, all History majors select either the global or the specialist track. The global track is designed for students seeking a broad understanding of major trends in the history of human societies throughout the world. The specialist track is for students seeking to focus in a particular geographic region, such as the United States, or in a thematic pathway, such as empires and colonialism. Majors may change tracks until the end of the course selection period in the second term of the junior year.

*The global track* requires one course in each of six different geographic regions (see below). Students must also take two preindustrial courses, covering material before the year 1800, and two departmental seminars, identified by a “J” suffix to the course number (such as HIST 138J).

*The specialist track* requires at least five (and up to eight) courses in a particular geographic region or in a thematic pathway (see list below). Courses appropriate for
each region and pathway are listed on the department website. Students must also take at least two courses outside their area of specialization, and their overall course work must include at least three geographic regions. Like students in the global track, students in the specialist track must take two preindustrial courses, covering material before the year 1800, and at least two departmental seminars, identified by a "J" suffix to the course number (e.g. HIST 138J). Students in the specialist track may design an area of specialization with the approval of a faculty adviser and the director of undergraduate studies (DUS).

Regions: Africa, Asia, Europe, Latin America, Middle East, and United States

Pathways: cultural history; empires and colonialism; environmental history; ideas and intellectuals; international and diplomatic history (formerly international history); politics, law, and government (formerly politics and law); race, gender, and sexuality; religion in context; science, technology, and medicine; social change and social movements; war and society; the world economy

Students in either track may count the same courses toward geographical, preindustrial, and seminar requirements. For instance, a departmental seminar on premodern Japan simultaneously fulfills the preindustrial, seminar, and Asia geographical requirements.

**Departmental seminars** All students who declare the History major are entitled to preregister for two departmental seminars (designated by a course number ending in J, such as HIST 138J). Many seminars are popular and fill up quickly. Students may use their preregistration privileges at any time after declaring the major, in their sophomore, junior, or senior years. Sophomores contemplating study abroad are urged to consider taking at least one seminar in the sophomore year. Residential College Seminars, study abroad courses, and courses in other departments that count toward the History major do not fulfill the departmental seminar requirement.

**Distinction in the major** Students who receive an A or A– on the two-term senior essay and who receive the requisite grades in their remaining coursework are awarded Distinction in the Major. (See The Undergraduate Curriculum, Honors.) Students who do not complete the two-term senior essay are not eligible for Distinction.

**Credit/D/Fail** Departmental seminars cannot be taken Credit/D/Fail.

**Roadmap** See visual roadmap of the requirements.

**SENIOR REQUIREMENT**

Students in the History major are not passive consumers of historical knowledge: they create original works of history themselves. As seniors, History majors complete a work of original research in close consultation with a faculty adviser. The range of acceptable topics and methodological approaches is wide. The aim is to take on study of a significant historical subject through research in accessible primary source materials.

Most students choose to write a two-term independent senior essay, for two course credits toward the major. The two-term essay is required to earn Distinction in the Major. A smaller number of students choose to write an independent one-term senior essay, for one course credit toward the major.

**The one-term senior essay** History majors may choose to write a one-term independent senior essay during the fall term under the guidance of a faculty
adviser; however, students who choose the one-term option are not eligible for Distinction in the Major or history prizes. The one-term essay is a substantial research paper (roughly half the length of the two-term senior essay) based on primary sources, along with a bibliographic essay. Seniors receive course credit for their departmental essays by enrolling in HIST 497 during the fall of senior year. In rare circumstances, with permission of the adviser and senior essay director, a student enrolled in HIST 497 during the fall term may withdraw from the course in accordance with Yale College regulations on course withdrawal and enroll in HIST 497 during the spring term. Additional details about the senior essay are provided in the Senior Essay Handbook, available on the History website.

The two-term senior essay History majors seeking to earn Distinction in the Major must complete a two-term independent senior essay under the guidance of a faculty adviser. The typical senior essay is 40–50 pages (no more than 12,500 words), plus a bibliography and bibliographical essay. Seniors receive course credit for their departmental essays by enrolling in HIST 495 (first term of senior year) and HIST 496 (second term of senior year). The grade for the final essay, determined by an outside reader in consultation with the faculty adviser, is applied retroactively to both terms. Additional details about the senior essay are provided in the Senior Essay Handbook, available on the History website. History majors graduating in December may begin their two-term senior essay in the spring term and complete the senior essay during fall term.

Additional option for the senior essay Some students embark on the two-term essay but discover that their choice is not a good fit. Students who enroll in HIST 495 during the first term may opt out in consultation with their faculty adviser and the senior essay director. This decision must be made in accordance with Yale College regulations on course withdrawal. Instead, the student will enroll in HIST 497 in the spring term to write a one-term senior essay. Students who opt out will not be eligible for Distinction in the Major or History prizes. Additional details about the senior essay are provided in the Senior Essay Handbook, available on the History website.

ADVISING

All students who declare the History major are assigned an adviser from among the departmental faculty. The adviser is available throughout the year for consultation about courses and the major. Students in the global track are assigned an adviser from the general History faculty. Students in the specialist track are assigned an adviser in their area of specialization. At the beginning of each term, students majoring in History must have their schedule signed and approved by their departmental adviser or by the DUS. Students may request a specific adviser in consultation with the DUS, though the department cannot always accommodate such requests.

Course substitution History majors are permitted to include up to two courses taught outside the department toward fulfillment of the major, with the approval of the DUS. Nondepartmental courses may fulfill geographic, region/pathway, and preindustrial distribution requirements. They may not fulfill departmental seminar or senior requirements.

Combined B.A./M.A. degree program Exceptionally able and well-prepared students may complete a course of study leading to the simultaneous award of the B.A. and M.A.
degrees after eight terms of enrollment. See Academic Regulations, section K, Special Academic Programs, “Simultaneous Award of the Bachelor’s and Master’s Degrees.” Interested students should consult the DUS prior to the sixth term of enrollment for specific requirements in History.

REQUIREMENTS OF THE MAJOR

Prerequisites 2 term courses in History

Number of courses 10 term courses (incl prereqs, not incl senior essay)

Distribution of courses Both tracks — 2 courses in preindustrial hist as specified; 2 departmental sems; Global track — 1 course in each of 6 geographical regions (Africa, Asia, Europe, Latin America, Middle East, U.S.); Specialist track — at least 5 courses in specific region or pathway; at least 2 courses outside region or pathway; overall course work must include 3 regions

Substitution permitted 1 or 2 nondepartmental courses approved by DUS

Senior requirement Two-term senior essay (HIST 495 and 496) or one-term senior essay (HIST 497)

FACULTY OF THE DEPARTMENT OF HISTORY


Associate Professors Paola Bertucci, Rohit De, Marcela Echeverri, Anne Eller, Crystal Feinster, Elizabeth Hinton, Andrew Johnston, Isaac Nakhimovsky, Joanna Radin, William Rankin, Edward Rugemer, Marci Shore, Eliyahu Stern, Jonathan Wyrtszen

Assistant Professors Jennifer Allen, Sergei Antonov, Denise Ho, Jessica Lamont, Ben Machava, Nana Quarshie, Carolyn Roberts

Senior Lecturers Jay Gitlin, William Klein, Stuart Semmel, Rebecca Tannenbaum

Lecturers Sakena Abedin, Ria Chae, Ivano Dal Prete, Suzanne Gay, Maria Jordan, Tyler Kynn, George Levesque, Chitra Ramalingam, Terence Renaud, Miriam Rich
History of Art

Director of undergraduate studies: Jacqueline Jung
(jacqueline.jung@yale.edu); arthistory.yale.edu

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.

Course Numbering

100-level courses are broad introductory surveys that address basic art history from a number of regional and thematic perspectives. Prospective majors are encouraged to take the surveys as early in their course of study as possible. Under certain circumstances, students who have taken the Advanced Placement test in art history may earn acceleration credit and, in consultation with the director of undergraduate studies (DUS), may place out of one required 100-level course.

Intermediate and advanced courses, numbered above 200, encompass more specialized surveys and themes in art history.

Requirements of the Major

Twelve term courses are required to complete the major: two introductory courses at the 100 level; four intermediate and advanced courses at the 200 and 300 levels; two seminars at the 400 level; a methods seminar, HSAR 401; two electives; and the senior essay, HSAR 499.

The major requires that the six intermediate and advanced courses must satisfy both a geographical and a chronological distribution requirement. These courses must be chosen from four geographical areas and four time periods. The geographical requirement is divided into five areas: Africa and the Pacific; the Americas; Asia and the Near East; Europe; and transregional. The chronological requirement is similarly divided into five segments: earliest times to 800; 800–1500; 1500–1800; 1800 to the present; and transchronological. A single course can fulfill both a geographical and a chronological requirement. Only classes originating in the History of Art department can fulfill the distribution requirements.

Junior seminar The methods seminar HSAR 401, Critical Approaches to Art History, is a wide-ranging introduction to the practices of the art historian and the history of the discipline. It is to be taken during the fall or spring term of the junior year.

Credit/D/Fail courses Courses taken Credit/D/Fail may not be counted toward the requirements of the major.

Roadmap See the visual roadmap of the requirements.

Senior Requirement

The senior essay is a research paper written usually in one term in 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 and/or with the DUS. It is also possible to write a two-term senior essay; students
wishing to do so must submit a petition to the DUS and the prospective adviser, normally by the first week after spring break of the junior year.

**ADVISING**

Electives may include courses from other departments if they have direct relevance to the major program of study. Approval of the DUS is required.

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.

**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 H. Loria Center, 190 York St.

**REQUIREMENTS OF THE MAJOR**

**Prerequisites** None

**Number of courses** 12 term courses (incl senior req)

**Specific courses required** HSAR 401

**Distribution of courses** 2 courses at 100 level; 6 courses numbered above 200, 2 of which must be 400-level seminars, fulfilling distribution requirements in 4 geographical and 4 chronological categories; 2 electives

**Substitution permitted** With DUS permission, 2 electives from related depts

**Senior requirement** Senior essay (HSAR 499)

**FACULTY OF THE DEPARTMENT OF HISTORY OF ART**

**Professors** Carol Armstrong, Tim Barringer, Marisa Bass, Edward S. Cooke, Jr., Cecile Fromont, Milette Gaifman, Jacqueline Jung, Pamela Lee, Kishwar Rizvi, Nicola Suthor, Mimi Yiengpruksawan

**Associate Professors** Craig Buckley, Molly Brunson (*Slavic Languages and Literatures*), Jennifer Raab

**Assistant Professors** Joanna Fiduccia, Subhashini Kaligotla, Morgan Ng, Quincy Ngan
History of Science, Medicine, and Public Health

**Director of undergraduate studies:** Ivano Dal Prete (ivano.dalprete@yale.edu), EM 310; hshm.yale.edu

History of Science, Medicine, and Public Health is an interdisciplinary program that focuses on how different forms of knowledge and technology have been created in various times, places, and cultures, and how they have shaped the modern world. The major explores a wide range of questions. For example, is science universal, or does each culture have its own approach to trustworthy knowledge? What is the relationship between medical expertise, social inequality, and everyday life? What is the nature of technology and its relationship to political, economic, and military power? Why do even the best public health campaigns have unintended consequences?

Course topics include the history of American and Western medicine and public health, medicine and race from the slave trade to the present, health and healing in Africa, scientific knowledge production in the global South, institutions of confinement, health activism, biotechnology, the history of the earth sciences, climate change and planetary catastrophe, the scientific revolution, scientific collections and material culture.

A major in History of Science, Medicine, and Public Health offers excellent preparation for a wide range of careers. Premedical students and others interested in health-related fields can combine preprofessional training with a broad humanistic education. The major also provides a solid foundation for any career at the intersection of the sciences, technology, and public life, including law, business, journalism, museum work, public policy, and government.

**REQUIREMENTS OF THE MAJOR**

The major in History of Science, Medicine, and Public Health requires twelve term courses (and twelve credits), including the two-term senior requirement. Students select a concentration of seven courses that guides them through an area of specialization. The seven concentration 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 full-credit science course; and three electives chosen from relevant courses in any department.

**Concentrations** The five standard concentrations in the major are Medicine and Public Health; Global Health; Science, Technology, and Society; Gender, Reproduction, and the Body; and Media, Knowledge, and Visual Cultures. Students may also design customized concentrations in consultation with the director of undergraduate studies (DUS). No later than the beginning of the junior year, students in the major must select a standard concentration or indicate that they wish to design their own.

**Electives** Beyond the seven concentration 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 concentration other than the one selected for the major. All courses for the major are chosen in collaboration with the student’s adviser.
Credit/D/Fail A maximum of one History of Science, Medicine, and Public Health course taken Credit/D/Fail before the fifth term of enrollment may be counted toward the requirements of the major.

Roadmap See visual roadmap of the requirements.

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 HSHM-listed course to complete the major. Only students who complete a yearlong senior project are eligible for Distinction in the Major.

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 website.

REQUIREMENTS OF THE MAJOR

Prerequisites None

Number of courses 12 term courses (incl senior req)

Distribution of courses 7 courses in concentration, incl 2 HSHM courses, 1 sem in HSHM or HIST numbered 100 or above, 1 science course, and 3 electives; 3 addtl HSHM electives, incl 1 sem and 1 course outside major concentration

Senior requirement Yearlong project (HSHM 490, 491), or one-term project (HSHM 492) and 1 addtl HSHM elective

FACULTY ASSOCIATED WITH THE PROGRAM OF HISTORY OF SCIENCE, MEDICINE, AND PUBLIC HEALTH

Professors Deborah Coen, Naomi Rogers, John Warner

Associate Professors Paola Bertucci, Joanna Radin, William Rankin

Assistant Professors Nana Quarshie, Marco Ramos, Carolyn Roberts

Lecturers Sakena Abedin, Ivano Dal Prete, Ziv Eisenberg, Chitra Ramalingam

Affiliated Faculty Rene Almeling (Sociology), Toby Appel (Yale University Library), Melissa Grafe (Yale University Library), Dimitri Gutas (Near Eastern Languages & Civilizations), Ann Hanson (Classics), Jessica Helfand (School of Art), Marcia Inhorn (Anthropology), Kathryn James (Yale University Library), Amy Kapczynski (Law School), Gundula Kreuzer (Music), Amy Meyers (Yale Center for British Art), Alan Mikhail (History), Ayesha Ramachandran (Comparative Literature), Paul Sabin (History), Jason
Schwartz (School of Medicine), Gordon Shepherd (School of Medicine), Frank Snowden (History), Rebecca Tannenbaum (History), R. John Williams (English)
Human Rights Studies

**Program director:** James Silk (humanrights.program@yale.edu), L39 SLB, 432-1729; humanrights.yale.edu

**HUMAN RIGHTS STUDIES MULTIDISCIPLINARY ACADEMIC PROGRAM**

The Multidisciplinary Academic Program in Human Rights Studies presents human rights as a rich and interdisciplinary field of study. The program provides students with the analytical, conceptual, and practical skills necessary for human rights study; connects students to affiliate faculty and peers; supports student research projects and internships; and offers guidance for post-graduate careers and studies related to human rights. Students apply to the Multidisciplinary Academic Program in Human Rights Studies during the fall term of the sophomore year. Students in the program also complete the requirements of a Yale College major. Yale College does not offer a major in human rights.

To fulfill the requirements of the program, students complete a gateway course (HMRT 100), four electives, and a capstone seminar (HMRT 400), which entails completion of a final capstone project. The gateway course equips students with the theoretical tools necessary for studying human rights, their evolution, and their justification. It introduces a number of contemporary issues such as gender disparities, racial discrimination, climate change, global health, human trafficking, refugees, world poverty, and humanitarian intervention. Students select four electives from a list of eligible courses provided at the start of each term. In the capstone seminar, students explore selected advanced issues in international human rights law and advocacy and complete a supervised capstone project that is informed by extracurricular experience and developed in consultation with the program director and other program advisers. Students’ capstone projects may draw on ideas and methods of a wide variety of disciplines.

Students are also expected to submit three reflections on Schell Center human rights events during the spring term of their sophomore year and one event reflection each term thereafter. They also attend program events and gatherings, including weekly dinners during the sophomore spring term and junior fall term. Additional information is available at the Human Rights program website.

**REQUIREMENTS OF THE PROGRAM**

**Prerequisite** None
**Number of courses** 6 courses (incl senior req)
**Specific courses required** HMRT 100
**Other requirements** 4 electives and event reflections as described
**Senior requirement** HMRT 400

**ADVISORY COMMITTEE FOR THE MULTIDISCIPLINARY ACADEMIC PROGRAM IN HUMAN RIGHTS STUDIES**

Public Health), Samuel Moyn (Law School, History), Jill Richards (English), James Silk (Law School), David Simon (Political Science), Quan Tran (Ethnicity, Race, and Migration, American Studies), Elisabeth Wood (Political Science)
Humanities

**Director of undergraduate studies:** Paul Grimstad, (paul.grimstad@yale.edu) HQ, 320 York St.; chair: Francesco Casetti, (francesco.casetti@yale.edu) HQ, 320 York St.

The undergraduate program in Humanities provides students the opportunity to integrate courses from across the humanistic disciplines into intellectually coherent and personally meaningful courses of study. Works of literature, music, history, philosophy, and the visual arts are brought into conversation with one another and with the history of ideas. The major offers both interdisciplinary breadth and intellectual depth.

The major in Humanities asks students to begin with broad surveys of foundational works in at least two different cultural traditions, including at least one course on classical Western European texts. All majors take two specially commissioned core seminars, one on the question of what "modernity" is, another spending a whole term interpreting a single work (or small corpus of works) in great depth. Students then devise an area of concentration according to their interests and with the help of appropriate faculty members.

**COURSES FOR NONMAJORS**

Students in all classes can find options in the varied course offerings, from special seminars for first-year students to the Franke and Shulman Seminars for seniors. Many courses are open to nonmajors.

**REQUIREMENTS OF THE MAJOR**

Fourteen term courses are required for the major, including three “foundational works” surveys, two core seminars, one course in each of four areas of study in the humanities (which may include the Franke and Shulman Seminars), four additional electives selected to complement the student’s area of concentration and approved by the director of undergraduate studies (DUS), and a one- or two-term senior essay. Majors are also required to keep an intellectual journal and are strongly encouraged to enroll in at least one term course in literature in a foreign language.

**Foundations** Three broad surveys of foundational works in any cultural tradition are required, such as HIST 280, EALL 200, or RLST 189. One or two foundations courses must be in the classical tradition of Western Europe, such as Directed Studies, or ENGL 129 or CLCV 256.

**Core seminars** The major requires two core seminars, one in “Modernities” and one in “Interpretations.” Core seminars typically are taught by a pair of faculty members from complementary disciplines. The two broad themes of the seminars remain consistent from year to year, but the material studied and the faculty members teaching change, allowing each class of students to explore the themes in different ways.

**Areas of study in the humanities** One course is required in each of four areas: literature; visual, musical, or dramatic arts; science in the humanities; and intellectual history and historical analysis. Courses may be drawn from any department or program in Yale College, with the approval of the DUS.

**Intellectual journal** Students are encouraged to log entries outlining particularly striking moments in their intellectual lives, whether in courses or outside of them, and
to keep track of questions they would like to pursue in their studies, including possible senior essay topics. Students submit a minimum of one journal entry each semester to the DUS.

Credit/D/Fail For students in the Class of 2025 and subsequent classes, a maximum of two courses taken Credit/D/Fail may count toward the major.

Roadmap See visual roadmap of the requirements.

SENIOR REQUIREMENT
A one- or two-term senior essay is required (HUMS 491).

ADVISING
Students are expected to declare their intent to major in Humanities in a meeting with the DUS before their junior year.

UNIQUE TO THE MAJOR
The Franke Seminar 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 Seminar 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 DUS and the instructor.

Summer program in Rome Humanities majors who take the course HUMS 444, The City of Rome (or its equivalent, with instructor approval), 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. Further information is available on the Humanities program website and the Yale Summer Session website.

REQUIREMENTS OF THE MAJOR
Prerequisites None
Number of courses 14 term courses (incl senior essay)
Distribution of courses 3 foundations courses, as specified; 2 core sems, as specified; 1 course in each of 4 disciplinary areas; 4 electives in concentration
Senior requirement Senior essay (HUMS 491)

Intellectual journal A minimum of one journal entry every term

FACULTY ASSOCIATED WITH THE PROGRAM OF HUMANITIES
Professors Jeffrey Alexander (Sociology), R. Howard Bloch (French), Edyta Bojanowska (Slavic Languages and Literatures), Leslie Brisman (English), David Bromwich (English), Ardis Butterfield (English), Rüdiger Campe (German), Francesco Casetti (Humanities), Deborah Coen (History of Science, Medicine, and Public Health, History), Stephen Davis (Religious Studies, History), Carolyn Dean (History, French), Carlos Eire (History, Religious Studies), Paul Freedman (History), Kirk Freudenburg (Classics), Bryan Garsten (Political Science), Marie-Hélène Girard (French), Emily Greenwood (Classics), Frank Griffel (Religious Studies), Martin Hägglund (Comparative Literature, Humanities), Christine Hayes (Religious Studies, Judaic Studies), Alice Kaplan (French), Jonathan
Kramnick (English), Anthony Kronman (School of Law), Tina Lu (East Asian Languages and Literatures), Ivan Marcus (History, Religious Studies), Stefanie Markovits (English), Giuseppe Mazzotta (Italian), Samuel Moyn (History, School of Law), Robert Nelson (History of Art), Paul North (German), John Durham Peters (English, Film & Media Studies), Brigitte Peucker (German), Pierre Saint-Amand (French), Maurice Samuels (French), Steven Smith (Political Science, Philosophy), Nicola Suthor (History of Art), Gary Tomlinson (Music, Humanities), Shawkat Toorawa (Near Eastern Languages and Civilizations), Katie Trumpener (Comparative Literature), Jing Tsu (East Asian Languages and Literatures), Miroslav Volf (Divinity School), Kirk Wetters (German), Christian Wiman (Institute of Sacred Music), Ruth Yeazell (English)

Associate Professors Marisa Bass (History of Art), Paola Bertucci (History, History of Science, Medicine, and Public Health), Molly Brunson (Slavic Languages and Literatures), Robyn Creswell (Comparative Literature), Toni Dorfman (Adjunct) (Theater Studies), Emily Erikson (Sociology), Marta Figlerowicz (Comparative Literature, English), Moira Fradinger (Comparative Literature), Milette Gaifman (History of Art, Classics), Mick Hunter (East Asian Languages and Literatures), Jacqueline Jung (History of Art), Brian Kane (Music), Noreen Khawaja (Religious Studies), Pauline LeVen (Classics), Isaac Nakhimovsky (History), Joanna Radin (History of Science, Medicine, and Public Health, History), Ayesha Ramachandran (Comparative Literature), Marci Shore (History)

Assistant Professors Lucas Bender (East Asian Languages and Literatures, Humanities), Marijeta Bozovic (Slavic Languages and Literatures), Thomas C. Connolly (French), Jessica Lamont (Classics), Joseph North (English), Giulia Oskian (Political Science), Jessica Peritz (Music), Christiana Purdy Moudarres (Italian), Maryam Sanjabi (French), Katrin Truestedt (German)

Senior Lecturers Peter Cole (Judaic Studies), William Klein (Humanities), Pauline Lin (East Asian Languages and Literatures), Stuart Semmel (History, Humanities), Kathryn Slanski (Humanities, Near Eastern Languages and Civilizations), Norma Thompson (Humanities)

Lecturers Benjamin Barasch (Humanities), Brianne Bilsky (Humanities), Dane Collins, Matthew Croasmun (Divinity School), Joseph Gordon (English), Paul Grimstad (Humanities), Alfred Guy (English), Katja Lindskog (English), Ryan McAnnally-Linz (Divinity School), Terence Renaud (Humanities), Karin Roffman (Humanities, English), Daniel Schillinger (Humanities), George Syrimis (Hellenic Studies), Adam Van Doren (School of Art)

Senior Lector Constantine Muravnik (Slavic Languages and Literatures)

Lector Simona Lorenzini (Italian)
Italian Studies

**Director of undergraduate studies:** Simona Lorenzini (simona.lorenzini@yale.edu), 320 York St., 432-0508; language program director: Anna Iacovella (anna.iacovella@yale.edu), 320 York St., 432-8299; italian.yale.edu

The major in Italian Studies explores Italy’s vital role in the formation of Western thought and culture. The core language courses provide students with the opportunity to acquire an in-depth linguistic proficiency, together with a solid literary and historical background in the language. In its interdisciplinary focus, the major offers a variety of advanced courses in literature, cinema, history, translation practice, art, and gender studies. Central to the major is the conviction that delving into another language and culture, in addition to the intellectual enrichment it affords, raises students’ awareness of what is distinctive about their own cultural identity.

Italian makes an excellent second major as a complement to several extradepartmental disciplines, among them History of Art, Comparative Literature, Economics, Film and Media Studies, History, Political Science, and Architecture.

Studying and appreciating a foreign language, literature, and culture offer students a useful and challenging option in their university education. In particular, the Italian Studies major prepares for careers in international business, translation, journalism, economics, art, media, film, fashion, design, education, and tourism.

**PREREQUISITE**

Candidates for the major should have completed a course in Italian at the level of ITAL 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.

**PLACEMENT PROCEDURES**

All students who have not taken Italian at Yale are expected to take the departmental placement test, except for students who have no previous knowledge of Italian. The placement examination is completed online during the summer; see the *Calendar for the Opening Days of College* and the department website for details.

**REQUIREMENTS OF THE MAJOR**

The major consists of eleven term courses beyond the prerequisite. Eight term courses in the Italian Studies department numbered 140 or above (including graduate courses) are required, at least five of which must be conducted in Italian. The courses in the department must include either ITAL 150 or 151, a survey course on Italian literature (ITAL 162 or 172), and a course on Dante’s *Divine Comedy* (ITAL 310 or equivalent), as well as three courses covering different periods in Italian Studies: one in the Middle Ages (in addition to the course on Dante’s *Comedy*), one in the Renaissance, and one in modern Italian literature and media. The aim of these six foundational courses is to provide students with both a broad acquaintance with the major works of Italian Studies and a more detailed knowledge of specific periods in Italian literature and media. No more than three Italian department courses taught in English may count toward the major. Students intending to major in Italian Studies should consult the director of undergraduate studies (DUS).
In completing their programs, students are required to elect two courses in other languages and literatures, history of art, history, linguistics, philosophy, or media that are related to their field of study and approved by the DUS. Any graduate course in another national literature or in linguistics may be substituted for one of these two courses.

**SENIOR REQUIREMENT**

During their senior year, all students majoring in Italian Studies are required to meet with the DUS at least twice per month. In the fall or spring of the senior year, all majors 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 DUS. A recommended length for the essay is thirty pages, plus bibliography. The student and the advisor will select and invite a second faculty reader, who will receive the final version of the thesis by the established deadline. While prospectus and draft deadlines are determined by the adviser, the student must submit the final version no later than 10 days before the last day of classes, in the Fall or Spring. The senior requirement culminates in a conversation with department faculty to discuss the thesis and the student’s overall experience of study in the major.

**ADVISING**

The department's course offerings vary greatly from year to year. Students interested in planning coursework in Italian that extends beyond the current academic year should consult the DUS.

**Related majors** In addition to the major in Italian Studies, 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 DUS 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.

**Combined B.A./M.A. degree program** Exceptionally able and well-prepared students may complete a course of study leading to the simultaneous award of the B.A. and M.A. degrees after eight terms of enrollment. See Academic Regulations, section K, Special Academic Programs, “Simultaneous Award of the Bachelor’s and Master’s Degrees.” Interested students should consult the DUS prior to the sixth term of enrollment for specific requirements in Italian.

**STUDY ABROAD**

For information about the Year or Term Abroad program, see Academic Regulations, section K, Special Academic Programs, “Year or Term Abroad.”

**REQUIREMENTS OF THE MAJOR**

**Prerequisite** ITAL 130 or equivalent
Number of courses  11 term courses beyond prereq (incl senior req)

Specific courses required  ITAL 150 or 151; ITAL 162 or 172; ITAL 310 or equivalent

Distribution of courses  8 term courses in Italian dept numbered 140 or above, incl 1 in Middle Ages (in addition to ITAL 310), 1 in Renaissance, and 1 in Italian lit and media, at least 5 of these conducted in Italian; 2 courses in other langs and lits, hist of art, hist, ling, phil, or media approved by DUS

Substitution permitted  Any grad course in another national lit or in linguistics for 1 of the 2 courses in other depts, with DUS permission

Senior requirement  Senior essay in Italian (ITAL 491) and a conversation with departmental faculty members at the end of the final semester.

CERTIFICATE OF ADVANCED LANGUAGE STUDY

The Italian Department offers a Certificate of Advanced Language Study in Italian. A certificate adviser, typically the director of undergraduate studies (DUS), advises students on the certification process and certifies to the University Registrar’s Office that students have completed the stated requirements before the end of eight terms of study. The Certificate of Advanced Language Study is listed on the student’s official transcript.

REQUIREMENTS

Students seeking to earn the certificate are required to take four courses beyond the L4 level in their chosen language, at least three of which must be Yale courses designated as L5. All courses must be taken for a letter grade, and students must achieve a grade of B or above. With the approval of the certificate adviser, one advanced non-L5 course, conducted in the target language, such as an independent study course, a graduate seminar, or an advanced seminar may count toward certification requirements.

The certificate adviser may allow one “language across the curriculum” (LxC) course, which ordinarily is an advanced seminar with an additional weekly discussion section in the target language, to count toward the certification requirements. The adviser may also approve the substitution of up to two credits earned during study abroad and taught in the target language to count toward the certificate requirements. If the adviser approves courses taken outside of Yale for inclusion in the certificate requirements, students must take the necessary steps to ensure that those courses appear on their transcripts.

Credit/D/Fail  No courses taken Credit/D/Fail may be counted toward the requirements of the certificate.

FACULTY OF THE DEPARTMENT OF ITALIAN

Professors  Millicent Marcus, Giuseppe Mazzotta, Jane Tylus (Chair)

Assistant Professor  Christiana Purdy Moudarres

Senior Lectors  Michael Farina, Anna Iacovella

Lector  Simona Lorenzini

Postdoctoral Associate  Serena Bassi
Islamic Studies Certificate

Certificate director: Shawkat Toorawa (shawkat.toorawa@yale.edu) [Sp 2022]; Supriya Gandhi (supriya.gandhi@yale.edu) [F 2022; Sp 2023]

This Certificate encompasses the study of Muslim and Islamic artistic, cultural, historical, intellectual, linguistic, literary, philosophical, political, religious, sociological and scientific presence, and impact on human society over the past one and a half millennia. It allows Yale College students to curate their courses relating to Muslims and to Islam. It will be of interest to non-humanities majors with a strong interest in Islamic Studies; social science and humanities majors wishing to complement their existing interests with coursework in Islamic Studies; and self-identifying Muslim students for whom such a certificate offers an ideal way academically to explore their heritage.

REQUIREMENTS

Students must successfully complete five course credits, of which no more than two may represent the same area of study or carry the same course attribute. Currently, the four areas of study are: the study of society; the history of art, architecture, or literature; a historical period; and religious thought.

Courses are drawn from the list of approved courses posted each semester on the Islamic Studies Certificate (website coming) and as indicated in YCS by the following course attributes: Islamic Society; Islamic Art, Arch, Lit; Islamic Religion; and Islamic History. Other courses may be approved by permission of the certificate director.

Courses must be distributed as follows:

• 1 course in the study of society (Islamic Society)
• 1 course in the history of art, architecture, or literature (Islamic Art, Arch, Lit)
• 1 course in religion or religious thought (Islamic Religion)
• 1 course in history or a historical period (Islamic History)
• 1 elective from any of the four content areas

Graduate and professional school courses may count toward the Certificate; language courses and non-Yale courses may not count toward the Certificate.

In addition to the course requirements, each student must attend three lectures on topics relating to Islamic Studies and submit a brief write-up. Notice of these events can be found on the Islamic Studies Certificate (website coming).

No more than two course credits fulfilling the requirements of the Islamic Studies certificate may overlap with a major, a simultaneous degree, a multidisciplinary academic program, or another certificate. Additionally, no course credit may be applied toward the requirements of more than two curricular programs. For example, the same course credit may not be used to fulfill the requirements of two certificates and a major.

Completion Procedure and Advising

Students must apply for the Certificate at the latest one week before final schedules are due in their final semester of study, by filling out the Declaration of Candidacy for a Certificate Form using this Qualtrics Survey, attesting to the fulfillment of all
requirements, and submitting it for approval to the Certificate director. Final approval of the certificate rests with the Certificate committee and director.

**REQUIREMENTS OF THE CERTIFICATE**

**Number of courses**  5 course credits

**Distribution of courses**  1 course in each of the four content areas; 1 elective from any of the four content areas

**Additional requirements**  attendance of 3 Islamic Studies lectures, and submission of a 1–2 page write-up for each
Judaic Studies

**Directors of undergraduate studies:** David Sorkin (david.sorkin@yale.edu) HQ 270; judaicstudies.yale.edu

Judaic Studies enables students to develop a broad knowledge of the history, religion, literature, philosophy, languages, and politics of the Jews. Jewish society, texts, ideologies, material cultures, and institutions are studied from a comparative perspective in the context of histories, cultures, and intellectual traditions among which Jews have lived throughout the ages. As an interdisciplinary program, Judaic Studies employs historical, literary, political, social, and philosophical methods of analysis.

The Judaic Studies major—especially as a second major with Economics, Political Science, Comparative Literature, English, Philosophy, or History—offers a broad liberal arts background combined with intensive preparation in the historical and religious experience of Jewish culture from antiquity to contemporary times. The major epochs of Jewish history are the Persian and Hellenistic, classical, medieval, early modern, and modern periods.

Students considering the major in Judaic Studies should contact the director of undergraduate studies (DUS) as early as possible.

**REQUIREMENTS OF THE MAJOR**

The major in Judaic Studies requires thirteen term courses, including three courses selected from a set of core requirements, a language or literature requirement, three courses selected from each of two areas of concentration, and the senior requirement.

**Core requirements** Each student must elect at least three from the following: (1) a course in Hebrew Bible, such as JDST 110; (2) a course in rabbinic literature or ancient Judaism, such as JDST 235; (3) JDST 200; (4) JDST 201; (5) a course in Jewish thought, such as JDST 281 or JDST 293; (6) a survey course in Hebrew and Jewish literature.

**Language or literature requirements** Students must complete either HEBR 110 and 120 or two courses in Hebrew literature in translation. Up to three Hebrew language courses may be counted toward the requirements of the major.

**Areas of concentration** Students must select two of the following areas of concentration: ancient Israel/Hebrew Bible; Judaism and Jewish history of Second Temple and Talmudic times; Jewish history and civilization of medieval and Renaissance times; modern Jewish history and civilization; Jewish/Hebrew literature (which requires the study of literature in Hebrew); and Jewish thought. With the approval of the DUS, students may design their own areas of concentration.

In each of the two areas of concentration, students choose three courses in consultation with the DUS. These are expected to comprise one introductory course; one seminar taken in the junior year, and one course requiring a final research paper. One relevant course should be in an area outside Judaic Studies, such as a course relating to the larger historical, literary, or philosophical 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/Hebrew literature.
SENIOR REQUIREMENT
Students are required either to complete a two-term senior essay in JDST 491 and 492 related to both areas of concentration, or to complete a one-term senior essay in JDST 491 or 492 related to one area of concentration and an additional seminar related to the other. The senior essay may build on research conducted for one or both of the student’s junior seminar papers.

STUDY ABROAD
Students majoring in Judaic Studies should be aware of the numerous opportunities for study abroad. Those interested in research and language-study opportunities in the Middle East, Europe, and South America should consult the DUS.

REQUIREMENTS OF THE MAJOR
Prerequisites None
Number of courses 13 term courses (incl senior req)
Distribution of courses 3 courses from (1) Hebrew Bible, (2) rabbinic lit or ancient Judaism, (3) JDST 200, (4) JDST 201, (5) Jewish thought, (6) survey of Hebrew and Jewish lit; HEBR 110 and 120, or 2 courses in Hebrew lit in translation; 2 areas of concentration, with 3 courses in each for a total of 6
Senior requirement Two-term senior essay (JDST 491, 492) or one-term senior essay (JDST 491 or 492) and additional seminar

FACULTY ASSOCIATED WITH THE PROGRAM OF JUDAIC STUDIES
Professors Joel Baden (Divinity School), Leslie Brisman (English), Steven Fraade (Religious Studies), Paul Franks (Philosophy), Christine Hayes (Religious Studies), Hannan Hever (Comparative Literature), Nancy Levene (Religious Studies), Ivan Marcus (History, Religious Studies), Samuel Moyn (Law), Steven Smith (Political Science, Philosophy), David Sorkin (History), Katie Trumpener (Comparative Literature, English), Laura Wexler (Women's, Gender, & Sexuality Studies, American Studies), Robert Wilson (Religious Studies)
Associate Professors Marci Shore (History), Eliyahu Stern (Religious Studies, History)
Senior Lecturer Peter Cole (Comparative Literature)
Lecturer Margaret Olin (Divinity School, History of Art, Religious Studies)
Senior Lector II Shiri Goren
Senior Lectors Dina Roginsky, Orit Yeret
Lector Joshua Price
Latin American Studies

**Director of undergraduate studies:** Ana De La O (ana.delao@yale.edu), Room 327, 115 Prospect St.; (203) 432-5234; https://macmillan.yale.edu/academic-programs

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 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 (DUS). Though all students choose courses in both the humanities and the social sciences, they are expected to concentrate on one or the other.

**PREREQUISITES**

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 DUS. 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.

**REQUIREMENTS OF THE MAJOR**

The major itself requires twelve term courses: one introductory course approved by the DUS; eight courses related to Latin America from departmental offerings or from a provided list of electives; two additional electives; and the senior essay, LAST 491. The eight Latin American content courses should include courses from the following categories: two courses in the social sciences (anthropology, economics, or political science); two courses in history; two courses in Spanish American or Brazilian literatures beyond the language requirement; one course in art, architecture, film and media studies, music, or theater studies; and one seminar in any area related to Latin American Studies. Students wishing to count toward the major courses that do not appear in the program’s course offerings should consult with the DUS.

Students must enroll in three seminars or upper-level courses during their junior and senior years. Elective seminars must be approved by the DUS, who can provide a list of appropriate courses.

**SENIOR REQUIREMENT**

The senior essay is a research paper written usually in one term in 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, Latin American Studies majors may undertake field research in Latin America. Students are encouraged to apply for summer travel grants through the Council on Latin American and Iberian Studies to conduct field research.
for their senior thesis. The Albert Bildner Travel Prize is awarded to an outstanding junior who submits an application in Spanish or Portuguese in addition to the English application essay. Information about these and other grants is available on Yale’s Student Grants & Fellowships website.

ADVISING
A list of courses intended as a guide to students in preparing their programs is available at the office of the DUS and on the Council on Latin American and Iberian Studies website. 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 or professional school registrar and the DUS.

STUDY ABROAD
Students are strongly encouraged to take advantage of study abroad opportunities during summers or through the Year or Term Abroad program. For more information, see Academic Regulations, section K, Special Academic Programs, “Year or Term Abroad.”

REQUIREMENTS OF THE MAJOR
Prerequisites 2 years of 1 lang (Spanish or Portuguese), 1 year of the other
Number of courses 12 courses beyond prereqs (incl senior essay)
Distribution of courses 1 intro course approved by DUS; 8 courses related to Latin America in specified fields and 2 electives, 3 of which must be seminars or upper-level courses in junior and senior years, approved by DUS
Senior requirement Senior essay (LAST 491)

FACULTY ASSOCIATED WITH THE PROGRAM OF LATIN AMERICAN STUDIES

Professors Rolena Adorno (Spanish & Portuguese), Ned Blackhawk (History, American Studies), Richard Burger (Anthropology), Hazel Carby (African American Studies, American Studies), Carlos Eire (History, Religious Studies), Eduardo Fernandez-Duque (Anthropology), Paul Freedman (History), Aníbal González (Spanish & Portuguese), Roberto González Echevarría (Spanish & Portuguese), K. David Jackson (Spanish & Portuguese), Gilbert Joseph (History), Stathis Kalyvas (Political Science), Daniel Markovits (Law School), Mary Miller (History), Stephen Pitti (History), Susan Rose-Ackerman (Law School, Political Science), Alicia Schmidt Camacho (American Studies), Stuart Schwartz (History), Susan Stokes ( Political Science), Robert Thompson (History of Art), Noël Valis (Spanish & Portuguese), Frederick Wherry (Sociology), Elisabeth Wood (Political Science)

Associate Professors Robert Bailis (Forestry & Environmental Studies), Susan Byrne (Spanish & Portuguese), Rodrigo Canales (School of Management), Ana De La O (Political Science), Moira Fradinger (Comparative Literature)

Assistant Professors Vanessa Agard-Jones (Women’s, Gender, & Sexuality Studies), Ryan Bennett (Linguistics), Oswaldo Chinchilla (Anthropology), Marcela Echeverri (History), Anne Eller (History), Leslie Harkema (Spanish & Portuguese), Seth Jacobowitz (East Asian Languages & Literatures), Erica James (History of Art, African American Studies),
Albert Laguna (American Studies, Ethnicity, Race, & Migration), Dixa Ramírez (American Studies, Ethnicity, Race, & Migration)

**Senior Lectors II** Margherita Tortora, Sonia Valle

**Senior Lectors** Sybil Alexandrov, Marta Almeida, María Pilar Asensio-Manrique, Mercedes Carreras, Ame Cividanes, Sebastián Díaz, María de la Paz García, María Jordán, Rosamaria León, Juliana Ramos-Ruano, Lissette Reymundi, Lourdes Sabé-Colom, Bárbara Safille, Terry Seymour

**Lector** Selma Vital
Linguistics

Director of undergraduate studies: Jim Wood (jim.wood@yale.edu); ling.yale.edu

Linguistics is the scientific study of language. The major in Linguistics offers a program of study leading toward an understanding of phonological, grammatical, and semantic structure and of various approaches to descriptive, experimental, and historical linguistics. 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 (DUS).

COURSES FOR NONMAJORS AND MAJORS

Students with no previous background in linguistics are encouraged to approach the field by taking a 100-level course.

REQUIREMENTS OF THE MAJOR

The major requires twelve term courses in linguistics and related areas, distributed as follows:

1. Breadth requirement (four courses). All majors must take a course in each of the core areas of phonology (LING 232) and syntax (LING 253). In addition, at least one course must be taken in any two of the six remaining core areas of linguistics: 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 of linguistics, students must take two additional courses beyond the introductory level.

3. Electives (four courses). Four additional courses relating to linguistics are required, at least one of which must be at the 200 level or above. Electives may be chosen from courses offered by the Linguistics department or, with approval of the DUS, from related courses in programs such as Anthropology, Classics, Cognitive Science, Computer Science, English, Philosophy, Psychology, or foreign languages. No more than two foreign language courses can count toward the major without specific DUS approval.

4. Research requirement (one course). LING 490, Research Methods in Linguistics, is required and is usually taken in the fall term of the senior year.

Credit/D/Fail Courses taken Credit/D/Fail, Pass/Fail, or any scale other than the standard letter-grade scale, may not be counted toward the requirements of the major without specific DUS approval.

SENIOR REQUIREMENT

Senior requirement (one course). Students attend a research colloquium and write a senior essay in LING 491 during the spring term of the senior year.

ADVISING

Combined B.A./M.A. degree program Exceptionally able and well-prepared students may complete a course of study leading to the simultaneous award of the B.A. and M.A. degrees after eight terms of enrollment. See Academic Regulations, section L, Special Academic Arrangements, “Simultaneous Award of the Bachelor’s and Master's
Degrees.” Interested students should consult the DUS prior to the sixth term of enrollment for specific requirements in Linguistics.

**REQUIREMENTS OF THE MAJOR**

**Prerequisites**  None

**Number of courses**  12 term courses (incl senior req)

**Specific courses required**  LING 232, 253, 490

**Distribution of courses**  1 course each in 2 addtl core areas, as specified; 2 addtl courses beyond intro level in 1 core area; 4 electives, at least 1 at the 200 level or above

**Substitution permitted**  Electives from related programs with DUS approval

**Senior requirement**  LING 491

**FACULTY OF THE DEPARTMENT OF LINGUISTICS**

**Professors**  Claire Bowern, Veneeta Dayal, Robert Frank, Laurence Horn (*Emeritus*), †Frank Keil, †Joshua Knobe, †Jason Stanley, †Zoltán Szabó, Petronella Van Deusen-Scholl (*Adjunct*), Raffaella Zanuttini (*Chair*)

**Associate Professors**  Maria Piñango, Kenneth Pugh (*Adjunct*), Jason Shaw

**Assistant Professors**  Natalie Weber, Jim Wood

**Lector**  Julia Silvestri

**Lecturers**  Roslyn Burns, Chelsea Sanker

†A joint appointment with primary affiliation in another department.
Mathematics

See also Applied Mathematics

Director of undergraduate studies: Andrew Neitzke, (andrew.neitzke@yale.edu)
DL 425; associate director of undergraduate studies: Miki Havlickova
(miki.havlickova), DL 446; Math DUS website, Math department website

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.

PREREQUISITE
The prerequisite for both the B.A and B.S. degree programs is single variable calculus,
through the level of MATH 115 or equivalent (score of 4 or 5 on the AP Calculus BC
degree exam).

CALCULUS PLACEMENT PROCEDURES
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 mathematics online placement examination. Detailed information is available
on the Math first-year student resources website. A calculus advising session will be
held prior to registration, to answer student questions about placement.

MATH 112 covers differential calculus, and assumes mastery of high school algebra,
geometry, and trigonometry. Enrolling students are expected to know the basic
definitions of the trigonometric functions, inverse functions, factoring quadratic
polynomials, and elementary area and volume formulas of plane and solid geometry.
Students who could benefit from a review of precalculus are encouraged to consider
MATH 110 and 111 in place of MATH 112.

The next course in the calculus sequence is MATH 115, which covers integral calculus,
including sequences and series. It assumes mastery of the content of MATH 112 or
equivalent (AP Calculus AB exam).

MATH 120 covers multivariable calculus, and assumes mastery of the material in
MATH 115 or equivalent (AP Calculus BC exam).

INTRODUCTORY SEQUENCE FOR THE MATHEMATICS MAJOR
Students wishing to pursue study of mathematics typically enroll in MATH 225
(linear algebra and introduction to proofs), followed by MATH 255 (real analysis
and introduction to proofs).

Most students complete multivariable calculus before enrolling in MATH 225, however,
prospective mathematics majors and students with interest in abstract mathematics may
consider enrolling in MATH 225 directly after MATH 115 or equivalent, and complete
their vector analysis/multivariable calculus requirement with MATH 302.
Students with a strong mathematical background that includes exposure to mathematical proofs are encouraged to consider the intensive version of the introductory sequence, MATH 226 and MATH 256.

Incoming students are encouraged to visit the Math first-year student resources website for advice about choosing their mathematics courses.

**REQUIREMENTS OF THE MAJOR**

**B.A. degree program** The B.A. degree program consists of ten term courses in Mathematics numbered 222 or higher, including the senior requirement (MATH 475 or 480 or 481); excluding, however, MATH 470. 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. Students must also take at least one course in at least two of the three core areas: real analysis; algebra; and complex analysis. Taking courses from all three core areas is strongly recommended. The categories and core areas to which each course belongs are indicated in the course listings.

**Introductory sequence requirement for students in the Class of 2025 and beyond**

Each student is expected to complete Linear algebra (MATH 225 or 226), Real analysis (MATH 255 or MATH 256), and Vector analysis or Multivariable calculus (MATH 302 or 120). MATH 222 is not recommended as a substitute for MATH 225 or 226, as it does not provide an introduction to proof writing, which is an essential skill for completing upper level mathematics courses.

**Students in the Class of 2023 and 2024** who have not yet completed their introductory requirement (MATH 230 and 231, or 120 and 225 and 250) are encouraged to visit the Math curriculum revision website for detailed information about transitioning to the new introductory sequences.

**B.S. degree program** The B.S. degree program consists of twelve term courses and follows the same requirements as for the B.A. degree, with the addition at least two advanced term courses in the physical sciences, such as ASTR 418, 420, 430, CHEM 333, 470, or PHYS 401, 402, 410, 420, 430, 440, 441. Such courses require the approval of the director of undergraduate studies (DUS); written approval is advised.

**Distinction in the major** To be eligible for Distinction in the Major, a student must have completed at least one course from each of the three core areas.

**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; algebra; and complex analysis. Intensive majors are also expected to include at least two graduate term courses in the Mathematics department, or equivalent independent study, among their required ten mathematics courses. Familiarity with the material of the following courses is prerequisite to graduate courses in each category: algebra: MATH 350 and MATH 370; analysis: MATH 305, 310; algebraic topology: MATH 350, 430; logic and foundations: MATH 270.
Substitutions  With permission of the Math DUS, up to two courses from other departments may be counted towards the required courses. For a list of courses that are typically approved, visit the FAQ page on the Math department website.

Credit/D/Fail  Courses taken Credit/D/Fail may not be counted toward the requirements of the major.

Roadmap  See visual roadmap of the requirements.

SENIOR REQUIREMENT
During the senior year students majoring in Mathematics normally take the senior seminar (MATH 480 or MATH 481). Alternatively, with the consent of the DUS, students may write a senior essay in MATH 475 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 DUS at least six weeks prior to enrolling in MATH 475, and are encouraged to pursue independent study opportunities prior to their senior year, for example through the Mathematics directed reading program or through summer research programs.

ADVISING  Students interested in pursuing further study in pure mathematics should include MATH 302, 305, 310, 350, 370, and 430 in their programs, and should consider taking one or more graduate-level courses. Students interested in applications of mathematics should include MATH 302, 310, 350, and a selection of courses from MATH 241, 242, 244, 246, 251, 260, and CPSC 440.

Courses related to mathematics  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, Philosophy, Physics, Statistics & Data Science, 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 DUS.

Graduate work  Each year the Mathematics and Statistics & Data Science departments offer a large number of graduate courses, some of which are accessible to undergraduates with advanced preparation in mathematics.

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 are eligible to receive this degree at their Senior Commencement. Required are: (1) eight additional term courses numbered 500 or higher, most of which must be completed with grades of B or better; (2) passing a written qualifying examination of the student’s choice from analysis, algebra, or topology.

The master’s program is in no sense a substitute for the B.S. program; rather, it is designed to accommodate 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 by the end of the junior year. Candidates must contact the Mathematics DUS at least two weeks prior to the last day of classes of their fifth term at Yale College. Minimum eligibility criteria include at least seventy-five percent of A/A– grades within mathematics as well as seventy-five percent of A/A– grades overall. For more information on mathematics requirements, please see
the B.S./M.S. section of the Math major FAQ. For more information on Yale College requirements for the program, see Academic Regulations, Section L, Special Academic Arrangements, “Simultaneous Award of the Bachelor’s and Master’s Degrees.”

REQUIREMENTS OF THE MAJOR

**Prerequisite** Single-variable calculus through MATH 115 or equivalent

**Number of courses**
- **B.A.** — 10 term courses numbered 222 or higher (incl senior essay), excludes MATH 470
- **B.S.** — 12 term courses numbered 222 or higher (incl senior essay), excludes MATH 470

**Specific courses required**
- **B.A. and B.S.** — MATH 225 or MATH 226; MATH 255 or MATH 256; MATH 302 or MATH 120

**Distribution of courses**
- **B.A. and B.S.** — 2 courses in each of 3 categories chosen from: analysis; algebra and number theory; stat and applied math; geometry and topology; logic and foundations; 1 course from 2 of 3 core areas chosen from: real analysis; algebra; and complex analysis; **B.S.** — at least two adv term courses in the physical sciences as approved by DUS

**Substitution permitted** With DUS permission, up to 2 courses from other depts, as specified

**Intensive major** Courses in all 3 core areas; 2 MATH grad courses or equivalent independent study counted among the required courses

**Senior requirement** Senior sem (MATH 480 or MATH 481) or, with DUS permission, senior essay (MATH 475) and oral report

FACULTY OF THE DEPARTMENT OF MATHEMATICS

**Professors** Richard Beals (Emeritus), Jeffrey Brock, Andrew Casson (Emeritus), Ronald Coifman, Igor Frenkel, Howard Garland (Emeritus), Anna Gilbert, Alexander Goncharov, Roger Howe (Emeritus), Peter Jones, Richard Kenyon, Ivan Losev, Gregory Margulis, Yair Minsky, Vincent Moncrief, Andrew Neitzke, Hee Oh, †Nicholas Read, Vladimir Rokhlin, Wilhelm Schlag, George Seligman (Emeritus), †Daniel Spielman, Van Vu, Lu Wang, †John S. Wettlaufer, Gregg Zuckerman (Emeritus)

**J. W. Gibbs Assistant Professors** Yariv Aizenbud, Pablo Boixeda Alvarez, Subhadip Dey, Gurbir Dhillon, Daniel Douglas, James Farre, Abinand Gopal, Erik Orvehed Hiltunen, Yakov Kononov, Boris Landa, Or Landesberg, Kevin O’Neill, Cosmin Pohoata, Congling Qiu, Ebru Toprak, Franco Vargas Pallete.

**Adjunct Professors** Gil Kalai, Alex Lubotzky, Jacques Peyriere, Mathias Schacht

**Senior Lecturers** John Hall, Miki Havlickova.

**Lecturers** Ian Adelstein, Mihai Alboiu, James Barnes, Rachel Diethorn, Eric Geiger, Su Ji Hong, Robert McDonald, Brett Smith.

†A joint appointment with primary affiliation in another department.
Mathematics and Philosophy

**Directors of undergraduate studies:** Andrew Neitzke (andrew.neitzke@yale.edu) (Mathematics), DL 425; associate director of undergraduate studies: Miki Havlickova (miki.havlickova@yale.edu) (Mathematics), DL 446; Daniel Greco (Philosophy), 106A C, 432-1687

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.

**PREREQUISITE**

The prerequisite for the major is MATH 120. Students who completed multivariable calculus during high school may consult with the directors of undergraduate studies (DUSes) about substituting a higher level mathematics course.

**REQUIREMENTS OF THE MAJOR**

The major requires twelve term courses including the prerequisite and the senior seminar. Of the remaining courses, at least four must be in mathematics at the 200 level or higher (other than MATH 470) and five 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.

A course must be listed with a MATH number to count toward the mathematics requirements—substitutions from other departments are not permitted.

**SENIOR REQUIREMENT**

Each year certain seminars offered by the Mathematics and Philosophy departments are designated as fulfilling the senior requirement of the combined 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 seminars MATH 480 or MATH 481 fulfill the senior requirement. For philosophy seminars that fulfill the senior requirement, consult the director of undergraduate studies (DUS) in Philosophy.

**Credit/D/Fail** At most, one course taken Credit/D/Fail may be applied toward the major, with permission of the DUSes. The following courses must be taken for letter grades: MATH 270, PHIL 267, PHIL 427; the required mathematics courses level 200 or higher; the additional philosophy course with an advanced logic component; and the senior seminar.
ADVISING

A typical program satisfying the major might consist of MATH 120, MATH 222 or 225 or 226, MATH 270, 300, 350, and a designated seminar; PHIL 126, 267, 427, a designated seminar (other than PHIL 427), and two additional electives.

REQUIREMENTS OF THE MAJOR

**Prerequisite** MATH 120

**Number of courses** 12 term courses (incl prereq and senior sem)

**Specific courses required** MATH 270, PHIL 267, 427

**Distribution of courses** At least 4 courses in MATH at 200 level or higher; at least 5 courses in PHIL, incl 1 PHIL course with adv logic component

**Senior requirement** Senior seminar or MATH 480 or MATH 481
Mathematics and Physics

Adviser for the major: Vincent Moncrief (vincent.moncrief@yale.edu), 64 SPL, 432-6930

Directors of undergraduate studies: Andrew Neitzke (andrew.neitzke@yale.edu) (Mathematics), DL 425; associate director of undergraduate studies: Miki Havlickova (miki.havlickova@yale.edu) (Mathematics), DL 446; Nikhil Padmanabhan (nikhil.padmanabhan@yale.edu) (Physics), EVN 207

The major in Mathematics and Physics allows students to explore the productive interaction between the two subjects more extensively than either individual major.

PREREQUISITES

Prerequisites to the major include MATH 120 or its equivalent, an introductory physics lecture sequence numbered PHYS 180, 181 or above, and the associated laboratory sequence PHYS 205L, 206L.

Students who completed multivariable calculus during high school may consult with directors of undergraduate studies (DUSes) about substituting a higher level mathematics course for MATH 120. The course being substituted will not count toward the total of fourteen term courses (beyond the introductory level) required for the major.

REQUIREMENTS OF THE MAJOR

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 (other than MATH 470), and at least six must be advanced Physics courses chosen in consultation with the adviser for the major.

A course must be listed with a Math number to count toward the mathematics requirements—substitutions from other departments are not allowed.

SENIOR REQUIREMENT

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.

Credit/D/Fail Courses taken Credit/D/Fail may not be counted toward the major.

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 (corey.ohern@yale.edu), M203 ML, 432-4258; seas.yale.edu/departments/mechanical-engineering-and-materials-science

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, materials design, control, and manufacturing), the interfacing of microelectromechanical systems and actuators via microprocessors to build high-precision sensors and devices, and the advent of advanced materials (e.g., composites, shape-memory alloys, ceramics, and superconductors) for new applications (e.g., coatings, biomaterials, and computer storage). These 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 also be constantly aware both of the finiteness of Earth’s resources and its environment and of the burden that engineering places 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 analytical and experimental methods and in 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; and to instill in students an understanding of their professional and ethical responsibilities, which affect society and their profession.
COURSES FOR NONMAJORS
Mechanics and mechanical engineering content can be found in several courses intended for those not majoring in science. See Engineering and Applied Science.

THE MECHANICAL ENGINEERING PROGRAM
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 first year.

A student’s undergraduate engineering program may include one or more special project courses (MENG 471, 472, 473, or 474), in which the student pursues a particular research 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 (DUS) for more information on special project courses.

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.

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.

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, economics, 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 major for all three degree programs requires a group of prerequisites or equivalents; several courses beyond the prerequisites; and a senior requirement, as indicated below.
PREREQUISITES

B.S. degree program in Mechanical Engineering

Prerequisites for the Class of 2023 Students may follow the prerequisites that were in place when they declared their major.

Prerequisites for the Class of 2024 and beyond 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 or 206L, or equivalents, and one introductory lecture course in chemistry, numbered CHEM 161 or higher. The chemistry lecture course may be waived for a Chemistry AP score of 4 or 5 or an IB Higher level or Standard level score of 6 or 7.

B.S. degree program in Engineering Sciences (Mechanical) 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.

B.A. degree program in Engineering Sciences (Mechanical) The prerequisites in mathematics are MATH 112 and 115. The basic science prerequisite is physics at least to the level of PHYS 170, 171.

REQUIREMENTS OF THE MAJOR

B.S. degree program in Mechanical Engineering requires 20 courses and 19 credits beyond the prerequisites as follows:

Requirements for the Class of 2023 If not taken as a prerequisite, one lecture course in chemistry numbered CHEM 161 or higher is required, as well as the requirements listed below. The chemistry lecture requirement may be waived for a Chemistry AP score of 4 or 5 or an IB Higher level or Standard level score of 6 or 7.

Requirements for the Class of 2024 and beyond

1. Advanced mathematics: ENAS 194 and MATH 222 or 225
3. Technical electives: three approved technical electives chosen in consultation with the DUS; only one course from MENG 471, 472, 473, or 474 may be counted as one of the three technical electives.

The curriculum in this program is arranged in prescribed patterns, but some departures from it are possible with approval of the DUS.

B.S. degree program in Engineering Sciences (Mechanical) The major requires twelve approved term courses in engineering (with only one course from MENG 471, 472, 473, or 474), beyond the prerequisites and including the senior project, which can cover a broad array of topics within the subject, provided that they contribute to a coherent program. Students should consult with the DUS at the beginning of their sophomore year.
B.A. degree program in Engineering Sciences (Mechanical) The program requires eight approved term courses in engineering (with only one course from MENG 471, 472, 473, or 474), beyond the prerequisites, including the senior project. Students should consult with the DUS at the beginning of their sophomore year.

Credit/D/Fail No courses taken Credit/D/Fail may be counted toward the Mechanical Engineering major, including prerequisites.

Roadmap See visual roadmap of the requirements.

SENIOR REQUIREMENT

B.S. degree program in Mechanical Engineering Students satisfy the senior requirement by taking MENG 487L (full-credit) and MENG 488L (half-credit) in the senior year.

B.S. degree program in Engineering Sciences (Mechanical) Students satisfy the senior project requirement by completing MENG 404; MENG 471, 472, 473, or 474; or another upper-level design course (taken during the senior year) chosen in consultation with the DUS. Only one course from MENG 471–474 may be counted toward the requirements of the major.

B.A. degree program in Engineering Sciences (Mechanical) Students satisfy the senior project requirement by completing MENG 471, 472, 473, or 474; or another upper-level design course (taken during their senior year) chosen in consultation with the DUS. Only one course from MENG 471–474 may be counted toward the requirements of the major.

REQUIREMENTS OF THE MAJOR

MECHANICAL ENGINEERING, B.S.

Prerequisites 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 or 206L, or equivalents), and 1 introductory chemistry lecture course

Number of courses 20 term courses and 19 credits beyond prerequisites (including senior req)

Specific courses required ENAS 130 and 194; EENG 200; MATH 222 or 225; MENG 185, 211, 280, 285, 286L, 325, 361, 363L, 383, 389, 390

Distribution of courses 3 technical electives chosen in consultation with DUS (only one of MENG 471, 472, 473, or 474)

Substitution permitted With DUS approval

Senior requirement MENG 487L and MENG 488L taken in senior year

ENGINEERING SCIENCES (MECHANICAL), B.S.

Prerequisites 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)

Number of courses 12 term courses beyond prerequisites (incl senior req)

Substitution permitted With DUS approval

Senior requirement MENG 404; MENG 471, 472, 473, or 474; or another upper-level design course chosen in consultation with the DUS

ENGINEERING SCIENCES (MECHANICAL), B.A.

Prerequisites MATH 112, 115; PHYS 170, 171 or higher
Number of courses 8 term courses beyond prerequisites (incl senior req)
Substitution permitted With DUS approval
Senior requirement MENG 471, 472, 473, or 474; or another upper-level design course chosen in consultation with the DUS

FACULTY OF THE DEPARTMENT OF MECHANICAL ENGINEERING AND MATERIALS SCIENCE

Professors Charles Ahn, Ira Bernstein (Emeritus), Aaron Dollar, Juan Fernández de la Mora, Alessandro Gomez, ‡Sohrab Ismail-Beigi, ‡Shun-Ichiro Karato, Marshall Long (Emeritus), Corey O’Hern, ‡Vidvuds Ozolins, ‡Brian Scassellati, Jan Schroers, Udo Schwarz (Chair), Mitchell Smooke

Associate Professors Rebecca Kramer-Bottiglio, Madhusudhan Venkadesan

Assistant Professors Ian Abraham, Amir Pahlavan, Diana Qiu, ‡Daniel Wiznia

Senior Lecturer Beth Anne Bennett

Lecturers Joran Booth, Lawrence Wilen, Joseph Zinter

‡A joint appointment with primary affiliation in another department or school.
Medieval Studies Certificate

Certificate director: Emily Thornbury (emily.thornbury@yale.edu) [Sp 2022]; F 2022 and Sp 2023 TBA; 432-0672; Medieval Studies

This certificate is available to all interested Yale College students, and provides them an opportunity to pursue a focused curriculum, in addition to their major, that will strengthen their liberal arts education. Medieval Studies is the interdisciplinary study of the histories, languages, and cultures of the medieval period worldwide. This certificate provides a curated set of courses across a range of departments—including, but not limited to, East Asian Studies, English, History, History of Art, Near Eastern Languages and Civilizations, and Religious Studies—to expand and deepen those interests.

The certificate requirements are flexible enough to offer structure and guidance to those students with a general interest in Medieval Studies, as well as accommodate interdisciplinary breadth for students whose research is already focused on the medieval period.

 REQUIREMENTS

Students must successfully complete five course credits on medieval topics, drawn from the list of approved courses posted each semester on the Medieval Studies website. Other course credits may be approved by permission of the Certificate director and the course instructor.

Of the five credits: no more than three may originate in the same zone. As currently configured, the four zones are East Asia; South Asia; the Near East; and Europe. Additionally, no more than two course credits may overlap in the fulfillment of the requirements of the Medieval Studies certificate or of a major, a simultaneous degree, a multidisciplinary academic program, or another certificate. Additionally, no course credit may be applied toward the requirements of more than two curricular programs. For example, the same course credit may not be used to fulfill the requirements of two certificates and a major.

In addition to the course requirements, each student must attend three lectures on medieval topics. After each lecture, students should submit a 1–2 page account of the lecture to the Certificate director to be credited for attendance. There are typically six Yale lectures in Medieval Studies every academic year, as well as Medieval Lunch talks. Notice of the these events can be found on the Medieval Studies website.

Completion Procedure and Advising

Students must apply for the Certificate at latest one week before final schedules are due in their final semester of study, by completing the form on the Medieval Studies website attesting fulfillment of all requirements, and submitting it for approval to the Certificate director. Final approval of the certificate rests with the Certificate committee and director. Students may also declare their candidacy for the certificate at any time by clicking here.
REQUIREMENTS OF THE CERTIFICATE

Number of courses  5 course credits dispersed between the four zones (East Asia, South Asia, the Near East, Europe)

Distribution of courses  up to 3 courses in any one of the four zones

Additional requirements  attendance at 3 Medieval Studies lectures, each followed by a 1–2 page account of the event
Modern Middle East Studies

**Director of undergraduate studies:** Jonas Elbousty (jonas.elbousty@yale.edu); www.yale.edu/macmillan/cmes

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, while developing expertise in any of the major languages associated with the region, namely Arabic, Hebrew, Persian, and Turkish. Courses are drawn from departments in the humanities and social sciences, including Anthropology, History, History of Art, Judaic Studies, Political Science, Near Eastern Languages and Civilizations, Religious Studies, and Sociology. The Modern Middle East Studies major gives students the analytical and linguistic skills necessary to master the complex issues of the Middle East and serves as excellent preparation for graduate study or for professional careers in which an understanding of that region is essential.

**REQUIREMENTS OF THE MAJOR**

The major allows students to develop highly individualized courses of study, tailored to their own academic, intellectual, and linguistic interests. There are no prerequisites. Twelve term courses are required for the major, including one course at the L5 level in a Middle Eastern language and two survey courses on the modern period, taken at the introductory level. Beyond those requirements, students take eight distribution courses focusing on any aspect of the culture, thought, history, religion, politics, and society of the region. These eight distribution courses must be spread geographically and temporally and draw from distinct methodological or disciplinary approaches. They must include, at a minimum, two courses from different regions or countries within the Middle East, two courses from different departments or programs, two courses that focus substantially on the period before 1750, and two advanced seminars. Up to two language courses below L5 in a Modern Middle East language may count toward the distributional requirement with approval of the director of undergraduate studies (DUS). The proposed course of study also requires DUS approval.

**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. Each student selects a faculty adviser with competence in the appropriate language. A prospectus and outline signed by the adviser must be submitted to the DUS 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 further information. Alternatively, under supervision of the instructor, 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** 2 intro survey courses on the Middle East, focusing on the modern period; 2 courses from different Middle Eastern regions or countries;
2 courses from two different departments or programs; 2 courses with focus on pre-1750; 2 adv seminars; and 1 course at L5 level in a Middle East language

**Substitution permitted** With DUS approval, up to 2 language courses below L5 in Modern Middle East language may count toward distributional requirement

**Senior requirement** One term senior essay (MMES 491), two term senior essay (MMES 492, 493), or essay written in additional seminar

**FACULTY ASSOCIATED WITH THE PROGRAM OF MODERN MIDDLE EAST STUDIES**


**Assistant Professors** Thomas Connolly (*French*), Robyn Creswell (*Comparative Literature*), Supriya Gandhi (*Religious Studies*), Samuel Hodgkin (*Comparative Literature*), Jill Jarvis (*French*), Elizabeth Nugent (*Political Science*), Eda Pepi (*Women’s, Gender, & Sexuality Studies*), Evren Savci (*Women’s, Gender, & Sexuality Studies*)

**Senior Lecturers** Tolga Köker (*Economics*), Kathryn Slanski (*Near Eastern Languages & Civilizations*)

**Lecturers** Karla Britton (*Architecture*), Teresa Chahine (*School of Management*), Karen Foster (*History of Art*), Nicholas Lolito (*Political Science*), Emma Sky (*Global Affairs*)

**Senior Lector II** Shiri Goren

**Senior Lectors** Sarab Al Ani, Muhammad Aziz, Jonas Elbousty, Ozgen Felek, Dina Roginsky, Farkhondeh Shayesteh

**Lector** Orit Yeret
Molecular Biophysics and Biochemistry

**Director of undergraduate studies:** Andrew Miranker  
(andrew.miranker@yale.edu) [Sp 2022], 318 BASS, 432-8954,  
MBBUndergrad@yale.edu; mb&b.yale.edu

Members of the Department of Molecular Biophysics and Biochemistry (MB&B) are united by a common view that processes in biology are understood when molecular, chemical, kinetic, and thermodynamic contributions to mechanisms have been elucidated. Correspondingly, our faculty and students are joined by a shared fascination with biochemistry, physical chemistry, structural biology, computation, spectroscopy, macromolecular engineering, imaging and the molecular basis of disease.

Three quarters of our graduates matriculate into PhD, MD, and MD/PhD programs. Other recent graduates have joined companies specializing in finance, management consulting, biotechnology, and pharma. Others have matriculated in law or business school and doctoral programs in the humanities. Still others have performed public service, entered secondary education, or joined the United States armed forces as officers.

**INTRODUCTORY COURSES**  
The basic science courses suggested for all majors include a two-term lecture sequence in general chemistry with its associated laboratories (CHEM 161, 165, 134L and 136L); a one-term course in organic chemistry with its associated laboratory (CHEM 220 or 174 with CHEM 222L); two terms of calculus (MATH 112 and MATH 115 or 116); two half-term units of biochemistry, biophysics and cell biology (BIOL 101, 102); and two half-term units of molecular biology, development, ecology and evolution (BIOL 103, 104). The latter may be waived with permission of the director of undergraduate studies (DUS) based on requirements within the concentrations described below. These introductory courses may be satisfied by scores on placement examinations sufficient to earn acceleration credits in the certain subjects, even if the student does not choose to accelerate.

**REQUIREMENTS OF THE MAJOR**  
The core elements of the major are biophysics, biochemistry, and science and society. The requirements beyond these core elements teach advanced concepts, and teach the technology and practical skills that enable scholarship in the discipline.

**The major requirements for the Class of 2025 and previous classes** With approval from the DUS, the following changes to the major may be fulfilled by students who declared their major under previous requirements.

**The following changes to the major requirements for the Class of 2026 and subsequent classes** apply to the B.S. degree, the B.A. degree, and the B.S./M.S. degree.

**B.A. Degree Program** The B.A. degree program requires a total of 9.5 course credits to include: 3 biophysics credits; 3 biochemistry credits, a half-credit for science and society; 1 credit to fulfill the practical skills requirement; 1 elective; and the senior requirement.
The core Biophysics requirements are two semesters of physics (PHYS 170 and 171 or higher) and one semester of biophysical chemistry (MB&B 275 or CHEM 332).

The core Biochemistry requirements include MB&B 300 and 301 (substitutions are not permitted), and CHEM 175 or any 200+ level Chemistry course.

The Science and Society core requirement is 0.5 credit (MB&B 268 is recommended) and addresses the intersection of Molecular Biophysics & Biochemistry with human identity and society. Alternatives to MB&B 268 are MB&B 107, HSHM 206, 241, 406, 424, 436, 475, 481, SOCY 127, 351 or WGSS 457. Petitions for course substitutions (see below) are encouraged.

The Practical skills requirement is fulfilled with one full-credit or two half-credit courses spread across two or three of the categories listed below. At least one half-credit must come from MB&B.

- Physics lab options include MB&B 101L (available spring 2023), 470 and 471*, PHYS 165L, 166L, CHEM 355L, other 200+ level lab courses with DUS approval.

- Biochemistry Lab options include MB&B 251L, 364, 470 and 471*, CHEM 355L, other 200+ level lab courses with DUS approval.

- Critical Tools options include MB&B 435, 470 and 471*, S&DS 105, 238, CPSC 112 and others with DUS approval.

*MB&B 470 and 471 are research for credit courses. Above categorization is dependent on the research project. Up to two credits may be taken for a letter grade.

The Elective course should be a lecture or seminar MB&B course at the 200+ level.

B.S. Degree Program The B.S. degree program requires a total of 12.5 course credits including the senior requirement. This program follows the requirements of the B.A. degree program with the following additions.

For the core Biophysics requirement: one additional 300+ course in physical sciences, mathematics, statistics or computer science.

For the Practical Skills requirement: one additional credit for a total of two credits.

For the elective courses: one additional 200+ level seminar or lecture course in STEM.

Combined B.S./M.S. Degree Program The B.S./M.S. degree program requires a total of 18.5 course credits including the senior requirement. See Academic Regulations, section L, Special Academic Arrangements, “Simultaneous Award of the Bachelor’s and Master’s Degrees.” Interested students should consult their academic advisor prior to the fifth term of enrollment for details and application requirements (due December 1 of the fifth semester). The B.S./MS program follows the requirements of the B.A. Degree program with the following additions.

For the core Biophysics requirement: one additional 300+ course in thermodynamics, statistical mech, quantum and/or spectroscopy (CHEM 332 is recommended). PHYS 180 and 181 in place of PHYS 170 and 171.
The Practical Skills requirement is replaced by one semester of MB&B 470 or 471 which must be completed by the end of the fifth semester.

For the Elective course, the single MB&B 200+ seminar or lecture elective is replaced by two MB&B electives at 500+ and four 500+ electives in STEM.

CONCENTRATIONS
Concentrations in MB&B are sets of electives, curated by faculty, designed to focus attention on specific subfields of Molecular Biophysics and Biochemistry. Concentrations appear on a student’s official Yale transcript and are currently available in Medicine; Computational Biology and Bioinformatics; Chemical Biology; Biochemistry; and Biophysics and Structural Biology.

Electives taken for the major that meet the same criteria as requirements for a concentration may be used to fulfill both requirements. Placement exams and acceleration credits do not count towards completion of concentration-specific requirements. Instead, majors enroll in higher-level courses in the same concentration-specific category. Depending on the particular concentration and the choice of electives, concentrations add between zero and three additional credits to major requirements. As incentive to take more challenging coursework, students fulfilling a concentration may take up to one course of upper-level requirements as Credit/D/Fail.

Some concentrations include research-for-credit courses or course-based undergraduate research experiences (CUREs) as a mechanism to fulfill a requirement. These courses must directly relate to the chosen concentration (broadly interpreted) and require DUS approval.

Medicine
This concentration is designed for students with strong interests in the molecular basis of physiology and disease. Majors aspiring to graduate studies in biomedical sciences, work in biotechnology, or medical school are particularly encouraged to fulfill this concentration.

In addition to, and/or as part of, the degree requirements, the following courses are required:

Genetics and Development: BIOL 103 and 104

Organic Chemistry: second term of organic chemistry (CHEM 175 or 221)

Statistics: S&DS 105, S&DS 230, or higher

Psychology: PSYC 110 or higher or PSYC 312

Physics labs (1 credit): MB&B 101L (available spring 2023), PHYS 165L, 166L, MB&B 364, or others as approved by the DUS (see below) are encouraged.

Biomedical research (total for 1 credit): MB&B 470 or 471, or course based undergraduate research including MB&B 251L, MCDB 291L, or others

Advanced Seminar: one from MB&B 445, 452, 449, MCDB 315, MCDB 450, or others as approved by the DUS
**Computational Biology & Bioinformatics**

This concentration is designed for students with strong interests in computer science, data science, statistics, and biology. Majors aspiring to graduate studies in computational biology, bioinformatics, medical informatics or biotechnology are particularly encouraged to fulfill this concentration.

In addition to, and/or as part of, the degree requirements, the following courses are required:

- *Genetics and Evolutionary Biology (B.A. degree):* BIOL 103 and 104

- *Genetics and Evolutionary Biology (B.S. degree):* one 200+ elective in genetics, MCDB 200, 202, 310, MB&B 330, or as approved by the DUS (BIOL 103 and 104 may be required for upper level courses)

- *Computer Science, Math, Statistics (B.A. degree):* CPSC 201 and one S&DS 100+ course

- *Computer Science, Math, Statistics (B.S. degree):* CPSC 223, CPSC 201, and S&DS 238 (CPSC 223 may also be used to fulfill the 300+ elective requirement). Other courses may be substituted with permission of the DUS.

- *Advanced Computational Biology & Bioinformatics (both degrees):* MB&B 452 or CPSC 453 or as approved by the DUS.

**Chemical Biology**

Chemical Biology leverages the tools and concepts of chemistry to understand, leverage, and/or manipulate biological processes. Students interested in the MB&B concentration in Chemical Biology select electives from organic and inorganic chemistry as well as advanced courses in cell biology. Majors interested in additional studies in chemical biology, drug development, and/or biotechnology after graduation are particularly encouraged to fulfill this concentration.

In addition to, and/or as part of, the degree requirements, the following courses are required:

- *Organic Chemistry (both degrees):* second semester of Organic Chemistry and accompanying half-credit lab

- *Cell Biology and Chemistry (for B.S. degree only):* two 200+ electives and one 300+ elective in Chemistry or Cell Biology (at least one credit must cover cell biology or chemistry)

- *Cell Biology (for B.A. degree only):* one 200+ elective in cell-based biology

- *Research in Chemical Biology (both degrees):* one from MB&B 470, 471, or 364, or course-based undergraduate research

- *Advanced Chemical Biology lecture or seminar (both degrees):* MB&B 443 or CHEM 419 or as approved by the DUS

**Biochemistry**

The concentration in Biochemistry is geared towards students seeking robust training in structure and function of nucleic acids and proteins in the context of life processes. Molecular length scale biochemistry is foundational to the mechanisms
by which dynamic networks of molecular machines enable everything from cellular function to whole organism physiology. Failures in these networks are responsible for pathology in plants and animals, agriculture and medicine. MB&B majors interested in working in these fields directly after graduation, or who hope to pursue graduate studies including PhD and MD/PhD, are particularly encouraged to fulfill this concentration.

In addition to, and/or as part of, the degree requirements, the following courses are required:

* Genetics and Development and Ecology and Evolution: BIOL 103 and 104
* Molecular, Cellular, or Organismal Biology: MCDB 205, MCDB 202, or as approved by the DUS
* Research in Biochemistry: MB&B 470 or 471 or course-based undergraduate research
* Advanced Chemical Biology lecture or seminar (1 credit for B.A. degree and 2 credits for B.S. degree): 300+ courses such as MB&B 365, MB&B 339, 445, 449, or 443

### Biophysics and Structural Biology

This concentration is designed for students with strong interests in life processes on the molecular length scale. Majors aspiring to graduate studies in biophysics, molecular medicine, and biotechnology are particularly encouraged to fulfill this concentration.

Biophysics and Structural Biology are made possible by fundamental quantitative and physical tools such as linear algebra, Fourier analysis, x-ray diffraction, imaging, and optical spectroscopy to measure biomolecular dynamics and atomic resolution structure. Seminar courses applicable to this area focus on the basic biology enabled by exquisitely specific macromolecular interactions, the molecular basis of disease and drug-design.

In addition to, and/or as part of, the degree requirements, the following courses are required:

* Computer Science, Math, Statistics (for B.A. degree): one from MATH 120, MATH 225, S&DS 100+, or CPSC 112
* Computer Science, Math, Statistics (for B.S. degree): one from MATH 120, MATH 225, S&DS 238, or CPSC 112
* Biophysical Chemistry (for B.S. degree): one from CHEM 332 or MB&B 431 or any 300+ elective in thermodynamics, statistical mech, quantum mechanics or spectroscopy.
* Research in Biophysics and Structural Biology (for both degrees): one from MB&B 470, MB&B 471, CHEM 355, or course-based undergraduate research
* Tools and Quantitative Analysis (for B.S. degree): one 200+ course with emphasis on measurement and/or modeling of energy, kinetics, or structure relevant to the molecular length scale, such as MB&B 330, 420, 431, 435, CHEM 333, 406, 492, or as approved by the DUS
* Advanced Biophysics and Structural Biology lecture or seminar (both degrees): one from MB&B 420, 431, 520, or as approved by the DUS
Credit/D/Fail Courses taken Credit/D/Fail may not be counted toward the requirements of the major; however, students fulfilling a concentration may take up to one credit of upper level requirements as Cr/D/F. Qualifying courses include 400-level MB&B courses and 300-level courses in any other STEM subject.

Roadmap See visual roadmap of the requirements. [roadmap to come]

SENIOR REQUIREMENT
The senior requirement for both the B.S. and the B.A. is fulfilled by successful completion of the senior project, MB&B 490. 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. The literature project for the senior requirement should be original work approved by the faculty member overseeing the senior colloquium.

The senior requirement for B.S./M.S. is completion of MB&B 570 and 571 taken during senior year.

ADVISING
Students are encouraged to declare their major long before completion of the introductory courses. This greatly improves academic advising. Changing majors at Yale does not require approval and is non-binding.

Students are assigned a member of MB&B faculty for academic advising as soon as they declare their major. Requests to change advisors should be sent to the registrar via email (elizabeth.vellali@yale.edu). Justification is not required nor is DUS approval.

Course Substitutions Students may petition the DUS for course substitutions by assembling the relevant syllabi and writing a short justification (less than 300 words). Thoughtful requests in line with MB&Bs teaching goals are always welcome.

DUS approvals: DUS approvals for waivers, course substitutions, endorsement of petitions to the Committee on Honors and Academic Standing, applications to the BS/MS program etc., are initiated by an email of support from students’ assigned MB&B academic advisor. The academic advisor functions as the student’s advocate on requests to the DUS with the MB&B registrar giving oversight and interfacing with the University registrar. One-on-one meetings by majors with their MB&B academic advisor during every registration period are logged. Failure to schedule meetings and missed meetings are factored into the DUS approval process.

Graduate work Graduate courses in molecular biophysics and biochemistry, biology, and the biomedical sciences that may be of interest to undergraduates are listed in the Graduate School online bulletin, and many are posted on the Biological and Biomedical Sciences website. Additional information is available from the DUSes 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.

Combined B.S./M.S. degree program A very small number of students will be eligible to complete a six-year course of study within 8 terms of enrollment leading to the simultaneous award of the B.S. and M.S. degrees. See Academic Regulations, section L,
Special Academic Arrangements, “Simultaneous Award of the Bachelor’s and Master’s Degrees.” Interested students should consult their academic advisor prior to the fifth term of enrollment.

Sample schedules  Diverse pathways exist for navigating the B.A. and B.S. degrees. In general, students are strongly encouraged to complete General Chemistry (e.g. CHEM 161, 165, 134L and 136L), introductory calculus (e.g. MATH 112) and introductory Biochemistry, Biophysics and Cell Biology (BIOL 101, 102) by the end of their first year. See the MB&B website for 4-year sample degree programs covering all five concentrations and for students who do not elect to pursue a concentration.

REQUIREMENTS OF THE MAJOR

Introductory courses  BIOL 101 and 102; 2 terms general Chemistry with associated labs; 1 term Organic Chemistry with associated lab; 2 terms of calculus; BIOL 103 and 104 for some concentrations

Number of courses  B.A. – 9.5 course credits (incl senior project); B.S. – 12.5 course credits (incl senior project)

Specific courses required  MB&B 275 or CHEM 332; MB&B 300; 301; PHYS 170 and 171 (or higher)

Distribution of courses  B.A. – 3 biophysics credits to include MB&B 275 or CHEM 332 and PHYS 170 and 171 or higher; 3 biochemistry credits to include MB&B 300 and 301 and CHEM 175 or 200+ Chem course; MB&B 268, a half-credit for science and society or other course as approved by DUS; 1 credit practical skills req; and 1 elective; B.S. — same reqs as for B.A. degree plus 1 addtl Practical Skills credit; 1 addtl 300+ biophysics credit; and one addtl 200+ credit in STEM

Senior requirement  MB&B 490

FACULTY OF THE DEPARTMENT OF MOLECULAR BIOPHYSICS AND BIOCHEMISTRY

Professors  †Karen Anderson, Susan Baserga, †Ronald Breaker, †Gary Brudvig, †Sandy Chang, Enrique De La Cruz, †Daniel DiMaio, Donald Engelman, Mark Gerstein, Nigel Grindley (Emeritus), †Sharon Hammes-Schiffer, Mark Hochstrasser, Jonathon Howard, Michael Koelle, Anthony Koleske, William Konigsberg, †Mark Lemmon, †Patrick Loria, †I. George Miller, Andrew Miranker, †Peter Moore (Emeritus), Karla Neugebauer, †Thomas Pollard, Lynne Regan (Emeritus), †Karen Reinisch, †David Schatz, Robert Schulman (Emeritus), †Frederick Sigworth, Dieter Söll, Mark Solomon, Joan Steitz, Scott Strobel, Yong Xiong

Associate Professors  Julien Berro, †Titus Boggon, Wendy Gilbert, Christian Schlieker, Matthew Simon, †Shervin Takyar, †Yongli Zhang

Assistant Professors  Franziska Bleichert, Allison Didychuk, †Luisa Escobar-Hoyos, Lilian Kabche, †Erdem Karatekin, Nikhil Malvankar, †Wei Mi, Candice Paulsen, †Sarah Slavoff, Kai Zhang

Adjunct Professors  Kenneth Williams, Carl Zimmer

Lecturer  Aruna Pawashe

†A joint appointment with primary affiliation in another department.
Molecular, Cellular, and Developmental Biology

**Director of undergraduate studies:** Valerie Horsley (valerie.horsley@yale.edu), 121 YSB, 432-3839; MCDB undergraduate registrar, (mcdb.ureg@yale.edu) 231 YSB, 260 Whitney Ave., 432-3839; mcdb.yale.edu

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 biological and pharmaceuticals, the practice of medicine, and the 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 and cellular biology and genetics, with applications to problems in cell and developmental biology, neurobiology, and various aspects of quantitative biology. Interdisciplinary opportunities are available within the major in the Biotechnology, Neurobiology, and Quantitative Biology 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.

**PREREQUISITES**

Most but not all of the MCDB courses require prior preparation in biological science. First years should take BIOL 101, 102, 103, and 104 or contact the director of undergraduate studies (DUS) for more information. All majors must also complete a course in mathematics numbered MATH 115 or higher or a statistics course taken at Yale and approved by the DUS.

For the B.A. degree, students must take a two-term lecture sequence in chemistry, usually in their first year, and a term course in physics numbered PHYS 170 or higher usually in their junior year.

For the B.S. degree, students must take a two-term lecture sequence in chemistry, with associated laboratories usually in their first year; a term course in organic chemistry with its associated laboratory usually in their sophomore year; and two term courses in physics numbered PHYS 170 or higher usually in their junior year.

**PLACEMENT PROCEDURES**

Placement in MCDB courses is determined by examinations administered at Yale or by permission of the DUS. A student may place out of one or more courses in the BIOL 101–104 sequence. One or more of these foundational biology courses (or equivalent performance on the corresponding biological sciences placement examination) may be explicitly required as prerequisites for upper-level MCDB courses. Students that place out of two BIOL modules will be required to take an additional credit in MCDB’s core courses.
Placement in chemistry courses is arranged by the Department of Chemistry. Because required chemistry courses are prerequisite to several MCDB courses, students are strongly encouraged to take general and organic chemistry in the first and/or sophomore years. Students who place out of general chemistry may want to consider taking organic chemistry during the first year. Finishing the prerequisites early allows for a more flexible program in later years.

Acceleration credit awarded in chemistry, mathematics, or physics, or completion of advanced courses in those subjects, is accepted in place 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, 222, or 225, or ENAS 151 or 194. Students in the B.A. degree program who have satisfied one or more prerequisites with advanced placement must still complete three term courses in chemistry and physics at Yale, including at least one from each department.

REQUIREMENTS OF THE MAJOR

**B.A. degree program** The B.A. degree requires a minimum of five and one-half course credits beyond the prerequisites, including five lecture or seminar courses and one laboratory, as follows:

1. Two core courses selected from MCDB 200, 202, 205, 210, 290, 300 (or MB&B 300)
2. Two general electives selected from MCDB courses numbered 250 or above, or two additional core courses from the list above. Two laboratory courses, either MCDB 342L and 343L or MCDB 344L and 345L, can be paired for a single elective credit. If used as an elective, these laboratories cannot also fulfill the laboratory requirement
3. One special elective selected from MCDB courses numbered 350 or higher
4. One laboratory from the biological sciences. Laboratories may be selected from MCDB, Molecular Biology and Biophysics, or Biomedical Engineering, or, with permission of the DUS, from Anthropology or Ecology & Evolutionary Biology
5. The senior requirement (senior essay option does not carry course credit)

**B.S. degree program** The B.S. degree requires a minimum of nine course credits beyond the prerequisites, including eight lecture or seminar courses and two laboratories, as follows:

1. Three core courses selected from MCDB 200, 202, 205, 210, 290, 300 (or MB&B 300)
2. Two general electives selected from MCDB courses numbered 250 or above. Additional core courses from the list above, a second term of organic chemistry, and courses in statistics may be used as general electives. Two laboratory courses, either MCDB 342L and 343L or MCDB 344L and 345L, can be paired for a single elective credit. If used as an elective, these laboratories cannot also fulfill the laboratory requirement
3. One special elective from MCDB courses numbered 350 or higher
4. Two laboratories from MCDB
5. The senior requirement (2 course credits), described below

**The B.S. degree program, intensive major** Requirements for the B.S. degree program, intensive major, are the same as those for the B.S. degree except for the senior requirement (see below).

**Independent research courses before senior year** The only independent research course available to students prior to the senior year is MCDB 474. This course is graded Pass/Fail and contributes to the thirty-six course credits required for the bachelor’s degree, but it does not substitute for any MCDB major requirement, including the senior requirement. No independent research course satisfies a lab requirement for the MCDB major.

**Independent research courses during senior year** The research courses MCDB 475, 485, 486, and 495, 496 exist primarily to fulfill the senior requirement, and do not satisfy any other requirement for the major. Note that Yale College limits the number of independent study or independent research courses that students may take; see Academic Regulations, section C, Course Credits and Course Loads. Any independent study course, regardless of its number, is included in the total. No independent research course satisfies a lab requirement for the MCDB major.

**Credit/D/Fail** No course taken Credit/D/Fail may be counted toward the MCDB major, including prerequisites.

**Roadmap** See visual roadmap of the requirements.

**SENIOR REQUIREMENT**

**For the Class of 2023** If it is problematic to fulfill the senior research requirement in person due to outside circumstances, students seeking the MCDB B.S. degree (only) should consult the MCDB website and may appeal to the DUS for MCDB course substitutions. No accommodations will be allowed for the B.S. Intensive degree and B.S./M.S. degree.

In addition to the course requirements described above, all students must satisfy a senior requirement undertaken during the senior year. A booklet listing the senior requirements of each track and degree is available in the office of the DUS (111 YSC). All students must fill out a checklist of requirements and go over it with the MCDB undergraduate registrar, (mcdb.ureg@yale.edu) by the spring term of the junior year.

**B.A. degree program** For the B.A. degree, the senior requirement can be met either by submitting a senior essay of 15–20 pages evaluating current research in a field of biology, 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 DUS 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 DUS by the last day of classes. Students electing this option should obtain an approval form from the office of the DUS.
**B.S. degree program** For the B.S. degree, the senior requirement is usually fulfilled by completing a yearlong research course, MCDB 485, 486. 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 at least ten hours per week in the lab conducting individual research.

**B.S. degree program, intensive major** Requirements for the B.S. degree with an intensive major are the same as those for the B.S. degree except that students fulfill the senior requirement by taking MCDB 495, 496 for four course credits. Seniors in the intensive major are expected to spend at least twenty hours per week in the lab conducting individual research.

**Requirements of the Neurobiology, Biotechnology, and Quantitative Biology Tracks**

**Neurobiology track** In addition to the core courses for the B.A. degree or the B.S. degree programs, the Neurobiology track requires MCDB 320. One elective is selected from MCDB courses numbered 350 or above and one is selected from BENG 410, CPSC 475, MCDB 250, 310, 315, 415, 425, 430, 440, MCDB 361, PSYC 376, or S&DS 101. 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.) The laboratory requirement and the senior requirement are the same as those for the B.A. degree or the B.S. degree programs. Students interested in the Neurobiology track should consult an adviser for the track.

*Neurobiology track advisers*

H. Keshishian, 228 YSB (432-3478)
D. Clark, C148 YSB (432-0750)
T. Emonet, C169 YSB (432-3516)
J. Carlson, 206 YSB (432-3541)
M. O’Donnell, 110 YSB (436-1934)
P. Forscher, 120 YSB (432-6344)
W. Zhong, 225 YSB (432-9233)

**Biotechnology track** In addition to the core courses for the B.A. degree or the B.S. degree programs, the Biotechnology track requires MCDB 370. One elective is selected from MCDB courses numbered 350 or above and one is selected from MB&B 420, 421, 443, BENG 351, 352, 410, 435, 457, 463, 464, CENG 210, 411, 412L, CPSC 437, 445, 470, or 475. The laboratory requirement and the senior requirement are the same as those for the B.A. degree or the B.S. degree programs. Students interested in the Biotechnology track should consult an adviser for the track.

*Biotechnology track advisers*

R. Breaker, 311 YSB (432-9389)
C. Crews, 250 YSB (432-9364)
F. Isaacs, 141 YSB (432-3783)
K. Nelson, 137 YSB (432-5013)
J. Wolenski, C112 YSB (432-6912)
Quantitative Biology track  In addition to the core courses for the B.A. degree or the B.S. degree programs, the Quantitative Biology track requires MCDB 330. One elective is selected from MCDB courses numbered 350 or above and one is selected from MCDB 320, 361, 461, BENG 463, 467, CPSC 440, 475, MB&B 302, 435, 452, 523, PHYS 402, MATH 246, 251, or CPSC 475, 440. The laboratory requirement and the senior requirement are the same as those for the B.A. degree or the B.S. degree programs. Students interested in the Quantitative Biology track should consult an adviser for the track.

Quantitative Biology track advisers
D. Clark, C148 YSB (432-0750)
T. Emonet, C169 YSB (432-3516)
D. Kankel, 111 YSB (432-3532)

ADDITIONAL INFORMATION AND ADVISING
The prerequisites for the B.S. degree fulfill most of the usual premedical science requirements. Students who choose the B.A. degree can also prepare for medical school by taking additional premedical courses.

Selection of courses  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 DUS. Many courses in other departments have prerequisites; such prerequisites can be substituted for an upper-level elective with permission of the DUS.

Residential College Seminars cannot be substituted for electives and 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, Ecology and Evolutionary Biology, or Neuroscience.

Advising  First-year students considering a major in Molecular, Cellular, and Developmental Biology are invited to consult with the DUS 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. Students in the Biotechnology, Neurobiology, or Quantitative Biology tracks 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 with a primary appointment in MCDB. The signature of the DUS is required only for students who are fulfilling the requirements of two majors or who have been admitted to the simultaneous B.S./M.S. degree program. Students whose regular adviser is on leave can consult the office of the DUS to arrange for an alternate.
College faculty advisers available to first-year students are listed below.

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**Simultaneous 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. 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. The requirements are as follows:

1. Candidates must satisfy the Yale College requirements for the B.S. degree. Students in the program must complete the core courses for the major and choose their 4 electives from graduate-level courses. One of the electives must be a graduate seminar selected with the approval of the DUS. Grades below B– in graduate courses are not accepted.

2. In addition to the courses specified above, students must complete three terms of graduate research courses for six course credits: (1) MCDB 585, a two-credit course taken in the second term of the junior year. At the start of the course, each student forms a committee comprised of the faculty 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; (2) MCDB 595, 596, 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. To be considered for admission to the program, by the end of their fifth term of enrollment students must have achieved at least two-thirds A or A– grades in all of their courses as well as in all of the courses directly relating to the major, including prerequisites.
2. Students must apply in writing to the DUS and obtain departmental approval no later than the last day of classes in their fifth term of enrollment in Yale College.

3. Students must have the approval of both the DUS and the director of graduate studies to receive graduate credit for the graduate courses they select.

4. 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 department during their last four terms at Yale and at least two undergraduate courses during their last two terms.

5. Students must earn grades of A in at least two of their graduate-level term courses (or in one yearlong course) and have at least a B average in the remaining ones.

For more information, see Academic Regulations, section L, Special Academic Arrangements, “Simultaneous Award of the Bachelor’s and Master's Degrees.”

STUDY ABROAD

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 DUS and the Center for International and Professional Experience.

REQUIREMENTS OF THE MAJOR

Prerequisites  
**B.A.** — BIOL 101, 102, 103, 104; a two-term lecture sequence in chem; one term of PHYS 170 or above; MATH 115 or above or a Yale statistics course approved by the DUS; **B.S.** — same as for the B.A. degree, in addition to labs associated with a two-term lecture sequence in chem; 1 term of organic chem with lab; two terms of physics, PHYS 170 or above

Number of courses  
**B.A.** — 5 courses and 1 lab, totaling at least 5½ course credits beyond the prereqs; **B.S.** — 8 courses and 2 labs, totaling at least 9 course credits beyond the prereqs; **B.S., intensive major** — 8 courses and 2 labs, totaling at least 11 course credits beyond prereqs

Specific courses required  
**Neurobiology track** — MCDB 320; **Biotechnology track** — MCDB 370; **Quantitative Biology track** — MCDB 330

Distribution of courses  
**B.A.** — 2 core courses from MCDB 200, 202, 205, 210, 290, 300 (or MB&B 300); 2 electives numbered MCDB 250 or above (or 2 addtl core courses); 1 elective numbered MCDB 350 or above; 1 biology lab; **B.S.** — 3 core courses from MCDB 200, 202, 205, 210, 290, 300 (or MB&B 300); 2 electives numbered MCDB 250 or above (or 2 addtl core courses); 1 elective numbered MCDB 350 or above; 2 MCDB labs; **Biotechnology, Neurobiology, and Quantitative Biology tracks** — same as B.A. and B.S. degree programs, with a specific req (track dependent) in place of one general elective

Senior requirement  
**B.A.** — MCDB 475 taken in senior year, or senior essay; **B.S.** — 2 consecutive terms of independent research in senior year, MCDB 485, 486; **B.S., intensive major** — MCDB 495, 496 in senior year

FACULTY OF THE DEPARTMENT OF MOLECULAR, CELLULAR, AND DEVELOPMENTAL BIOLOGY

Professors  
Ronald Breaker, John Carlson, Lynn Cooley, Craig Crews, Stephen Dellaporta, Thierry Emonet, Paul Forscher, Mark Hochstrasser, Scott Holley, Vivian
Irish, †Akiko Iwasaki, Douglas Kankel, †Paula Kavathas, Haig Keshishian, Mark Mooseker, Thomas Pollard, Anna Pyle, Joel Rosenbaum, †Hugh Taylor

**Associate Professors** Damon Clark, Joshua Gendron, Valerie Horsley, Farren Isaacs, †Megan King, †Kathryn Miller-Jensen, Weimin Zhong

**Assistant Professors** Shirin Bahmanyar, David Breslow, Nadya Dimitrova, Stavroula Hatzios, Yannick Jacob, Binyam Mogessie, Sigrid Nachtergaele, Michael O’Donnell, Josien van Wolfswinkel, Jing Yan

**Professor Adjunct** Robert Bazell

**Lecturers** †Meghan Bathgate, †Alexia Belperron, Francine Carland, †Surjit Chandhoke, Iain Dawson, †Seth Guller, Amaleah Hartman, Ronit Kaufman, Rebecca LaCroix, Thomas Loreng, †Elizabeth Luoma, Maria Moreno, Kenneth Nelson, †Aruna Pawashe, Joseph Wolenski

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

**Director of undergraduate studies:** Anna Zayaruznaya (anna.zayaruznaya@yale.edu), 205 STOECK, 432-2996; yalemusic.yale.edu

The Department of Music offers introductory and advanced instruction in the history of music, the theory of music, composition, music technology, and performance. The Music major provides a general music program in the humanities, as well as preparation for graduate studies or for careers in music.

**COURSES FOR NONMAJORS AND MAJORS**

Introductory courses, numbered from 100 to 199, are open to all undergraduates and require no previous experience in music.

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. Of these four course credits, only two may be applied to the major in Music. Auditions for lessons are held at the beginning of the fall term; students sign up at the School of Music auditions website. Students who audition for lessons are placed into one of three groups: (1) noncredit instruction for a fee; (2) lessons for academic credit at the intermediate level (MUSI 345), graded Pass/Fail; or (3) lessons for academic credit at the advanced level (MUSI 445), graded A–F. Only students with exceptional proficiency are placed into MUSI 445.

Students accepted for noncredit instruction are charged $550 for ten hours of lessons per term or $350 for six hours of lessons per term. The fees are added to the Student Financial Services bill and are not refundable after the first two weeks of lessons each term.

**COURSE NUMBERING**

Introductory courses are numbered from 100 to 199. Intermediate courses, numbered between 200 and 399, may require prerequisites or a familiarity with music notation. Advanced courses, numbered between 400 and 494, are intended for students who have completed intermediate courses in the relevant field. They are intended primarily for students majoring in music, but they may be elected by others who meet the stated prerequisites.

**COREQUISITES AND LESSONS**

Students taking MUSI 345 or 445 are required to enroll concurrently in a non-introductory music theory or music history course for two terms, or they must complete one term of the theory/history requirement before enrolling in MUSI 345 or 445 for the first time, and another before enrolling in MUSI 345 or 445 again. MUSI 345 is taken pass/fail; MUSI 445 and the corequisites are taken for a letter grade. Eligible corequisites include MUSI 110 or any course designated as Group I, III, or IV within the music major (i.e. courses numbered 200–219, 250–299, 300–319, 350–399, 400–419, 450–499).
PLACEMENT PROCEDURES
There is no longer a placement test for the music theory curriculum; instead we invite students to identify the right course for them by using our self-placement guide, and to consult with the course instructors.

REQUIREMENTS OF THE MAJOR
Thirteen courses are required, two intermediate courses and one advanced course in each of four groups, and the senior requirement. Group I (MUSI 200–219; 300–319; 400–419) includes music theory and technology courses focused on the materials and structures of musical works and repertoires. Group II (MUSI 220–249; 320–349; 420–449) includes composition, technology, and performance courses with a practical focus on techniques of artistic production. Group III (MUSI 250–274; 350–374; 450–474) includes lectures and seminars taking a research- and writing-based approach to the Western art-music tradition. Group IV (MUSI 275–299; 375–399; 475–494) includes lectures and seminars taking a research- and writing-based approach to popular or vernacular music or to music of non-Western traditions.

Credit/D/Fail Courses taken Credit/D/Fail may not be counted toward the requirements of the major.

SENIOR REQUIREMENT
Each student majoring in Music must satisfy the senior requirement by completing a senior essay, composition, or recital in MUSI 496, 497, 498, or 499.

The standard major Students must submit a completed Senior Project Form to the director of undergraduate studies (DUS) by the end of the course selection period in the term during which the project will be completed. The Senior Project Form, available in the departmental office, includes a brief description of the project and a timeline for completion. The form must be signed by the project’s primary and secondary advisers, at least one of whom is a member of the faculty of the Department of Music.

The intensive major The intensive major is for students of high standing who are qualified to do sustained independent and original work in music research or in composition. Students wishing to elect the intensive major must register for the senior project in the fall term of their senior year (MUSI 497–499). A plan for progress must be included in the project proposal at the beginning of the fall term, specifying a deliverable end-of-term product with approximately the same scope as a one-term senior project. Upon satisfactory completion of this work, a student may be admitted to the intensive major, which consists of a second term of registration for the senior project (MUSI 497–499). The additional course for the intensive major is supplementary to the thirteen term courses that constitute the standard major.

ADVISING
Simultaneous B.A./M.A. program Undergraduates with exceptionally strong preparation in music history or music theory may complete a course of study leading to the simultaneous award of the B.A. and M.A. degrees after eight terms of enrollment. Students may not enroll in Yale College for more than eight terms to qualify for the simultaneous award of both degrees. Declared majors in Music may apply for the program until the last day of classes in their fifth term of enrollment, if they have completed at least two graduate courses in the Department of Music, at least one
numbered 700 or higher, with grades of B+ or above, and if their overall grade average is A– or above. Applicants must demonstrate progress toward proficiency in a foreign language examined by the Department of Music.

Students in the simultaneous program fulfill the requirements for the intensive major in Music. They also take eight graduate courses in the Department of Music, with average grades of B+ or higher and grades of A or A– in at least two of the courses. They satisfy the Yale College requirements for the program (see Academic Regulations, section L, Special Academic Arrangements, “Simultaneous Award of the Bachelor’s and Master’s Degrees”), and they pass a departmental examination in a modern foreign language.

**B.A./M.M. program** The Bachelor of Arts/Master of Music program is designed for students with outstanding abilities in performance who are also interested in a liberal arts education. Admission to the B.A./M.M. program is through acceptance into Yale College as well as a separate, successful audition through the School of Music, either before matriculation into Yale College or during the third year of the B.A. program. For details regarding the B.A./M.M. program, please consult the Yale School of Music online bulletin.

Students cannot accelerate the undergraduate program in the B.A./M.M. program.

**REQUIREMENTS OF THE MAJOR**

**Prerequisites** None

**Number of courses** 13 term courses numbered 200 or above (incl senior req)

**Specific courses required** None

**Distribution of courses** 2 intermediate courses and 1 advanced course from each group I–IV

**Senior requirement** One-term senior essay, composition, or recital in MUSI 496–499

**Intensive major** Two-term senior essay or project in MUSI 497–499; additional course is supplementary to the thirteen course req

**FACULTY OF THE DEPARTMENT OF MUSIC**

**Professors** Kathryn Alexander (*Adjunct*), Richard Cohn, Daniel Harrison, Gundula Kreuzer, Richard Lalli (*Adjunct*), Ian Quinn (*Chair*), Gary Tomlinson, Michael Veal

**Associate Professors** Robert Holzer (*Adjunct*), Konrad Kaczmarek (*Adjunct*), Brian Kane, Markus Rathey (*Adjunct*), Anna Zayaruznaya

**Assistant Professors** Maria-Christina Oliveras (*Visiting*), Jessica Peritz

**Lecturers** Nathaniel Adam, Trevor Baća, FNU Darsono, Daniel Egan, Grant Herreid, Maho Ishiguro, Annette Jolles, Sara Kohane, Joshua Rosenblum, Wendy Sharp, Jeanine Tesori
Naval Science

Program adviser: Scott Ryan (scott.ryan@yale.edu), 55 Whitney Ave., 432-8223; nrotc.yalecollege.yale.edu

The Naval Reserve Officers Training Corps (NROTC) program educates young men and women for service as commissioned officers in the United States Navy (USN) or Marine Corps (USMC). NROTC develops future officers mentally, morally, and physically, and instills in them the highest ideals of duty and loyalty and the core values of honor, courage, and commitment. The Naval Science program prepares students to assume the highest responsibilities of command, citizenship, and government.

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.

Navy students must complete eight core curriculum courses offered by Yale College: two term courses in calculus to be completed by the sophomore year, two term courses in calculus-based physics (with laboratory) to be completed by the junior year, two term courses in English or equivalent writing courses, one term course in history or national security policy, and one term course in world culture or regional studies.

For Navy students, the usual sequence of Naval Science courses is:

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<tr>
<th>First-Year</th>
<th>Sophomore</th>
<th>Junior</th>
<th>Senior</th>
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<tbody>
<tr>
<td>Introduction to Naval Science</td>
<td>Seapower &amp; Maritime Affairs</td>
<td>Naval Engineering</td>
<td>Naval Operations</td>
</tr>
<tr>
<td>Navigation</td>
<td>Leadership &amp; Management</td>
<td>Naval Systems</td>
<td>Leadership &amp; Ethics</td>
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Marine students must complete three core curriculum courses offered by Yale College, including two term courses in English or equivalent writing courses, and one term course in history or national security policy.

For Marine Corps students, the usual sequence of Naval Science courses is:

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<thead>
<tr>
<th>First-Year</th>
<th>Sophomore</th>
<th>Junior</th>
<th>Senior</th>
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<tbody>
<tr>
<td>Introduction to Naval Science</td>
<td>Seapower &amp; Maritime Affairs</td>
<td>Elective</td>
<td>Evolution of Warfare</td>
</tr>
<tr>
<td>Elective</td>
<td>Leadership &amp; Management</td>
<td>Fundamentals of Maneuver Warfare</td>
<td>Leadership &amp; Ethics</td>
</tr>
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ADVISING AND APPLICATION TO THE PROGRAM

**Application to the National Scholarship Program** Eligible applicants must use the online application to complete and submit all the required information to apply for the NROTC scholarship. Applicants select either the Navy or Marine Corps option and scholarship recipients are appointed midshipmen in either the United States Naval Reserve (USNR) or United States Marine Corps Reserve (USMCR), as appropriate. Scholarship recipients are granted the compensation and benefits authorized by law and current policy for a total period not to exceed four years (forty months or fifty months with approved fifth year benefits). During this period, the United States government pays for college tuition, authorized academic fees, a textbook stipend, and a subsistence allowance, and provides uniforms or compensation in lieu. Upon conferral of a degree, graduates are commissioned into the Navy or Marine Corps for a minimum of five years of active duty service. Yale students who matriculate without a scholarship may apply for the National Scholarship program during the fall term of their first year.

**Application to the College Program** Students without a scholarship who are in their first or second year may apply for enrollment in the College Program and compete for two- or three-year scholarships. If selected for the two- or three-year Scholarship Program, students receive the same benefits as students in the National Scholarship Program for their remaining undergraduate studies. Upon conferral of a degree, graduates of the College Program are commissioned into the Navy or Marine Corps for a minimum of three years of active duty service. Yale students interested in the College Program may apply directly to the Yale University NROTC Unit.

**FACULTY OF THE NAVAL SCIENCE program**

**Professor** Captain Ronald Withrow, USN (*Adjunct*)

**Lecturers** Commander Scott Ryan, USN; Captain Ratsamy May, USMC; LT Samantha Barszowski, USN; LT Dale Pettenski, USN
Near Eastern Languages and Civilizations

**Director of undergraduate studies:** Kathryn Slanski
(kathryn.slanski@yale.edu) (kathryn.slanski@yale.edu); nelc.yale.edu

The major in Near Eastern Languages & Civilizations is an interdisciplinary liberal arts major. Students acquire language proficiency and skills in critical analysis in order to study the long-lived and rich civilizations of the Near East, ranging from ancient Egypt and Mesopotamia, to the medieval Near East and classical Islam, to contemporary civilization represented by modern Arabic, Hebrew, Persian, and Turkish.

We study the Near East for its own intrinsic literary, historic, and artistic achievements as well as its cultural and historical legacies. In addition, close engagement with the written and visual traditions of this complex region expands our ability to decipher developments and challenges in our modern world. Near Eastern Languages and Civilizations majors go on to careers in government, public policy, international finance, and academia, and the major provides a strong foundation for post-graduate study in foreign service, law, medicine, and education.

Languages offered by the Department of Near Eastern Languages and Civilizations include Akkadian, Arabic, Armenian, Egyptian, Hebrew, Ottoman Turkish, Persian, Syriac, and Turkish. Students must complete a departmental placement examination before they can enroll in language courses offered by the department during a term, year, or summer abroad.

**Requirements of the Major**

There are two pathways to the major. Each requires twelve term courses, one of which is the senior requirement (see below). Working with the director of undergraduate studies (DUS), students develop coherent programs of study in one of two concentrations.

**Language and Civilization concentration** This concentration is appropriate for students who wish to focus in depth on a particular language and/or civilization, such as ancient Egypt or Mesopotamia; the classical Near East or medieval Islam; or modern Arabic, Hebrew, Persian, or Turkish. Richly contextualized through study of literature, religion, visual arts, archaeology, and political and social history, this pathway gives students the opportunity to explore Near Eastern civilization through in-depth study of languages and texts in their original languages.

Requirements include: six term courses in one or two Near Eastern languages; one NELC Foundations course; four NELC electives, chosen in consultation with the DUS (no more than two may be counted from other departments/program); and the senior project (see below).

**Languages, Civilization, and Culture concentration** This concentration is appropriate for students who wish to study Near Eastern languages and civilizations more broadly. It provides students flexibility to study the Near East in its historical and cultural breadth, and to explore its rich and long-lived civilizations and cultures comparatively. Working with the DUS, students in this concentration take a range of classes and design their course of study in line with their interests, which might prioritize multiple languages or focus on Near Eastern literature, history, religion, art and archaeology, or philosophy.
Requirements include: four term courses in NELC languages; two NELC Foundations courses; five NELC electives, including one on the ancient Near East, one on the medieval Near East, and one on the modern Middle East, chosen in consultation with the DUS (no more than three may be counted from other departments/programs); and the senior essay (see below).

NELC majors are also encouraged to take related courses in other departments and programs to complement their interests and round out their intellectual formation. These typically include courses in Anthropology, Archaeology, Classics, History, History of Art, History of Science, Medicine and Public Health, Judaic Studies, Comparative Literature, Philosophy, and Religious Studies. Above all, complementary courses should be chosen according to the student’s interests, ideally in consultation with the DUS or other faculty advisor. Such courses, including Residential College Seminars, may be approved at the discretion of the DUS toward the electives requirement for the major if they include substantial Near Eastern content and are relevant to the student’s overall program of study.

SENIOR REQUIREMENT

The senior requirement is an opportunity for students to design and execute an independent research project, bringing to bear the intellectual curiosity as well as philological and analytic skills the student has honed during their time at Yale. It is also a chance to be mentored by a Yale faculty member who serves as advisor to the project, which typically culminates in an essay of about 25–35 pages (one-semester project) or 35–55 pages (year-long project). Conversations about the senior project should begin with the DUS in the fall of junior year, especially if the student plans to undertake summer research travel.

In certain circumstances and only with advanced written agreement of the instructor and the DUS, a research paper for an upper-level seminar may be developed and expanded to satisfy the senior requirement. In such cases, the project should constitute work substantially beyond the requirements of the seminar paper.

Each year the DUS provides majors with resources, guidelines, and a list of deadlines for both the one-semester and year-long senior project.

REQUIREMENTS OF THE MAJOR

Prerequisites  None
Number of courses  12 term courses (including the senior project)
Distribution of courses  Language and Civilization concentration – 6 term courses of up to 2 Near Eastern languages; 1 Foundations course; and 4 electives; Languages, Civilization, and Cultures concentration – 4 term courses of 1 or more Near Eastern language courses; 2 Foundations courses; 5 NELC electives to include 1 ancient, 1 medieval, and 1 modern
Senior requirement  Senior project, enrollment in NELC 492 and/or 493, or in an upper-level department seminar

CERTIFICATE OF ADVANCED LANGUAGE STUDY

The Department of Near Eastern Languages and Civilizations offers a Certificate of Advanced Language Study in Arabic, Hebrew, and Turkish. A certificate adviser, typically the director of undergraduate studies (DUS), advises students on the certification process and certifies to the University Registrar’s Office that students
have completed the stated requirements before the end of eight terms of study. The Certificate of Advanced Language Study, once certified, is listed on the student’s transcript.

REQUIREMENTS

Students seeking to earn the certificate are required to take four courses beyond the L4 level in their chosen language, at least two of which must be Yale courses designated as L5. All courses must be taken for a letter grade, and students must achieve a grade of B or above. With the approval of the adviser, one advanced non-L5 Yale course, conducted in the target language, such as an independent study course, a graduate seminar, or an advanced seminar may count toward certification requirements.

The certificate adviser may allow one “language across the curriculum” (LxC) course, which ordinarily is an advanced seminar with an additional weekly discussion section in the target language, to count toward the certification requirements. The certificate adviser may also approve the substitution of up to two credits earned during study abroad and taught in the target language to count toward the certificate requirements. If the adviser approves courses taken outside of Yale for inclusion in the certificate requirements, students must take the necessary steps to ensure that those courses appear on their transcripts.

Credit/D/Fail No courses taken Credit/D/Fail may be counted toward the requirements of the certificate.

FACULTY OF THE DEPARTMENT OF NEAR EASTERN LANGUAGES AND CIVILIZATIONS

Professors John Darnell, Benjamin Foster, Eckart Frahm, Dimitri Gutas (Emeritus), Bentley Layton (Emeritus), Nadine Moeller, Shawkat Toorawa, Kevin Van Bladel, Harvey Weiss

Senior Lectors and Senior Lecturers Sarab Al Ani, Mohammad Aziz, Jonas Elbousty, Shiri Goren, Randa Muhammed, Dina Roginsky, Farkhondeh Shayesteh, Kathryn Slanski, Orit Yeret

Lectors and Lecturers Ozgen Felek, Agnete Lassen, Gregory Marouard, Klaus Wagensoner, Ezgi Yalcin, Lingxin Zhang
Neuroscience

Directors of undergraduate studies: Damon Clark (neuroscience.dus@yale.edu) (MCDB), YSB C148; Steve Chang (steve.chang@yale.edu) (Psychology), Kirtland 310; neuroscience.yale.edu

Neuroscience aims to understand how the brain produces the mind and behavior, with the goal of advancing human understanding, improving physical and mental health, and optimizing performance. This entails a broad, interdisciplinary effort that spans from molecules to minds. At one end, biology, chemistry, and physics are improving our understanding of the molecular and cellular mechanisms of neuronal signaling and development. At the other end, psychology, psychiatry, and computer science link neural processes and systems to the mind and behavior. At all levels, the rich array of methods and data analysis depends on a strong foundation in the basic sciences, mathematics, statistics, and computer science.

PREREQUISITES
The foundational biology courses required of all Neuroscience majors are BIOL 101, 102, 103, and 104. All majors must also complete one of the following: PSYC 200, S&DS 103, 105, 230, 238.

PLACEMENT PROCEDURES
When declaring the major, students are encouraged to send a completed Neuroscience major worksheet to the department registrar (neuroscience.registrar@yale.edu) to help with advising.

REQUIREMENTS OF THE MAJOR
A minimum of 18.5 credits is required, including the three prerequisites, 15 lecture or seminar courses (which include the senior requirement), and one laboratory, as follows:

1. Two Neuroscience foundation courses, NSCI 160 and 320.
2. One Neuroscience lab chosen from NSCI 229L, 258, 260, 270, 321L.
3. Eleven electives from the following core groupings, with a minimum of: two from the Systems/Circuits/Behavior Core, two from the Molecular/Cellular/Biological Core, one from the Quantitative Core, one from the Computational Core, and one from the Basic Allied Core. No more than two credits may be taken from the Other Allied Core.

Systems/Circuits/Behavior Core: NSCI 340, 341, 346, 352, 355, 360, 440, 441, 442, 445; PSYC 238; NSCI 449
Molecular/Cellular/Biological Core: NSCI 324, 325, 329, 420; MCDB 200, 202, 205, 210, 300, 310, 370, 450, 452; MB&B 300
Quantitative Core: MATH 112, 115, 116, 120, 222, 225, 226, 230, 231, 244, 246, 247, 255, 256; ENAS 151; NSCI 324, 325; CPSC 202
Computational Core: CPSC 100, 112, 201, 223, 323, 365, 470, 475, 476; ENAS 130; S&DS 123, 262, S&DS 355, 361; NSCI 453
Basic Allied Core: PHYS 170, 171, 180, 181, 200, 201, 260, 261; CHEM 161, 163, 165, 167, 174, 175, 220, 221
**Other Allied Core:** NSCI 141, 161, 240, 419, 455, 479; BENG 485; MCDB 250; CGSC 110; PSYC 110; one additional Neuroscience lab course from the list above

**Credit/D/Fail** No course taken Credit/D/Fail may be counted toward the major, including prerequisites.

**Roadmap** See visual roadmap of the requirements.

**SENIOR REQUIREMENT**

In addition to the course requirements described above, all students must satisfy a senior requirement undertaken during the senior year. All students must fill out a checklist of requirements and go over it with the undergraduate registrar by the spring term of the junior year.

**B.S. degree program** The B.S. degree program requires two course credits of empirical research, NSCI 490 and 491. These courses are only available to Neuroscience seniors and receive a letter grade. Students are expected to spend at least 10 hours per week in the laboratory, to complete written assignments, and to give a presentation. In addition to time in the lab, and as part of NSCI 490 and 491, students are expected to attend a semi-regular capstone seminar, to hear guest speakers and to discuss senior work progress with their peers and the directors of undergraduate studies (DUSes). Research can be conducted over original, archival, or consortium data sets. Written assignments include a short research plan due at the beginning of the fall term, a grant proposal due at the end of the fall term, and a final report due at the end of the spring term. Students should pursue the same research project for two terms, with the grant proposal guiding and serving as the background for the research and final report. Seniors are also required to present their research in the spring term at a poster session. Students should find a research laboratory during the term preceding the research. Yale College does not grant academic credit for summer research unless the student is enrolled in an independent research course in Yale Summer Session. To register for NSCI 490 and 491, students must submit a form and the research plan with bibliography, approved by the faculty research adviser and a DUS, by the end of the first week of classes.

**B.A. degree program** The B.A. degree program requires two course credits in nonempirical research, NSCI 480 and 481; or one credit in nonempirical research, NSCI 480 or 481, and one credit in empirical research, NSCI 490 or 491. These courses are only open to Neuroscience seniors and receive a letter grade. Under faculty supervision, for NSCI 480 or 481, students are required to conduct original research for at least 10 hours per week that does not involve direct interaction with data, such as developing a theory or conducting a meta-analysis to synthesize existing findings. A literature review without novel intellectual contribution is not adequate. Written assignments include a short research plan due at the beginning of the fall term, a literature review or draft theoretical paper due at the end of the fall term, and a theoretical paper due at the end of the spring term. Seniors are also required to present their research in the spring term at a poster session. To register, students must submit a form and the research plan with bibliography, approved by the faculty adviser and a DUS, by the end of the first week of classes.
More detailed guidelines, forms, and deadline information is available on the program website.

**ADDITIONAL INFORMATION**

**Independent research courses before senior year.** The only independent research courses available to students prior to senior year are NSCI 470, 471. These courses are graded Pass/Fail and count toward the thirty-six credits required for the bachelor's degree, but they do not substitute for any NSCI major requirement, including the senior requirement. Independent research courses do not satisfy the lab requirement for the NSCI major.

**ADVISING**

Due to overlap in the major course requirements, the Neuroscience major should not be combined with a second major either in Molecular, Cellular and Developmental Biology or in Psychology.

**Program advisers** Each term, students should update their Neuroscience major worksheet and then meet with their assigned faculty adviser to discuss their schedule and review their worksheet. These documents should then be submitted to the Neuroscience registrar for DUS review and approval. For questions concerning credits for courses taken at other institutions, or courses not listed in Yale Course Search, students should contact the Neuroscience registrar.

**REQUIREMENTS OF THE MAJOR**

**Prerequisites** BIOL 101, 102, 103, and 104; and one of PSYC 200, S&DS 103, 105, 230, 238

**Number of courses** 18.5 credits (including prereqs and senior req)

**Specific courses required** 2 neuroscience foundation courses, NSCI 160 and 320

**Distribution of courses** B.S. or B.A. – 1 lab course; 11 electives including at least: 2 Systems/Circuits/Behavior Core courses, 2 Molecular/Cellular/Biological Core courses, 1 Quantitative Core course, 1 Computational Core course, 1 Basic Allied Core course, and no more than 2 Other Allied Core courses

**Senior requirement** B.S. – 2 empirical research courses, NSCI 490 and 491; B.A. – 2 nonempirical research courses, NSCI 480 and 481, or 1 empirical research course (NSCI 490 or 491) and 1 nonempirical research course (NSCI 480 or 481)

**FACULTY OF THE NEUROSCIENCE MAJOR**

**Professors** †Amy Arnsten (School of Medicine, Psychology), Ty Cannon (Psychology), John Carlson (Molecular, Cellular and Developmental Biology), B. J. Casey (Psychology), Marvin Chun (Psychology), Paul Forscher (Molecular, Cellular and Developmental Biology), Jutta Joormann (Psychology), Douglas Kankel (Molecular, Cellular and Developmental Biology), Haig Keshishian (Molecular, Cellular and Developmental Biology), †John Krystal (School of Medicine, Psychology), Rajit Manohar (Electrical Engineering), †Linda Mayes (School of Medicine, Psychology), Greg McCarthy (Psychology), Laurie Santos (Psychology), †Dana Small (School of Medicine, Psychology), †Jane Taylor (School of Medicine, Psychology), Nick Turk-Browne (Psychology), Robert Wyman (Molecular, Cellular and Developmental Biology)

**Associate Professors** †Alan Anticevic (School of Medicine, Psychology), Arielle Baskin-Sommers (Psychology), Abhishek Bhattacharjee (Computer Science), †Sreeganga
Chandra (School of Medicine, Molecular, Cellular and Developmental Biology),
Steve Chang (Psychology), Damon Clark (Molecular, Cellular and Developmental Biology), †Philip Corlett (School of Medicine, Psychology), Molly Crockett (Psychology), Thierry Emonet (Molecular, Cellular and Developmental Biology), Avram Holmes (Psychology), †Hedy Kober (School of Medicine, Psychology), Smita Krishnaswamy (Genetics), †Ifat Levy (School of Medicine, Psychology), †James McPartland (School of Medicine, Psychology), Weimin Zhong (Molecular, Cellular and Developmental Biology)

Assistant Professors Dylan Gee (Psychology), Maria Gendron (Psychology), Julia Leonard (Psychology), Samuel McDougle (Psychology), †John Murray (School of Medicine, Physics), Michael O’Donnell (Molecular, Cellular and Developmental Biology), Priya Panda (Electrical Engineering), Robb Rutledge (Psychology), Ilker Yildirim (Psychology)

Lecturer Stephanie Lazzaro (Psychology)

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

**Director of undergraduate studies:** Paul Franks (paul.franks@yale.edu) [Sp 2022]; Daniel Greco (daniel.greco@yale.edu) [F 2022, Sp 2023]; (daniel.greco@yale.edu) philosophy.yale.edu

The Philosophy major prepares students to reflect critically and creatively on questions concerning the nature of things, the scope and limits of human understanding, and the principles of value and right action. The aim of the major is to address these questions wherever they arise, whether in the philosophical tradition, in other disciplines and practices, or in everyday life. Our courses are designed to encourage depth in thinking, rigor in argument, clarity in writing and speaking, and the widest possible view of whatever subject matter we take up.

**COURSES FOR NONMAJORS AND MAJORS**

Introductory philosophy courses, numbered 001–099 are First-Year Seminars and are only open to first-year students. They have no prerequisites. Courses numbered 100-199 are open to all students and have no prerequisites.

**COURSE NUMBERING**

Courses numbered 001–199 are introductory and have no prerequisites. Courses numbered 200–399 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 400–499 are advanced, and are taught as limited enrollment seminars. These 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.

**PREREQUISITES**

Prerequisite to the standard major are two introductory or intermediate philosophy courses. Prerequisite to the concentration in psychology are two introductory or intermediate courses in philosophy or psychology.

**REQUIREMENTS OF THE MAJOR**

The Philosophy curriculum is divided into three broad groups: history of philosophy; metaphysics and epistemology; and ethics and value theory. The group in which a course belongs is indicated in Yale Course Search (YCS). This information is found in the "course information" section of each course listing. Students can also search for courses satisfying a given group requirement in YCS by clicking the drop-down menu titled, "Any Course Information Attribute." Students have the following choices: YC Phil: Ethics & Value Theory, YC Phil: History of Philosophy, YC Phil: Metaphysics & Epistemology, as well as YC Phil: Logic and YC Phil: Psychology Track.

The standard major requires twelve term courses (including the prerequisites and the senior requirement) that collectively expose students to a wide range of philosophy and philosophers. In history of philosophy, majors are required to take (1) either PHIL 125 and 126 or both terms of Directed Studies (DRST 003, 004), and (2) an additional, third course in history of philosophy. Majors are encouraged to take PHIL 125 and
as early as possible; these courses may be taken in either order. Majors must also complete two courses in metaphysics and epistemology, two courses in ethics and value theory, and a course in logic (such as PHIL 115), the last preferably by the fall of their junior year. Majors must also take two advanced seminars at the 400 level (either or both of which can be counted toward one of the group requirements) 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 (DUS), courses offered by other departments may be counted toward the major requirements, though no more than two such courses will normally be allowed.

Specific regulations for the group requirements are as follows:

1. Some introductory courses do not count toward any group requirement.
2. Courses automatically count toward the group under which they are listed in Yale Course Search (YCS). In rare cases, a course will be designated as counting toward a second group, although no one course can be counted toward two group requirements. Students may petition to have a course count toward a group other than the one under which it is listed, 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.

The psychology concentration  The psychology concentration is designed for students interested in both philosophy and psychology. Majors in the concentration 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 (1) two courses in the history of philosophy, usually PHIL 125 and 126 or DRST 003 and 004, (2) a course in logic, such as PHIL 115, preferably by the fall of the junior year, (3) two seminars, one of which may be in the Psychology department, with the approval of the DUS, and (4) 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 (4) must be approved by the DUS. The five psychology courses must include PSYC 110 or its equivalent. Each major must also satisfy the senior requirement as described below.

Credit/D/Fail  At most one class taken Credit/D/Fail can count towards the philosophy major. Courses taken Credit/D/Fail cannot fulfill any specific distribution requirements within the major—they cannot fulfill the area requirements, or the seminar requirement, or the senior requirement, or (on the psychology track) the intersection requirement. But if all those requirements are fulfilled with classes taken for a letter grade, then one of the remaining 12 total credits may be fulfilled with a class taken Credit/D/Fail.

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, which may include (1) additional readings, (2) submission of a complete draft of the final paper by the eighth week of the term that will then be significantly revised, and (3) one-on-one or small-group meetings with the instructor to discuss class material, the additional readings, and drafts in preparation. The specific nature of these additional requirements will vary from seminar to seminar. Students planning to satisfy the requirement with a third seminar should express that intention to the instructor at the beginning of the term, so the instructor can explain the work that will be required.

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 DUS, in consultation with an appropriate supervisor, by the end of the term prior to beginning the independent study.

ADVISING
By default, advising in the philosophy department is done by the DUS. Juniors have the option of selecting an alternative adviser—which should be done by the first of October in the junior year—but all seniors are advised by the DUS. The adviser aids students in choosing courses.

Other majors involving philosophy Majors in Mathematics and Philosophy and in Physics and Philosophy are also available. Students interested in philosophy and psychology should also consider the major in Cognitive Science.

REQUIREMENTS OF THE MAJOR
Prerequisites Standard major—2 intro or intermediate phil courses; Psychology concentration—any 2 courses in phil or psych

Number of courses 12 term courses, incl prereqs and senior req

Specific courses required Standard major—PHIL 125 and 126, or DRST 003 and 004; Psychology concentration—PSYC 110 or equivalent

Distribution of courses Standard major—3 courses in hist of phil (incl PHIL 125 and 126, or DRST 003 and 004), 2 in metaphysics and epistemology, 2 in ethics and value theory, and 1 in logic; 2 phil sems at 400 level; Psychology concentration—7 courses in phil, as specified; 5 courses in psych

Substitution permitted Standard major—2 related courses in other depts, with DUS permission

Senior requirement a third sem in phil, or a one- or two-term independent project (PHIL 490, 491)

FACULTY OF THE DEPARTMENT OF PHILOSOPHY

Associate Professors Daniel Greco, John Pittard
Assistant Professors Robin Dembroff, Manon Garcia, Lily Hu
Physics

**Director of undergraduate studies:** Nikhil Padmanabhan (nikhil.padmanabhan@yale.edu), Thomas Mellon Evans Hall, Rm. 207, 56 Hillhouse Ave., 432-9950; physics.yale.edu/academics/undergraduate-studies

The overarching goal of the physics program is to train students—majors and nonmajors alike—to think like physicists, the hallmarks of which include: striving for fundamental explanations that have broad predictive power; appreciating that quantitative analysis is necessary for proper understanding; simplifying physical situations to their essentials to enable the development of mathematical models to explain and predict experimental data; and comparing experimental data from the natural world to theory.

To achieve this goal, we offer courses for physics majors who intend to further their study of physics or any STEM field in graduate school, as well as those physics majors who intend to go into law, consulting, financial services, technology industries, teaching, or any number of fields. Many students enroll in our introductory courses as a compulsory requirement of their STEM major; to satisfy a requirement for admission into medical school; or because they appreciate the quantitative training and intrinsic value offered by a basic understanding of modern physics. The director of undergraduate studies (DUS) can help students prepare for graduate school in physics by recommending appropriate electives to supplement the core courses. Research experience (PHYS 469, 470, 471, and 472) is an important aspect of preparing for graduate school.

The department offers two majors in Physics: the B.S. and the B.S. 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 interests. Both degree programs require some research experience. PHYS 469 and PHYS 470, introductory research courses, are open to all students. Juniors and seniors, as part of the senior requirement, are required to enroll in PHYS 471 and 472—one term for the B.S. degree and two terms for the B.S. degree, intensive major. Combined majors are available in Mathematics and Physics, Astrophysics, Physics and Philosophy, and Physics and Geosciences.

**COURSES FOR NONMAJORS AND MAJORS**

A guide to selecting physics courses is available to aid in course selection. Questions about placement should be addressed to the DUS.

**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. Many of these courses fulfill the science and/or quantitative reasoning distributional requirements. 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 aimed at students who are interested in the biological sciences or medicine. Knowledge of differential and integral calculus at the level of MATH 112
or equivalent is a prerequisite. MATH 115 or (preferably) MATH 116 should be taken concurrently with PHYS 171. PHYS 170 is a prerequisite for PHYS 171.

2. PHYS 180, 181 is aimed at students who plan to major in the physical sciences or engineering. Calculus at the level of MATH 112 is a prerequisite; MATH 115 and 120 should be taken concurrently. PHYS 180 or PHYS 200 is a prerequisite for PHYS 181.

3. PHYS 200, 201 is aimed at 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 and either MATH 222, 225, or 226, which are generally taken concurrently.

4. PHYS 260, 261 is intended for students who have had excellent prior training in mathematics and a solid foundation in physics. One of MATH 120, ENAS 151, PHYS 301, or the equivalent should be taken concurrently with PHYS 260, 261. Students considering an alternative MATH course should check with the DUS in Physics.

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.

1. PHYS 165L, 166L is an introductory laboratory sequence aimed at students interested in engineering, the life sciences, and medicine. 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 or engineering. Related lecture courses are PHYS 180, 181; PHYS 200, 201; and PHYS 260, 261. Students who take the lecture courses in their first year are advised to start this laboratory sequence with PHYS 205L in the spring of their first 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). Physics courses more advanced than PHYS 290 count as electives for the major.

PREREQUISITES

B.S. degree program The prerequisites include 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 222 or 225 or 226; or PHYS 260, 261 with MATH 120, ENAS 151, PHYS 301, 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 first 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 first year at the appropriate level.
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.

REQUIREDS OF THE MAJOR

B.S. degree program 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, PHYS 401, 402, and either PHYS 439 or 440, involve advanced study of fundamental topics common to all branches of physics. PHYS 401 and 402 pertain to advanced classical physics (mechanics, statistical physics and thermodynamics, and electromagnetism), while the third, PHYS 439 or 440 covers quantum mechanics. PHYS 401 must be taken before PHYS 402, 439, or 440.

Three advanced elective courses are also required. Suitable advanced courses are numbered higher than PHYS 290, such as the advanced laboratory 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 DUS. In order to pursue their individual interests in sufficient depth, many students choose to take more than the required number of advanced courses.

B.S. degree program, intensive major 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). Because the ideas build progressively: PHYS 410 must precede PHYS 440; PHYS 430 and 440 must precede PHYS 441, and PHYS 440 must also precede PHYS 420.

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 are more advanced than PHYS 290 and include 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 DUS. In order to pursue their individual interests in sufficient depth, many students choose to take more than ten advanced courses.

Credit/D/Fail courses Courses taken Credit/D/Fail may not be counted toward the requirements of either major, including prerequisites.

Roadmap See visual roadmap of the requirements.

SENIOR REQUIREMENT

B.S. degree program The senior requirement for the standard B.S. degree is fulfilled by receiving a passing grade on a one-term research project in PHYS 471 or 472 or equivalent. One enrollment of PHYS 471 or 472 taken at any time during junior or
senior year counts as the senior requirement for the Physics major. Students should consult the DUS for further information.

**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 or 472. Two enrollments of PHYS 471 or 472 taken at any time during junior or senior year counts as the senior requirement for the intensive Physics major. Students may take either PHYS 471 or 472 two times or they can take each course one time. Students should consult the DUS for further information.

**ADVISING**

All Physics majors in the sophomore, junior, and senior classes must have their programs approved by the DUS. First-year students and undeclared sophomores who are interested in Physics or related majors are encouraged to meet with the DUS to discuss their questions and proposed programs.

For both the standard B.S. degree and the B.S. degree with an intensive major, students are advised to begin the program in their first 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:

<table>
<thead>
<tr>
<th>First-Year or Sophomore</th>
<th>Sophomore or Junior</th>
<th>Senior</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 170, 171, or 180, 181, or 200, 201, or 260, 261</td>
<td>PHYS 206L</td>
<td>PHYS 439 or PHYS 440</td>
</tr>
<tr>
<td>PHYS 205L</td>
<td>PHYS 301</td>
<td>PHYS 471 or 472</td>
</tr>
<tr>
<td>Mathematics corequisites</td>
<td>PHYS 401</td>
<td>Two advanced electives</td>
</tr>
<tr>
<td>PHYS 205L</td>
<td>PHYS 402</td>
<td>One advanced elective</td>
</tr>
</tbody>
</table>

A program for a student completing the intensive major in three years might be:

<table>
<thead>
<tr>
<th>First-Year or Sophomore</th>
<th>Sophomore or Junior</th>
<th>Senior</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 170, 171, or 180, 181, or 200, 201, or 260, 261</td>
<td>PHYS 206L</td>
<td>PHYS 382L</td>
</tr>
<tr>
<td>PHYS 205L</td>
<td>PHYS 301</td>
<td>PHYS 420</td>
</tr>
<tr>
<td>Mathematics corequisites</td>
<td>PHYS 410</td>
<td>PHYS 441</td>
</tr>
<tr>
<td>PHYS 430</td>
<td>PHYS 471</td>
<td>PHYS 472</td>
</tr>
<tr>
<td>PHYS 440</td>
<td></td>
<td>One advanced elective</td>
</tr>
</tbody>
</table>

**REQUIREMENTS OF THE MAJOR**

**B.S. DEGREE**

**Prerequisites** PHYS 170, 171 or 180, 181 or 200, 201 or 260, 261, with appropriate math coreqs, as indicated; PHYS 205L, 206L or PHYS 165L, 166L

**Number of courses** 8 term courses beyond prereqs (incl senior req)

**Specific courses required** PHYS 401, 402, and either PHYS 439 or 440, as indicated

**Distribution of courses** PHYS 301 or other advanced math course; 3 advanced electives approved by DUS
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, as indicated; PHYS 205L, 206L or PHYS 165L, 166L
Number of courses 10 term courses beyond prereqs (incl senior req)
Specific courses required PHYS 410, 440, 441, 420, 430, as indicated; PHYS 382L or equivalent
Distribution of courses PHYS 301 or other advanced math course; 1 advanced elective approved by DUS
Senior requirement two terms of PHYS 471 or 472

FACULTY OF THE DEPARTMENT OF PHYSICS

Professors †Charles Ahn, Yoram Alhassid, Thomas Appelquist, †Charles Bailyn, O. Keith Baker, Charles Baltay, Sean Barrett, Helen Caines, †Hui Cao, Richard Casten (Emeritus), †Paolo Coppi, †Michel Devoret, †Thierry Emonet, Bonnie Fleming, †Marla Geha, Steven Girvin, Larry Gladney, Leonid Glazman, Jack Harris, John Harris (Emeritus), Karsten Heeger (Chair), †Victor Henrich (Emeritus), †Joe Howard, Francesco Iachello (Emeritus), †Sohrab Ismail-Beigi, Steve Lamoreaux, Simon Mochrie, Vincent Moncrief, †Priyamvada Natarajan, †Corey O’Hern, Peter Parker (Emeritus), †Daniel Prober, Nicholas Read, †Peter Schiffer, †Robert Schoelkopf, Ramamurti Shankar, Witold Skiba, †A. Douglas Stone, †Hong Tang, Paul Tipton, C. Megan Urry, †Frank van den Bosch, †Pieter van Dokkum, †John Wettlaufer, Michael Zeller (Emeritus)

Associate Professors †Damon Clark, Sarah Demers, Walter Goldberger, Reina Maruyama, †Michael Murrell, Daisuke Nagai, Nikhil Padmanabhan, David Poland, †Peter Rakich, Alison Sweeney

Assistant Professors Meng Cheng, Eduardo Higino da Silva Neto, Benjamin Machta, David Moore, Ian Moul, †John Murray, Nir Navon, Laura Newburgh, †Diana Qiu

Senior Lecturers Sidney Cahn, Adriane Steinacker

Lecturers Mehdi Ghiassi-Nejad, Stephen Irons, Rona Ramos

†A joint appointment with primary affiliation in another department.
Physics and Geosciences

**Directors of undergraduate studies:** Nikhil Padmanabhan (nikhil.padmanabhan@yale.edu) (Physics), 207 Thomas Mellon Evans Hall, 56 Hillhouse Ave., 432-9950; Pincelli Hull (pincelli.hull@yale.edu) (Earth and Planetary Sciences), 111 KGL, 432-3167

The major in Physics and Geosciences applies fundamental physical principles to the study of the Earth and other planetary bodies, synthesizing concepts and methods from both the Physics majors and the Earth and Planetary Sciences majors.

**PREREQUISITES**

The prerequisites for the major include MATH 120 or its equivalent, PHYS 170, 171 or another introductory physics sequence, the associated physics laboratory sequence PHYS 205L, 206L, and a course in ordinary differential equations chosen from ENAS 194, MATH 246, or PHYS 301.

**REQUIREMENTS OF THE MAJOR**

Beyond the prerequisites, the major requires twelve term courses (13 term courses if the EPS introductory course has an accompanying laboratory), including the senior project. At least four of these courses must be in Physics and at least six must be in Earth and Planetary Sciences. Students complete a two- or three-term advanced physics sequence: either PHYS 401 and 402, or PHYS 410, 420, and 430. They must also take basic quantum mechanics (PHYS 439 or PHYS 440) and one elective numbered PHYS 290 or above. Relevant classes in related departments may be substituted with the permission of the DUS in Physics. Required courses in Earth and Planetary Sciences include one introductory course numbered EPS 100–140, with any accompanying laboratory; one elective numberd EPS 200 or above; and four advanced electives from one of two EPS tracks: the Atmosphere, Ocean, and Climate track or the Solid Earth Science track. Relevant classes in related departments may be substituted with the permission of the DUS in Earth and Planetary Sciences. No elective course may count toward multiple requirements for the major.

**Credit/D/Fail** No course taken Credit/D/Fail may be counted toward the Physics and Geosciences major, including prerequisites.

**SENIOR REQUIREMENT**

Students complete a two-term senior project on a topic that is appropriate for the combined major and acceptable to both the Physics and the Earth and Planetary Sciences departments. The project is undertaken in either PHYS 471, 472 or EPS 490, 491. In addition, students must present an oral report on their project to each department.

**ADVISING**

Interested students should consult the directors of undergraduate studies (DUSes) in Physics and in Earth and Planetary Sciences.

**REQUIREMENTS OF THE MAJOR**

**Prerequisites** MATH 120 or equivalent; PHYS 170, 171 or above; PHYS 205L, 206L; ENAS 194, MATH 246, or PHYS 301
Number of courses  At least 12 courses beyond prereqs, incl senior req
Specific courses required  PHYS 401 and 402, or PHYS 410, 420, and 430; PHYS 439 or PHYS 440
Distribution of courses  1 elective numbered PHYS 290 or above; 1 intro course in EPS, with lab, as specified; 1 elective course numbered EPS 200 or above; 4 advanced courses in an EPS track, as specified
Substitution permitted  Courses in related departments for PHYS elective and EPS electives with DUS permission
Senior requirement  Senior project in PHYS 471, 472 or EPS 490, 491, on topic acceptable to both depts; oral report on project to both depts or equivalent
Physics and Philosophy

Directors of undergraduate studies: Nikhil Padmanabhan (nikhil.padmanabhan@yale.edu) (Physics), 207 Thomas Mellon Evans Hall, 56 Hillhouse Ave., 432-9950; Paul Franks [Sp 2022]; Daniel Greco (Philosophy) [F 2022, Sp 2023]

PREREQUISITES
Prospective majors in Physics and Philosophy are advised to begin taking the prerequisites during their first 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.

REQUIREMENTS OF THE MAJOR
Beyond the prerequisites, students take fourteen term courses, including the senior requirement. Seven courses in Physics approved by the director of undergraduate studies (DUS) and numbered 295 or higher are required, including PHYS 301 or equivalent and either PHYS 439 or 440. Six courses in Philosophy or in History of Science, Medicine, and Public Health 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 DUSes.

SENIOR REQUIREMENT
B.S. degree program Seniors must complete PHYS 471 and/or 472, only one of which may count toward the seven required Physics courses.

B.A. degree program Seniors must complete one of the following: (1) PHIL 490 or 491 (senior essay); (2) PHIL 480 (tutorial) on an appropriate subject; (3) an appropriate Philosophy seminar with the approval of the DUS in Philosophy.

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
Number of courses 14 term courses beyond prereqs, incl senior req
Specific courses required PHYS 301 or equivalent; PHYS 439 or 440; PHIL 125, 126
Distribution of courses 7 Physics courses numbered 295 or higher approved by DUS; 6 courses in PHIL or HSHM, incl 1 in logic above intro level and a PHIL sem, as specified
Senior requirement B.S. — PHYS 471 and/or 472 (only one of which may count toward the 7 required Physics courses); B.A. — PHIL 490 or 491, PHIL 480 on appropriate topic, or approved PHIL sem
Political Science

**Director of undergraduate studies:** David Simon (david.simon@yale.edu), 115 Prospect St., 432-5236; politicalscience.yale.edu

Political science addresses how individuals and groups organize, allocate, and challenge the power to make collective decisions involving public issues. The goal of the major is to enable students to think critically and analytically about the agents, incentives, and institutions that shape political phenomena within human society. The subfields of political philosophy and analytical political theory (which includes the study of both qualitative and quantitative methodology) support the acquisition of the lenses through which such thought skills can be enriched. The subfields of American government, comparative politics, and international relations, in turn, allow students to reinforce and refine those skills, while also promoting their application to a wide variety of contexts, whether contemporary or historical. Students may also construct interdisciplinary curricula, which allows them to apply the approaches of the discipline to a topic for which a more complete understanding also involves approaches gleaned from other disciplines.

**Students in the Class of 2025 and previous classes** With the approval of the director of undergraduate studies (DUS), the following changes to the requirements of the major may be fulfilled by students who declared their major under previous requirements.

**REQUIREMENTS OF THE MAJOR**

**Students in the Class of 2026 and subsequent classes, following the standard B.A. degree program** must take twelve term courses. These courses include: at least two introductory courses (i.e. bearing numbers between 101 and 119); at least one course designated as belonging to the methodology and formal theory subfield; at least two non-introductory lectures designated as "core"; at least two classes in each of any two of the department’s subfields (other than methodology and formal theory) — international relations, American government, political philosophy, and comparative politics; at least two seminars, including at least one during their senior year.

All students, regardless of their graduating year, may also take courses related to political science that are offered by other departments. Students who elect the standard program may petition to count up to two such courses toward the major. Students may routinely count Residential College Seminars taught by members of the Political Science faculty toward the major, and they may petition to count one Residential College Seminar taught by an instructor outside the department. Students who have completed Directed Studies may, with the approval of the director of undergraduate studies (DUS), count one term of DRST 005 or DRST 006 toward the major.

**Students in the Class of 2026 and subsequent classes, following the standard B.A. degree program, interdisciplinary concentration** are allowed to identify and pursue an area of study that crosses conventional disciplinary and departmental boundaries. Examples of interdisciplinary concentrations include (but are not limited to) urban studies, health politics and policy, political economy, political psychology, or a focus on the politics of a given global region informed by the study of the history and society of that region. Students choosing an interdisciplinary concentration are required to take twelve term courses toward the major. At least seven courses must be in the field
of concentration. Of the courses counting toward the major outside of the field of concentration, at least two courses must be taken in each of any two of the department’s five fields. As many as three courses taken in other departments may be counted toward the major, with the permission of the DUS. Note: students who choose the interdisciplinary concentration must fulfill the introductory course requirement, the core lecture requirement, the methodology and formal theory subfield requirement, and the seminar requirement as described for the standard degree program.

Students wishing to pursue the Political Science major with an interdisciplinary concentration must submit an application, which is due prior to the beginning of the November recess in the student’s final year of enrollment. Students should also meet with the DUS to discuss their proposed program of study in their sophomore or junior year.

The intensive major  The intensive major gives students an opportunity to undertake more extensive coursework and research for the senior essay than is possible in the standard major. Requirements for the intensive major are identical to those for the standard program or interdisciplinary concentration, with the following exceptions: (1) in the spring term of the junior year, intensive majors take PLSC 474 in preparation for writing a yearlong senior essay; (2) in the senior year, intensive majors fulfill the senior essay requirement by enrolling in the yearlong course sequence PLSC 490 and PLSC 493 (PLSC 490 also counts toward the senior seminar requirement); (3) a total of fifteen term courses is required.

Juniors wishing to pursue an intensive major must apply to the DUS. The application should contain: (1) the intensive major application form signed by a faculty adviser who has agreed to supervise the student for the final three terms of enrollment; (2) a plan of study that identifies the political science courses that will be taken in those three terms; and (3) a one-page description of the proposed senior essay.

Seminar requirement Students majoring in Political Science are required to take at least two seminars taught by members of the Political Science department, including at least one during the senior year.

Credit/D/Fail Students may count up to two lecture courses taken Credit/D/Fail toward the major, which will count as non-A grades for purposes of calculating Distinction in the Major. Seminars taken Credit/D/F will not count toward the major requirements, but will count as non-A grades for purposes of calculating Distinction in the Major.

Roadmap  See visual roadmap of the requirements.

SENIOR REQUIREMENT

Seniors in the major must complete a senior essay. The essay can be written either in one term or over both terms of the senior year. In order to graduate from Yale College, a student majoring in Political Science must achieve a passing grade on the senior essay. The senior requirement for the standard B.A. degree program with an interdisciplinary concentration is the same as for the standard program, with the provision that the essay must be written on a subject that falls within the field of concentration.

Senior essay  The senior essay provides an appropriate intellectual culmination to the student’s work in the major and in Yale College. The essay should ordinarily be
written on a topic in an area in which the student has previously done course work, and an effort should be made to demonstrate how the student’s work relates to broader topics, issues, and approaches within the discipline of political science. It should rest on research that is appropriate to the subject matter, and should reflect an awareness of how the student’s topic is connected to previous work within the discipline of political science. Essays are expected to be in the range of 25–30 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. Each student is expected to consult regularly with the seminar instructor or adviser and take the initiative in developing a plan of research, scheduling regular meetings, and submitting preliminary drafts for review.

One-term essays may be written either in a seminar or, with the approval of an adviser and the DUS, in PLSC 480. More extensive information about the senior essay can be found on the department website.

**Yearlong senior essay** Students who wish to undertake a more extensive research project than is possible in a single term may fulfill the senior essay requirement by enrolling in the yearlong course sequence PLSC 490 and 491. Both classes are offered in both terms, but must be taken in order. PLSC 490 also counts toward the senior seminar requirement. In the first term, students writing a yearlong senior essay develop a research prospectus for the essay and begin their research under the supervision of a member of the faculty who specializes in the area being investigated. In the second term, students complete the essay. Yearlong senior essays are expected to be substantially longer than a regular term paper. While there is no fixed length, they are normally at least fifty pages long.

Majors who wish to enroll in the yearlong senior essay must apply for admission in their junior year. By the appropriate date, students should submit to the office of the DUS: (1) the yearlong senior essay prospectus form signed by a faculty adviser who has agreed to supervise the student during both terms of the senior year; and (2) a one-page statement describing the research project. Due to space constraints in PLSC 490, it is expected that no more than fifteen students will be admitted each term.

**Students in the Class of 2026 and subsequent classes** have the option of choosing an honors track or a non-honors track. Senior essays of students seeking to fulfill the honors requirements may be either semester-long or year-long. Honors will be awarded to students who meet the standard for honors on their senior essay (as determined by a second reader appointed by the director of undergraduate studies) and who meet certain standards of achievement across graded coursework in the major as determined by the chair, the director of undergraduate studies, and the faculty. Senior essays of students not seeking to fulfill the honors requirements must be written within a seminar, and will not be assigned to a second reader.

**ADVISING**

The DUS and other members of the department can provide advice about departmental requirements, options within the major, requirements of two majors, study abroad, and other matters related to the major. Majors must secure written approval of their course selections each term from the DUS. All subsequent changes in a student’s major program must also be approved. Although advisers (beyond the DUS and the senior
essay adviser) are not formally assigned, students are encouraged to seek advice from other department faculty members who are knowledgeable about their fields of interest. Information on faculty interests can be found on the department website.

**Combined B.A./M.A. degree program** Exceptionally able and well-prepared students may complete a course of study leading to the simultaneous award of the B.A. and M.A. degrees after eight terms of enrollment. See Academic Regulations, section L, Special Academic Arrangements, “Simultaneous Award of the Bachelor’s and Master’s Degrees.” Interested students should consult the DUS prior to the sixth term of enrollment for specific requirements in Political Science.

**STUDY ABROAD**

Students who study in a junior term abroad program or at another university during the summer may, with the approval of the DUS, count up to two courses toward the major. Students who study in a junior year abroad program may, with the approval of the DUS, count up to four courses toward the major. Students may also petition to have non-Yale courses that were not taught in political science departments count toward the major. Pending approval of the DUS, these courses will count toward the maximum number of substitutions.

**REQUIREMENTS OF THE MAJOR**

**B.A. DEGREE, STANDARD PROGRAM**

**Prerequisites** None

**Number of courses** Standard major—12 term courses; intensive major—15 term courses

**Distribution of courses** 2 intro courses; 2 core lectures; 2 seminars (1 in senior year); 1 course in methodology and formal theory subfield; 2 courses in each of any two subfields (excluding methodology and formal theory subfield)

**Substitution permitted** 2 courses from other depts with DUS approval

**Senior requirement** 1-term senior essay in sem or in PLSC 480; or 2-term senior essay in PLSC 490, 491

**Intensive major** PLSC 474 in spring term of junior year; 2-term senior essay in PLSC 490, 493

**B.A. DEGREE, INTERDISCIPLINARY CONCENTRATION**

**Prerequisites** None

**Number of courses** Standard major with interdisciplinary concentration—12 term courses; intensive major with interdisciplinary concentration—15 term courses

**Distribution of courses** 7 courses in concentration: 2 intro courses; 2 core lectures; 2 seminars (1 in senior year); 1 course in methodology and formal theory subfield; outside of concentration: 2 courses in each of any two subfields

**Substitution permitted** 3 courses from other depts with DUS approval (2 courses from other depts with DUS approval for intensive major)

**Senior requirement** 1-term senior essay in sem or in PLSC 480; or 2-term senior essay in PLSC 490, 491; both options on subject within concentration

**Intensive major** PLSC 474 in spring term of junior year; 2-term senior essay in PLSC 490, 493 on subject within concentration

**FACULTY OF THE DEPARTMENT OF POLITICAL SCIENCE**

**Professors** Bruce Ackerman, Akhil Amar, Seyla Benhabib (*Emeritus*), Paul Bracken, David Cameron (*Emeritus*), Benjamin Cashore, Bryan Garsten, Alan Gerber, Jacob
Hacker, Oona Hathaway, Daniel HoSang, Gregory Huber, Isabela Mares, David Mayhew (Emeritus), Gerard Padro i Miquel, Doug Rae (Emeritus), John Roemer, Susan Rose-Ackerman (Emeritus), Frances McCall Rosenbluth, Bruce Russett (Emeritus), Kenneth Scheve, James Scott (Emeritus), Jasjeet Sekhon, Ian Shapiro, Stephen Skowronek, Steven Smith, Milan Svolik, Peter Swenson, Edward Tuft (Emeritus), Ebonya Washington, Steven Wilkinson, Elisabeth Wood

**Associate Professors** Peter Aronow, Katharine Baldwin, Sarah Bush, Ana De La O, Alexandre Debs, Hélène Landemore, Nuno Monteiro, Kelly Rader

**Assistant Professors** Alexander Coppock, Allison Harris, John Henderson, Joshua Kalla, Sarah Khan, Christina Kinane, Egor Lazarev, Daniel Mattingly, Salma Mousa, Elizabeth Nugent, Giulia Oskian, Tyler Pratt, Didac Queralt, Lucia Rubinelli, Fredrik Savje, Emily Sellars, Ian Turner

**Senior Lecturers** Boris Kapustin, Stephen Latham, David Simon

Portuguese

**Director of undergraduate studies:** Kenneth David Jackson (k.jackson@yale.edu); span-port.yale.edu

Portuguese is taught at Yale as part of the Department of Spanish and Portuguese.

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.

**PREREQUISITES**

Students begin the study of Portuguese with PORT 110, 125, or S112. After two years of Portuguese language study, or equivalent, students have sufficient proficiency to take advanced courses in Luso-Brazilian literature and culture.

The prerequisite for the major is PORT 130 or the equivalent.

**PLACEMENT PROCEDURES**

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. See the department website for placement test times and details.

**REQUIREMENTS OF THE MAJOR**

The requirements of the Portuguese major consist of ten term courses beyond the prerequisites. Students must take at least five term courses in the literatures or cultures of the Portuguese world. 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 (DUS).

**SENIOR REQUIREMENT**

All majors must present a senior essay. The essay is written in PORT 491 and/or 492. A maximum of two credits counts toward the major.

**ADVISING**

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.

**REQUIREMENTS OF THE MAJOR**

- **Prerequisite** PORT 130 or equivalent
- **Number of courses** 10 term courses beyond prereq (incl senior essay course)
- **Distribution of courses** At least five term courses in literatures or cultures of the Portuguese world
- **Substitution permitted** With DUS permission, up to 4 relevant courses from other depts or from study abroad
Senior requirement  Senior essay (PORT 491 and/or 492)

CERTIFICATE OF ADVANCED LANGUAGE STUDY

The Department of Spanish and Portuguese offers a Certificate of Advanced Language Study in Portuguese. A certificate adviser, typically the director of undergraduate studies (DUS), advises students on the certification process and certifies to the University Registrar’s Office that students have completed the stated requirements before the end of eight terms of study. The Certificate of Advanced Language Study, once certified, is listed on the student transcript.

REQUIREMENTS

Students seeking to earn the certificate are required to take four courses, all beyond the L4 level in their chosen language, at least two of which must be Yale courses designated as L5. All courses must be taken for a letter grade, and students must achieve a grade of B or above. With the approval of the certificate adviser, one advanced non-L5 course, conducted in the target language, such as an independent study course, a graduate seminar, or an advanced seminar may count toward certification requirements.

The adviser may approve the substitution of one credit earned as part of a Yale or Yale-designated study abroad program and taught in the target language to count toward the certificate requirements. If the adviser approves courses taken outside of Yale for inclusion in the certificate requirements, students must take the necessary steps to ensure those courses appear on their transcripts.

Credit/D/Fail  No courses taken Credit/D/Fail may be counted toward the requirements of the certificate.

FACULTY OF THE DEPARTMENT OF SPANISH AND PORTUGUESE

Professors  Rolena Adorno, Roberto González Echevarría, Aníbal González, K. David Jackson, Noël Valis, Jesús R. Velasco (Chair)

Senior Lectors II  Sybil Alexandrov, Margherita Tortora, Sonia Valle

Senior Lectors I  María Pilar Asensio-Manrique, Mercedes Carreras, Ame Cividanes, Sebastián Díaz, María de la Paz García, María Jordán, Rosamaría León, Juliana Ramos-Ruano, Lissette Reymundi, Lourdes Sabé-Colom, Virginia Santos, Terry Seymour, María M. Vázquez

Lectors  Carolina Baffi, Luna Nájera, Giseli Tordin
Psychology

Directors of undergraduate studies: Yarrow Dunham (yarrow.dunham@yale.edu), 205 K, 432-0699; psychology.yale.edu

Psychology is the scientific study of the mind, the brain, and human behavior. The Psychology department offers coursework and research opportunities in the fields of clinical, cognitive, developmental, neuroscientific, and social psychology. By studying psychology, students better understand human behavior, including who we are, how we do the things we do, and how we enhance our lives and society. The Psychology major provides a foundation for careers in education and research; law; medicine and public health; politics and public policy; and in business fields such as marketing, finance, and management.

COURSE NUMBERING

Courses in the department are organized so that they are best taken in several parallel sequences. Courses numbered from 120–190 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 200–209 focus on statistics. Courses numbered from 210–299 teach general methodology or data collection in various areas of psychology. Courses numbered from 300–399 are more advanced courses in a particular specialization. Senior seminars, whose enrollment is limited to no more than twenty students, are numbered from 400–489. These seminars are best taken once a student has appropriate background. Courses numbered from 490–499 are special tutorial courses that require permission of the adviser and the director of undergraduate studies (DUS).

PREREQUISITE

PSYC 110, a general survey course, is prerequisite to several 100-level and all 200-level and above courses. This prerequisite may alternatively be satisfied by a score of 5 on the Psychology Advanced Placement test or a score of 7 on the IB Psychology exam.

REQUIREMENTS OF THE MAJOR

Standard major The standard major in Psychology for both the B.A. degree program and the B.S. degree program requires twelve credits beyond PSYC 110, including the senior requirement. The difference between the B.A. and the B.S. degree programs is the senior requirement (see below).

1. Because psychology is so diverse a subject, every student is required to take two courses from the social science point of view in psychology and two from the natural science point of view in psychology. Listed below are examples of courses that fulfill these requirements. A complete list of courses, updated each term, may be found on Yale Course Search (YCS) by searching "Any Course Information Attribute." At least one from each group must be a course designated as Core in the course listings and below. Students are expected to take their two core courses as early as possible in the major, normally within two terms after declaring their major.

Social science core (YC PSYC: Social Science Core): PSYC 140, 150, 180
Social science: Search YCS for courses with the YC PSYC: Social Science designation.

Natural science core (YC PSYC: Natural Science Core): PSYC 120, 130, 135, 160

Natural science: Search YCS for courses with the YC PSYC: Natural Science designation.

2. Because statistical techniques and the mode of reasoning they employ are fundamental in psychology, a course in statistics (PSYC 200) is required, preferably prior to the senior year. A student may substitute S&DS 103 for PSYC 200 or may substitute an examination arranged with the instructor of PSYC 200 for the course requirement. Students may take the examination only one time, and an additional course in psychology should be taken if the examination substitutes for PSYC 200. A student who has taken S&DS 103 may not take PSYC 200 for credit.

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 210–299 fulfill this research methods requirement.

4. Students may, with permission of the DUS, count up to three term courses in other related departments toward the major. Appropriate courses are rare and students should consult with the DUS in Psychology about selecting outside courses.

Students interested in research are encouraged to take an independent study course (PSYC 493) as early as the sophomore year. Students may also take PSYC 495 for one-half course credit of independent research per term with prior permission of the faculty adviser and the DUS. To obtain permission, download the tutorial form from the department website, and submit it by the seventh calendar day before classes begin. These independent study courses are graded P/F. No more than a total of three credits from PSYC 490–499 combined may count toward the major.

Neuroscience track 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, Steve Chang (steve.chang@yale.edu). Majors in the neuroscience track meet with the track adviser at the beginning of each term in their junior and senior years.

Requirements for the neuroscience track are the same as for the standard major, with the additional requirements listed below. A complete list of courses, updated each term, may be found on Yale Course Search (YCS) by searching "Any Course Information Attribute."

1. Two terms of introductory biology are required for the major, BIOL 101-104. Students who have scored 5 on the Advanced Placement test in Biology or scored 7 on the IB Biology exam may place out of these courses.

2. Students must take PSYC 160 or 170 and a data-collection course (YCS attribute: YC PSYC: NSCI Track Rsrch Mthds) chosen from PSYC 230, 238, 250, 258
or 270. PSYC 229L, 260, or MCDB 320 may substitute for the PSYC 160 or 170 requirement, or MCDB 320 and 321L may substitute for PSYC 229L or 260, 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. As required for the standard major, students in the neuroscience track must take two social science courses, at least one of which must be designated as Core in the course listings. Students in the neuroscience track must also take a course from the natural science list in addition to the courses specified in item 2 above.

4. At least two advanced science courses (YCS attribute: YC PSYC: NSCI Track Adv Scie) 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, 250, 300, 315, 320, E&EB 220, 225, and 240. Certain courses outside of these departments may also meet the advanced science requirement, including BENG 350, 421, CPSC 475, MB&B 300, 301, 420, 435, 443, 452, MATH 222, 225, 230, 231, and 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.

Credit/D/Fail 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.

Roadmap See visual roadmap of the requirements.

SENIOR REQUIREMENT

Standard major Majors are required to earn two course credits from courses numbered PSYC 400–499. At least one of these courses (excluding PSYC 490–495, which can only be taken P/F) must be taken during the senior year, for which a student must write a substantial final paper (a minimum of 5,000 words) and receive a letter grade. The B.A. degree is typically awarded to students who conduct a nonempirical literature review during senior year. There are no restrictions in the research format for the B.A. The B.S. degree is awarded to students who conduct empirical research through PSYC 499 during senior year. An empirical research project normally includes designing an experiment and collecting and analyzing the data.

Neuroscience track The senior requirement for the neuroscience track is the same as for the standard major, except that the two required course credits from PSYC 400–499 must have neuroscience content (Consult YCS for courses with the YC PSYCH: NSCI Track Senior Seminar designation). Students pursuing the B.S. degree in the track must carry out a neuroscientific empirical project in PSYC 499 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.

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 term when the course used for the senior essay is taken. Senior essays
that are submitted after the deadline will be subject to grade penalties. Senior essays considered for Distinction in the Major are graded by a second reader and the essay adviser.

**ADVISING**

Schedules for all majors must be discussed with, and approved by, the DUS or the adviser for the neuroscience track in Psychology. For questions concerning credits for courses taken at other institutions or at Yale but outside the Department of Psychology, students should consult with the DUS. For questions concerning the neuroscience track, students should consult with the adviser for the neuroscience track in Psychology.

**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 Computer Science and Psychology for more information.

**REQUIREMENTS OF THE MAJOR**

**STANDARD MAJOR**

**Prerequisite** PSYC 110

**Number of courses** 12 courses beyond prereq (incl senior req)

**Specific course required** PSYC 200

**Distribution of courses** B.A. or B.S. — 2 social science courses and 2 natural science courses, as specified; 1 course numbered PSYC 210–299

**Substitution permitted** For PSYC 200, S&DS 103 or exam arranged with instructor; up to 3 relevant courses in other depts, with DUS permission

**Senior requirement** B.A. — 1 course credit from PSYC 400–489 or 499 taken during senior year; 1 additional course credit from PSYC 400–499; B.S. — PSYC 499 taken during senior year; 1 additional course credit from PSYC 400–499

**NEUROSCIENCE TRACK**

**Prerequisite** PSYC 110

**Number of courses** 12 courses beyond prereq (incl senior req); same as for the standard major with the additional requirements listed below

**Specific courses required** BIOL 101–104 unless students place out; PSYC 160 or 170; PSYC 200; PSYC 230, 238, 250, 258 or 270.

**Distribution of courses** B.A. or B.S. — 2 social science courses and 1 natural science course, as specified; at least 2 advanced science courses, as specified

**Substitution permitted** MCDB 320 or PSYC 229L or 260 may substitute for PSYC 160 or 170; or MCDB 320 and 321L may substitute for PSYC 229L or 260; S&DS 103 or exam arranged with instructor for PSYC 200

**Senior requirement** B.A. — 1 course credit from PSYC 400–489 or 499 with neuroscience content taken during senior year; 1 additional course credit from PSYC 400–499 with neuroscience content; B.S. — PSYC 499 taken during senior year, with neuroscience content in a research project; 1 additional course credit from PSYC 400–499 with neuroscience content

**FACULTY OF THE DEPARTMENT OF PSYCHOLOGY**

**Professors** Woo-kyoung Ahn, John Bargh, Tyrone Cannon, B. J. Casey, Marvin Chun, Margaret Clark, Melissa Ferguson, Jutta Joormann, Frank Keil, Joshua Knobe, Gregory
McCarthy, Jennifer Richeson, Peter Salovey, Laurie Santos, Brian Scholl, Nick Turk-Browne

**Associate Professors** Arielle Baskin-Sommers, Steve Wohn Chang, Molly Crockett, Yarrow Dunham, Avram Holmes

**Assistant Professors** Dylan Gee, Maria Gendron, Julian Jara-Ettinger, Julia Leonard, Sam McDougle, Robb Rutledge, Ilker Yildirim

**Lecturers** Jennifer Hirsch, Stephanie Lazzaro, Kristi Lockhart, Mary O’Brien, Matthias Siemer
School of Public Health

For information about Yale College course offerings related to health, see Global Health Studies.

The five-year B.A.–B.S./M.P.H. degree program The B.A.–B.S./M.P.H. degree program in Public Health offers 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 (YSPH) in a five-year joint program.

Undergraduate requirements During four years of Yale College enrollment, students complete any standard major. Four of the thirty-six course credits required for the bachelor’s degree are typically taken at YSPH in partial fulfillment of the M.P.H. degree requirements. Students may take additional YSPH courses while enrolled in Yale College, but no more than four course credits earned in the professional schools may be applied toward the bachelor’s degree. Two Yale College courses selected from an approved list may be counted as electives toward the M.P.H. degree requirements.

Students accepted into the B.A.–B.S./M.P.H. program typically take the following courses at the School of Public Health while enrolled in Yale College: EPH 505, Biostatistics in Public Health; EPH 507, Social Justice and Health Equity; EPH 508, Foundations of Epidemiology and Public Health; EPH 515, Ethics and Public Health: An Introduction; EPH 510, Health Policy and Health Care Systems, and EPH 513, Major Health Threats: Determinants and Solutions.

During the summer between the fourth and fifth years, students complete a public health internship.

Master's program requirements Students accepted into the program affiliate with one of seven departments or programs at the School of Public Health; this affiliation determines the primary adviser and the specific requirements for the five-year program. During the fifth year, students are in full-time residence at the School of Public Health to complete their remaining coursework and master’s thesis.

Admission requirements Students apply to the B.A.–B.S./M.P.H. program in the fall term of the junior year. Successful candidates present a verified commitment to improving the health of the public and evidence of quantitative skills. Two terms each of college-level mathematics, science, and social science courses are recommended, although some of these courses can be completed after applying to the program. Additional qualifications may be required by particular departments or programs. Applications are submitted through the School of Public Health’s application service, SOPHAS Express, and include transcripts, SAT scores, two letters of recommendation (at least one from an instructor of a Yale course), and a personal statement. Questions about admissions should be directed to Mary Keefe (mary.keefe@yale.edu).

Further information about the program may be viewed on the YSPH website.
Religious Studies

Director of undergraduate studies: Travis Zadeh, (travis.zadeh@yale.edu) 420 York Street, 432-6532; religiousstudies.yale.edu

Religious Studies offers a curriculum of challenging coursework that explores and critically analyzes religious traditions and systems of value. The many diverse courses delve into the history and meaning of rituals, canonical and non-canonical texts, and theological and social categories and how they have been shaped by and construct institutions, habits, hierarchies, and collectives. The study of religion probes the organization of society, gender roles, global affairs, war, violence, terrorism, and conflicting orthodoxies. Multiple disciplinary lenses and methodological approaches inform and shape the field, including: anthropology, history, philosophy, philology, psychology, and sociology. Courses on religious practices and formations span the globe over the course of history, from antiquity until the present day. The curriculum also addresses competing value systems that circulate in pop culture and politics, with studies of fundamentalism, spirituality, secularism, atheism, and consumerism.

The Department of Religious Studies is particularly known for its promotion of scholarly research by undergraduates. The tight cohort of majors have the unique opportunity to work closely with leading scholars of the field. The curriculum enables majors to acquire the linguistic, philosophical, and historical acumen necessary for in-depth research projects during their senior year. While courses normally have no prerequisites, some advanced seminars may require the permission of the instructor. The multidisciplinary nature of Religious Studies makes it attractive both for students seeking two majors and for those seeking to delve deep into a field of study as it relates broadly to the humanities.

Requirements of the Major

The Religious Studies major requires twelve term courses, to include a core of five courses, a junior seminar (RLST 490), a two-term senior essay (see below) and four electives. Religious Studies majors develop specialized areas of expertise as they plan a coherent program in consultation with the director of undergraduate studies (DUS) and other members of the faculty.

Core requirement A core of five courses in Religious Studies is required of all majors and should be selected in consultation with the DUS. These courses should originate in the Religious Studies department and carry a RLST subject code. One of the core courses must be an introductory course, numbered 001–199; another must introduce breadth into the student’s core area of study; the remaining three courses must form a cohesive cohort of courses leading students to the area of expertise upon which they write their senior essay.

Electives The four elective courses are designed to complement a student’s area of expertise. Collectively they should form the basis for advanced work in the major conducted during the senior year. These electives can be taken either within or beyond the Department of Religious Studies. They can comprise language study, topics and methods from other disciplines, or further advanced coursework within the department. Through these electives, students develop expertise in methods, regions, historical periods, or bodies of literature that inform their area of study and their work.
for the senior essay. Students pursuing a double major or an outside certificate may count up to two courses taken for the fulfillment of their other major or certificate toward the elective requirement in Religious Studies.

SENIOR REQUIREMENT

Students 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 subject on which they have completed coursework 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 DUS. The senior essay courses, RLST 491 and 492, include research and writing assignments as well as colloquia in which seniors present and discuss their research. Students submit at least ten pages of the essay to the DUS by the last day of classes in the first term in order to receive a grade of ”satisfactory” for that term.

ADVISING

Students majoring in Religious Studies who plan to do graduate work in the subject are strongly encouraged to study the languages that they will need for their graduate programs.

Courses in the Divinity School Some Divinity School courses may count toward the major, with permission of the DUS. Divinity School faculty are eligible to advise senior essays. Information about courses and faculty may be found in the Divinity School online bulletin.

REQUIREMENTS OF THE MAJOR

Prerequisites None

Number of courses 12 term courses (incl senior req)

Specific course required RLST 490

Distribution of courses 5 core courses to include: 1 intro course, 1 breadth course, 3 core RLST courses; 4 electives, as described and with DUS permission

Substitution permitted Divinity School courses, with DUS permission

Senior requirement Senior essay (RLST 491, 492)

FACULTY OF THE DEPARTMENT OF RELIGIOUS STUDIES

Professors Stephen Davis, Carlos Eire, Steven Fraade, Paul Franks, Bruce Gordon, Philip Gorski, Frank Griffel, John Hare, Christine Hayes, Noel Lenski, Nancy Levene, Kathryn Lofton, Ivan Marcus, Laura Nasrallah, Sally Promey, Shawkat Toorawa

Associate Professors Zareena Grewal, Noreen Khawaja, Hwansoo Kim, Eliyahu Stern, Travis Zadeh

Assistant Professors Maria Doerfler, Supriya Gandhi, Eric Greene, Nicole Turner

Senior Lecturers John Grim, Margaret Olin, Mary Evelyn Tucker

Lecturers Jimmy Daccache, Stephen Latham
Directors of undergraduate studies: Constantine Muravnik (constantine.muravnik@yale.edu) [Sp 2022]; Claire Roosein (claire.roosein@yale.edu) [F 2022, Sp 2023]; language coordinator: Irina Dolgova, (irina.dolgova@yale.edu) HQ 538, 320 York Street, 432-1307; slavic.yale.edu

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, East European, and Eurasian Studies, an interdisciplinary program administered by the Department of Slavic Languages and Literatures.

Placement Procedures
Students who have previously studied Russian formally or informally are required to take the Russian placement exam. This brief oral exam helps determine which Russian course best fits each student’s background. Contact the Russian language coordinator, Irina Dolgova (irina.dolgova@yale.edu), to schedule the oral placement exam or for information about preregistration. She may be reached via email or at 432-1307.

Students in the Class of 2023 With approval from the director of undergraduate studies (DUS), the following changes to the prerequisites and requirements of the major may be fulfilled by students who declared their major under previous requirements.

Students in the Class of 2024 and subsequent classes Follow the requirements as indicated.

Prerequisites
Prerequisite to the major in both programs is second year Russian, RUSS 140, 142, 145, or S140. The department offers three sequences of language courses to fulfill the prerequisite: either (1) RUSS 110, 120, 130, 140, or (2) RUSS 125, 145 or (3) courses for heritage speakers, RUSS 122, 142. Prospective majors should complete the prerequisites 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.

Requirements of the Major
In addition to the prerequisite, the major in Russian requires eleven term courses, which must include the following (some courses may fulfill more than one requirement):

1. Third-year Russian: RUSS 150 and 151.
3. Two terms of Russian literature in translation, one in 19th-century or earlier Russian literature and one in 20th-century or later Russian literature. First-Year Seminars and courses number 200 or higher fulfill this requirement.
4. One content course in which Russian is the language of instruction (RUSS 170–190).

5. One course in Russian, East European, or Eurasian history or social sciences.

6. RUSS 490 or 491. 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.

If the language proficiency is met without coursework, these course requirements must be fulfilled through additional term courses to bring the overall total to 11 term courses. A Yale summer program in Russian culture may be used to fulfill the requirements, with DUS approval.

Credit/D/Fail Courses taken Credit/D/Fail may not be counted toward the requirements of the major.

SENIOR REQUIREMENT
All majors write a senior essay (RUSS 490 or 491), an independent project carried out under the guidance of a faculty member. By the end of the junior year, students should declare their general topic and arrange for a faculty adviser, in consultation with the DUS. Students planning to conduct summer research for the senior essay, especially if abroad, should contact the DUS early in the spring semester of the junior year and apply for fellowships. By the first day of the reading period of the term prior to the term of the senior essay (RUSS 490 or 491), majors submit a proposal to the adviser (up to two pages double spaced). 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 midterm of RUSS 490 or 491. The senior essay takes the form of a substantial article, no longer than 13,000 words, excluding footnotes and bibliography. The final essay is due on the first day of the reading period of the term the student is enrolled in RUSS 490 or 491. A member of the faculty other than the adviser grades the essay.

Students pursuing two majors need to fulfill the senior requirement of both majors. If the second major allows, students may enroll in both RUSS 490 and 491 and write an essay longer than a single-term essay. In this case, students count the second term of the Russian senior essay as their twelfth course in the Russian major.

ADVISING
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 DUS.

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 DUS. Language courses, as well as RUSS S241, S242, and S243, 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 DUS well before their junior year. Students can apply for FLAS and Fox fellowships to support their travel.

REQUIREMENTS OF THE MAJOR
Prerequisite RUSS 140, 142, 145, S140 or placement exam
Number of courses 11 term courses beyond prereq (incl senior essay)
Specific courses required RUSS 150, 151, 160, 161
Distribution of courses 1 course in 19th-century or earlier Russian literature in translation, as specified; 1 course in 20th-century or later Russian literature in translation, as specified; 1 content course taught in original language, as specified; 1 course in Russian, East European, or Eurasian history or social sciences, as specified
Substitution permitted Yale summer program in Russian culture (RUSS S241, S242, or S243) for electives
Senior requirement Senior essay (RUSS 490 or 491)

CERTIFICATE OF ADVANCED LANGUAGE STUDY
The Department of Slavic Languages and Literatures offers a Certificate of Advanced Language Study in Russian. A certificate adviser, typically the director of undergraduate studies (DUS), advises students on the certification process and certifies to the University Registrar’s Office that students have completed the stated requirements before the end of eight terms of study. The Certificate of Advanced Language Study, once certified, is listed on the student transcript.

REQUIREMENTS
Students seeking to earn the certificate are required to take four courses beyond the L4 level in their chosen language, at least two of which must be Yale courses designated as L5. Students should take L5 content courses only after they have completed RUSS 151, Third-Year Russian II. All courses must be taken for a letter grade, and students must achieve a grade of B or above. With the approval of the adviser, one advanced non-L5 course, conducted in the target language, such as an independent study course, a graduate seminar, or an advanced seminar may count toward certification requirements.

The certificate adviser may allow one “language across the curriculum” (LxC) course, which ordinarily is an advanced seminar with an additional weekly discussion section in the target language, to count toward the certification requirements. The certificate adviser may also approve the substitution of up to two credits earned during study abroad and taught in the target language to count toward the certificate requirements. If the adviser approves courses taken outside of Yale for inclusion in the certificate requirements, students must take the necessary steps to ensure those courses appear on their transcript.

Credit/D/Fail No courses taken Credit/D/Fail may be counted toward the requirements of the certificate.

FACULTY OF THE DEPARTMENT OF SLAVIC LANGUAGES AND LITERATURES
Professors Edyta Bojanowska (Slavic Languages and Literatures), Katerina Clark (Comparative Literature, Slavic Languages and Literatures), John MacKay (Film & Media Studies, Slavic Languages and Literatures)
Associate Professor Molly Brunson (Slavic Languages and Literatures)
Assistant Professors Marijeta Bozovic (Slavic Languages and Literatures), Jinyi Chu (Slavic Languages and Literatures), Claire Roosien (Slavic Languages and Literatures)
Senior Lectors II  Irina Dolgova (Slavic Languages and Literatures), Constantine Muravnik (Slavic Languages and Literatures), Julia Titus (Slavic Languages and Literatures)

Senior Lectors I  Krystyna Illakowicz (Slavic Languages and Literatures), Karen von Kunes (Slavic Languages and Literatures)

Lector  Anastasia Selemeneva (Slavic Languages and Literatures)
Russian, East European, and Eurasian Studies

**Director of undergraduate studies:** Constantine Muravnik (constantine.muravnik@yale.edu) [Sp 2022]; Claire Roosein (claire.roosein@yale.edu) [F 2022, Sp 2023]; language coordinator: Irina Dolgova (irina.dolgova@yale.edu), HQ 538, 320 York St.; slavic.yale.edu

The major in Russian, East European, and Eurasian 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. Students majoring in RSEE may concentrate exclusively on Russian Studies, or on East European or Eurasian Studies. The major is appropriate for students considering careers in international public policy, diplomacy, or business, and is also suited to students wishing to continue academic work.

**Placement Procedures**

Students who have previously studied Russian formally or informally are required to take the Russian placement exam. This brief oral exam helps determine which Russian course best fits each student’s background. Contact the Russian language coordinator, Irina Dolgova (irina.dolgova@yale.edu), to schedule the oral placement exam or for information about preregistration. She may be reached via email or at 432-1307. Entering first-year students who have some knowledge of Czech or Polish should contact Krystyna Illakowicz (krystyna.illakowicz@yale.edu) (Polish) or Karen von Kunes (karen.vonkunes@yale.edu) (Czech) to arrange to take a brief placement examination.

**Students in the Class of 2023** With approval from the director of undergraduate studies (DUS), the following changes to the prerequisites and requirements of the major may be fulfilled by students who declared their major under previous requirements.

**Students in the Class of 2024 and subsequent classes** follow the requirements as indicated.

**Prerequisites**

**Russian Studies concentration** Completion of Second-Year Russian (RUSS 140, 142, 145 or S140) or placement exam.

**East European Studies or Eurasian Studies concentration** Two semesters of the first-year sequence in an East European or an Eurasian language or a placement exam.

**Requirements of the Major**

Students select one of three concentrations to complete the requirements for the major in Russian, East European, and Eurasian Studies. A full understanding of these areas demands knowledge of its languages and so students are encouraged to learn more than one language.

**Russian Studies concentration** Twelve term courses, including the senior requirement, are required for the Russian Studies concentration. Students must take two courses in Russian, East European, or Eurasian history; one RSEE-area focused course in the social sciences, such as those found in anthropology, economics, sociology, political
science, global affairs, and other disciplines of social science; one course in Russian, East European, or Eurasian literature or culture, selected in consultation with the director of undergraduate studies (DUS); and the Senior Essay (RSEE 490 or 491). To fulfill the language requirement students must demonstrate a proficiency in Russian by completing RUSS 150 and 151 or by passing an equivalency exam. A maximum of five language courses may be counted toward the major. If language proficiency is met without coursework, the course requirements must be fulfilled through additional term courses to bring the overall total to twelve courses. Electives are selected in consultation with the DUS and may include RUSS 160 and 161, a content course taught in Russian at the 170–190 level, or courses in other East European or Eurasian languages at the second-year level or above.

**East European Studies or Eurasian concentration** Eleven term courses, including the senior requirement, are required for the East European and the Eurasian concentrations. The requirements are the same as for the Russian Studies concentration, excluding the language requirements. To fulfill the language requirement students must demonstrate a proficiency in either an East European or Eurasian language (such as Czech, Polish, Romanian, Bosnian-Serbian-Croatian, Hungarian, Ukrainian, or those languages taught through the Shared Course Initiative) by completing the third-year level (4 term courses) of the chosen language or by passing an equivalency exam. The remaining two courses are chosen in consultation with the DUS. If language proficiency is met without coursework, the course requirements must be fulfilled through additional term courses to bring the overall total to eleven courses.

**Credit/D/Fail** Courses taken Credit/D/Fail may not count toward the requirements of the major.

**SENIOR REQUIREMENT**

Every major must write a one-term senior essay in RSEE 490 or 491 either in the fall or spring. By the end of the junior year, students should declare their general topic and confirm a faculty adviser, in consultation with the DUS. Students planning to conduct summer research for the senior essay, especially if abroad, should contact the DUS early in the spring term of the junior year and apply for fellowships. With the permission of the DUS and senior essay adviser, a student may choose a two-semester senior essay project in the RSEE major, which must be approved by the end of the junior year.

The senior essay takes the form of a substantial article, no longer than 13,000 words, excluding footnotes and bibliography. Students present to their senior essay adviser a detailed prospectus of the essay, with bibliography, prior to midterm in the semester before the essay is due and a draft of at least ten pages, or a detailed outline of the entire essay, by the last day of reading period in the term before they enroll in RSEE 490 or 491. A member of the faculty other than the adviser grades the essay.

Students pursuing two majors need to fulfill the senior requirement of both majors. If the second major allows, students may enroll in both RSEE 490 and 491 and write a longer essay than for the single-term essay. In this case, students count the second term of the RSEE senior essay as their 13th (Russian Studies concentration) or 12th (East European or Eurasian concentration) course in Russian, East European, and Eurasian Studies.
ADVISING

Qualified students may elect pertinent courses in the Graduate School with the permission of the instructor, the director of graduate studies, and the DUS.

Graduate work The European and Russian Studies program does not offer the simultaneous award of the B.A. and M.A. 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.

STUDY ABROAD

Students should be aware of opportunities for study and travel in Russia, eastern Europe, and Eurasia. The DUS 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 DUS.

REQUIREMENTS OF THE MAJOR

Prerequisites Russian Studies concentration—RUSS 140, 142, 145 or S140; East European and Eurasian concentrations—two courses of first-year sequence in East European or Eurasian language

Number of courses Russian Studies concentration—12 term courses beyond prereqs (incl senior req); East European and Eurasian concentrations—11 term courses beyond prereqs (incl senior req)

Specific courses required Russian Studies concentration—RUSS 150 and 151 or equivalency exam

Distribution of courses All concentrations—2 courses in RSEE history; 1 RSEE-area focused course in the social sciences, as specified; 1 course in Russian, East European, or Eurasian literature or culture, in consultation with DUS; Russian Studies concentration—up to 5 language courses and/or electives in consultation with DUS to fulfill total course requirement; East European Studies and Eurasian Studies concentrations—third-year level in East European or Eurasian language or equivalency exam; remaining electives in consultation with DUS to fulfill total course requirement

Senior requirement Senior essay (RSEE 490 or 491)

FACULTY ASSOCIATED WITH THE MAJOR

Professors Sergei Antonov (History), Edyta Bojanowska (Slavic Languages and Literatures), Paul Bushkovitch (History), Katerina Clark (Comparative Literature, Slavic Languages and Literatures), John Gaddis (History), John MacKay (Slavic Languages and Literatures, Film & Media Studies), Timothy Snyder (History)
**Associate Professors**  Molly Brunson (*Slavic Languages and Literatures*), Jason Lyall (*Political Science*), Douglas Rogers (*Anthropology*), Marci Shore (*History*)

**Assistant Professors**  Marijeta Bozovic (*Slavic Languages and Literatures, Film and Media Studies, Women’s, Gender, & Sexuality Studies*), Jinyi Chu (*Slavic Languages and Literatures*), Marta Figlerowicz (*Comparative Literature, English*), Claire Roosien (*Slavic Languages and Literatures*)

**Senior Lectors II**  Irina Dolgova (*Slavic Languages and Literatures*), Constantine Muravnik (*Slavic Languages and Literatures*), Julia Titus (*Slavic Languages and Literatures*)

**Senior Lectors**  Krystyna Illakowicz (*Slavic Languages and Literatures*), Karen von Kunes (*Slavic Languages and Literatures*)

**Lector**  Anastasia Selemeneva (*Slavic Languages and Literatures*)
Science

Yale College offers several interdepartmental course sequences for first-year students through the First-Year Seminar Program. SCIE 030 and 031, Current Topics in Science, presents a broader range of topics than standard courses and highlights the interdependence of the scientific disciplines. For first-year students interested in research, SCIE 010 and 011, Perspectives on Biological Research, combines lectures from Yale faculty on their own research, as well as instruction on those skills essential for any successful scientist. In addition to these yearlong courses, a single term course, SCIE 099, Introduction to Research Methods in Physics and Biology, spans both the classroom and laboratory, providing an immersive introduction to scientific research for students interested in science but who do not have prior research experience. Application information is available on the First-Year Seminar website.
Sociology

**Director of undergraduate studies:** Emily Erikson (emily.erikson@yale.edu); sociology.yale.edu

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, and sociology. Others work in finance, consulting, publishing, marketing, city planning, teaching, research, and advocacy.

The Sociology department offers four undergraduate pathways leading to the B.A. degree: (1) the standard major focuses on sociological concepts, theories, and methods; (2) the concentration in economy and society focuses on the cultural frameworks, social ties, and social institutions that give rise to markets and shape economic behavior; (3) the concentration in health and society emphasizes social processes as they affect health and medicine; (4) the student-designed program combines sociology with a concentration in another field. Students interested in the major are encouraged to contact the director of undergraduate studies (DUS) early in their academic careers to discuss potential options.

**COURSE NUMBERING**

Courses in Sociology are divided by level, with introductory courses numbered from 100–149, courses in sociological theory from 150–159, courses in sociological methods from 160–169, intermediate courses from 150–299, advanced courses in the 300s, and individual study and research courses in the 400s. First-Year Seminars are numbered below 100 and count as introductory or intermediate courses.

**PREREQUISITE**

Students interested in the Sociology major should complete either a First-Year Seminar or at least one introductory course (numbered SOCY 110–149), ideally by the end of the sophomore year. This course may be applied toward the requirements of the major. The DUS can waive the introductory course requirement for students who demonstrate adequate preparation for advanced coursework in sociology.
REQUIREMENTS OF THE MAJOR

The standard major The requirements for the standard major are given here. The three areas of concentration have slightly different requirements, as specified below.

1. Thirteen term courses in sociology (including the prerequisite and 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 DUS, but no more than two introductory courses may count toward the total.

2. Two courses in sociological theory and two in sociological methods, normally completed by the end of the junior year. SOCY 151 and 152 are the required courses for theory. SOCY 160 and one additional Sociology course numbered SOCY 161–169 are required for methods. Other methods courses from outside the department can be approved at the discretion of the DUS. 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 DUS before finalizing their plans.

3. One advanced seminar in Sociology (SOCY 300–399).

4. The senior requirement.

Concentration: Economy and Society Students in the economy and society concentration gain a broad understanding of markets and their relationship to social networks, religion, the state, and culture. Students explore the field of economic sociology, develop insights into market logics and economic outcomes, and develop skills in network analysis. Requirements for the concentration are:

1. Thirteen term courses in sociology (including the prerequisite and senior colloquium). At least one must be an introductory Sociology course or a substitute approved by the DUS, but no more than two introductory courses in any department or program may count toward the total. Up to four courses may be drawn from outside the Sociology department, with approval from the DUS.

2. SOCY 160 and one theory course (SOCY 151 or 152).

3. Two intermediate or advanced courses in economic sociology (e.g., SOCY 234, 314, 321).

4. At least one intermediate or advanced course in microeconomics (e.g., ECON 121 or 125).

5. The senior requirement, integrating sociology with business, markets, or economic behavior.

Concentration: Health and Society Students in the health and society concentration gain a broad understanding of how supraindividual factors such as socioeconomic inequality, demographic processes, neighborhood environments, cultural norms, and social networks affect health and medical care. Students explore the fields of medical sociology, stratification, demography, and network science. The core courses in the concentration satisfy the social science requirements of premedical programs while also providing a solid foundation for students interested in public health, health policy, and global health. Requirements for the concentration are:
1. Thirteen term courses in Sociology (including the prerequisite and senior colloquium).

2. SOCY 126 or SOCY 127, the gateway courses for the concentration (or other similar course, with approval of DUS).

3. One theory course (SOCY 151 or SOCY 152).

4. A course in statistics (SOCY 162, S&DS 103, S&DS 105, or GLBL 121, or a higher-level statistics course approved by the DUS).

5. SOCY 160 or a comparable course approved by the DUS.

6. In order to build a broad base of interdisciplinary knowledge on health, students may take up to five course credits from outside the Sociology department, with approval from the DUS. It is recommended that students select at least one course credit from the following: BIOL 101, BIOL 102, BIOL 103, BIOL 104; MATH 112 or higher-level MATH course; ECON 170.

7. Two upper-level Sociology seminars (200 or 300 level), or other courses approved by the DUS.

8. The senior requirement, integrating sociology with health and medicine.

**Concentration: Student-Designed** This program allows students to combine the study of sociology with the study of another discipline or substantive area, and to design a program that satisfies their own interests and career plans. By the beginning of the junior year, participants in the combined program are expected to consult with the DUS in order to obtain approval for their course of study.

1. Thirteen term courses (including the prerequisite and senior colloquium), of which at least nine and no more than ten are selected from Sociology, the remainder (up to four) being chosen from another department or program. At least one must be an introductory Sociology course or a substitute approved by the DUS, but no more than two introductory courses in any department or program may count toward the total. The courses outside Sociology must constitute a coherent unit alone and form a logical whole when combined with the Sociology courses.

2. Two courses in sociological theory and two in sociological methods, normally completed by the end of the junior year. SOCY 151 and 152 are the required theory courses. SOCY 160 and one additional Sociology course numbered SOCY 161–169 are the required method courses. Other methods courses from outside the department can be approved at the discretion of the DUS. 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 DUS before finalizing their plans.

3. One advanced seminar in Sociology (SOCY 300–399).

4. The senior requirement must integrate sociology and the other subject chosen.

**Credit/D/Fail courses** A maximum of two courses taken Credit/D/Fail may be counted toward the requirements of the major.

**SENIOR REQUIREMENTS**

**For the non-intensive major** Students electing the non-intensive major take one additional seminar in Sociology (SOCY 300–399) and write a one-credit senior essay
during the senior year (SOCY 491 or SOCY 492). The senior essay for non-intensive majors is intended to be an in-depth scholarly review and critical analysis based on secondary sources. Students select an important topic in any sociological field and write a literature review that evaluates what is known about the topic. All non-intensive majors are required to enroll in SOCY 491 or SOCY 492 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 DUS no later than the end of registration period in the term in which the senior essay is to be written. Non-intensive majors are not eligible to graduate with Distinction in the Major.

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 sub-field. Students use research methods such as data gathering through participant observation, in-depth interviewing, administration 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 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 and submit a senior essay written in SOCY 493, 494. See The Undergraduate Curriculum, Honors.

ADVISING

All students interested in the Sociology major should meet with the DUS no later than the beginning of the junior year to elect a program of study. Qualified students may petition to enroll in graduate courses, with permission of the instructor and the director of graduate studies. A list of graduate courses and descriptions is available from the DUS.

Admission to the intensive major Candidates for the intensive major should indicate interest to the DUS by the last day of classes in the spring term of their junior year. The intensive major is especially recommended for students considering graduate school or social research. In special circumstances, applications may be accepted through the first week in the first term of the senior year. An email indicating interest to the DUS should include a one-paragraph description of the topic, a list of relevant courses taken, and choice of a prospective senior essay adviser. The DUS and the senior essay adviser serve as advisers to seniors in the intensive major.

STUDY ABROAD

Students planning to study abroad in their junior year are strongly encouraged to begin meeting specific requirements in their sophomore year. They should also discuss the options for their course of study with the DUS before finalizing their plans.

REQUIREMENTS OF THE MAJOR

Prerequisite 1 first-year sem or intro course (SOCY 110–149) or equivalent

Number of courses 13 term courses (incl prereq and senior essay)

Specific courses required  
Standard major and Student-Designed concentration

— SOCY 151, 152, 160, 1 addtl course from SOCY 161–169; Economy &
Society concentration—SO CY 151 or 152; SO CY 160; Health & Society concentration—SO CY 126 or 127, SO CY 151 or 152, SO CY 160, or a comparable course approved by the DUS.

**Distribution of courses** Standard major, Economy & Society concentration, and Student-Designed concentration—at least 1, but no more than 2 intro courses; Standard major—1 sem from SO CY 300–399; Economy & Society concentration—2 intermed or adv courses in economic sociology (e.g., SO CY 234, 314, 321) and 1 in microecon (ECON 121 or 125); Health & Society concentration—1 course in stat, as specified; 2 upper-level sems, as specified; Student-Designed concentration—9 or 10 courses in sociology; 3 or 4 courses from another dept, as specified; 1 sem from SO CY 300–399

**Substitution permitted** Standard major—up to 2 courses from other depts; Economy & Society concentration—up to 4 courses from other depts, with DUS approval; Health & Society concentration—up to 5 courses from other depts, with DUS approval

**Senior requirement** Standard major—1 addtl 300-level Sociology sem and senior essay (SO CY 491 or SO CY 492); Intensive major—two-term senior essay (SO CY 493, 494)

**FACULTY OF THE DEPARTMENT OF SOCIOLOGY**

**Professors** Julia Adams, Jeffrey Alexander, Elijah Anderson, †James Baron, Scott Boorman, Nicholas Christakis, †Paul Cleary, Philip Gorski, Grace Kao, †Marissa King, †Peter Salovey, †Vicki Schultz, Philip Smith

**Associate Professors** Rene Almeling, †Monica Bell, Emily Erikson, †Justin Farrell, †Marissa King, †Issa Kohler-Hausmann, Jonathan Wyrtzen

**Assistant Professors** †Julie DiBenigno, Daniel Karell, †Balázs Kovács, Alka Menon, Rourke O’Brien, Emma Zang

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

**Director of undergraduate studies:** Sarah Khan (sarah.khan@yale.edu), south.asia@yale.edu

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.

**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 (DUS) 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.

**Language requirement** One South Asian language must be studied at the advanced level (L5). Students who matriculate with advanced proficiency in a South Asian language (excluding English), as demonstrated through testing, are encouraged to study Sanskrit, or to study a second modern language through Yale courses or 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.

**Credit/D/Fail** A maximum of one course taken Credit/D/Fail may count toward the major.

**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, or by completion of a one-credit, one-term directed study in SAST 486 that culminates in a senior essay. 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. The DUS must approve senior essay plans early in the student’s senior year.

**ADVISING**

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 DUS. Students should also identify an adviser from the South Asian Studies faculty in their area of specialization as early as possible.

**Two majors** 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.

**Courses in the Graduate School** Graduate courses in South Asian Studies are open to qualified undergraduates. Course descriptions appear in the Graduate School online bulletin and are also available in the South Asian Studies program office. Permission of the instructor and of the director of graduate studies is required.

**STUDY ABROAD**

Up to three course credits from approved study abroad programs may be applied toward the requirements of the major, with permission of the DUS.

**REQUIREMENTS OF THE MAJOR**

**Prerequisites** None

**Number of courses** 7 term courses (not incl senior req or lang req)

**Distribution of courses** 7 courses in South Asian Studies numbered 200 or above, 2 in premodern, 2 sems

**Substitution permitted** One relevant course in another dept, and/or up to 3 study abroad credits 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, or senior essay in SAST 486

**CERTIFICATE OF ADVANCED LANGUAGE STUDY**

The Department of South Asian Studies offers a Certificate of Advanced Language Study in Hindi. A certificate adviser, typically the director of undergraduate studies (DUS), advises students on the certification process and certifies to the University Registrar’s Office that students have completed the stated requirements before the end of eight terms of study. The Certificate of Advanced Language Study, once certified, is listed on the student’s transcript.

**REQUIREMENTS**

Students seeking to earn the certificate are required to take four courses beyond the L4 level in their chosen language, at least two of which must be Yale courses designated as L5. All courses must be taken for a letter grade, and students must achieve a grade of B or above. With the approval of the adviser, one advanced non-L5 Yale course, conducted in the target language, such as an independent study course (graded Pass/Fail), a graduate seminar, or an advanced seminar may count toward certification requirements.

The certificate adviser may allow one “language across the curriculum” (LxC) course, which ordinarily is an advanced seminar with an additional weekly discussion section in the target language, to count toward the certification requirements. The certificate adviser may also approve the substitution of up to two credits earned during study abroad and taught in the target language to count toward the certificate requirements. If the adviser approves courses taken outside of Yale for inclusion in the
certificate requirements, students must take the necessary steps to ensure that those courses appear on their transcripts.

**Credit/D/Fail**  No courses taken Credit/D/Fail may be counted toward the requirements of the certificate.

**FACULTY ASSOCIATED WITH THE PROGRAM OF SOUTH ASIAN STUDIES**

**Professors** Akhil Amar (Law School), Sunil Amrith (History), Tim Barringer (History of Art), Venecia Dayal (Linguistics), Nihal de Lanerolle (School of Medicine), Michael Dove (Anthropology, Forestry & Environmental Studies), Robert Jensen (Economics), Mushfiq Mobarak (Economics, School of Management), Kaivan Munshi (Economics), Mushfiq Pande (Economics), Kishwar Rizvi (History of Art), Kalyanakrishnan Sivaramakrishnan (Anthropology, Forestry & Environmental Studies), Shyam Sunder (School of Management), Steven Wilkinson (Political Science)

**Associate Professors** Rohit De (History), Mayur Desai (Public Health), Zareena Grewal (Ethnicity, Race, & Migration)

**Assistant Professors** Supriya Gandhi (Religious Studies), Subhashini Kaligotla (History of Art), Sarah Khan (Political Science), Priyasha Mukhopadhyay (English)

**Senior Lecturer** Carol Carpenter (Anthropology, Forestry & Environmental Studies)

**Senior Lecturer** Swapna Sharma

**Lecturer** Aleksandar Uskokov
Southeast Asia Studies

Chair: Erik Harms (erik.harms@yale.edu), 10 Sachem St., 436-4276; program manager: Kristine Mooseker (kristine.mooseker@yale.edu), 311 LUCE, 432-3431; language program director: Dinny Aletheiani (dinny.aletheiani@yale.edu); cseas.yale.edu

The Council on Southeast Asia Studies offers an interdisciplinary program that brings together faculty and students sharing an interest in Southeast Asia and contributes to the curriculum with language courses, a weekly seminar series, periodic conferences, cultural events, and special lectures. Yale maintains extensive library and research collections on Southeast Asia, including online archives of periodicals and newspapers from all parts of the region.

Yale does not offer a degree in Southeast Asia studies, but 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 interested in pursuing field research or language study in Southeast Asia may apply to the Council for summer fellowship support.

Courses featuring Southeast Asian content are offered each year within a variety of departments and programs, including Anthropology, Ethnicity, Race, and Migration (ER&M), Environmental Studies, History, History of Art, Music, Philosophy, Political Science, and Sociology. A list of courses for the current year can be obtained through the Council office or the Southeast Asia Studies website.

Language instruction at all levels is offered in two Southeast Asian languages, Indonesian and Vietnamese. Other Southeast Asian languages may be available in any given year via video conference through the Yale Shared Course Initiative. Check the Southeast Asia Studies language studies web page for updated information. The Council on Southeast Asia Studies supports language tables and independent study in other Southeast Asian languages through the Directed Independent Language Study program.

FACULTY ASSOCIATED WITH THE COUNCIL ON SOUTHEAST ASIA STUDIES

Professors Michael R. Dove (School of the Environment), J. Joseph Errington (Anthropology), Benedict Kiernan (History), James Scott (Political Science), Mimi Yiengpruksawan (History of Art)

Associate Professor Erik Harms (Anthropology)

Assistant Professor Alka Menon (Sociology)

Senior Lecturers Carol Carpenter (School of the Environment, Anthropology), Amity Doolittle (School of the Environment)

Lecturer Quan T. Tran (American Studies)

Curator Ruth Barnes (Art Gallery)

Senior Lectors II Quang Phu Van (Vietnamese)

Senior Lectors Dinny Risri Aletheiani (Indonesian), Indriyo Sukmono (Indonesian)
CERTIFICATE OF ADVANCED LANGUAGE STUDY

The Department of Southeast Asian Studies offers a Certificate of Advanced Language Study in Vietnamese. A certificate adviser, typically the director of undergraduate studies (DUS) or language program director (dinny.aletheiani@yale.edu), advises students on the certification process and certifies to the University Registrar’s Office that students have completed the stated requirements before the end of eight terms of study. The Certificate of Advanced Language Study, once certified, is listed on the student’s transcript.

REQUIREMENTS

Students seeking to earn the certificate are required to take four courses beyond the L4 level in their chosen language, at least two of which must be Yale courses designated as L5. All courses must be taken for a letter grade, and students must achieve a grade of B or above. With the approval of the adviser, one advanced non-L5 Yale course, conducted in the target language, such as an independent study course (graded Pass/Fail), a graduate seminar, or an advanced seminar may count toward certification requirements. The certificate adviser may allow one “language across the curriculum” (LxC) course, which ordinarily is an advanced seminar with an additional weekly discussion section in the target language, to count toward the certification requirements. The certificate adviser may also approve the substitution of up to two credits earned during study abroad and taught in the target language to count toward the certificate requirements. If the adviser approves courses taken outside of Yale for inclusion in the certificate requirements, students must take the necessary steps to ensure that those courses appear on their transcripts.

Credit/D/Fail No courses taken Credit/D/Fail may be counted toward the requirements of the certificate.
Spanish

**Director of undergraduate studies:** Noël Valis (noel.valis@yale.edu); language program directors: Luna Nájera, 320 York St., Rm. 511, 436-9820 and Sarab Al Ani, 320 York St., Rm. 607, 432-5757; span-port.yale.edu

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 included in the faculty roster.

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, Latin America, and the Caribbean. 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.

**COURSE NUMBERING**

Courses numbered SPAN 110–199 include beginning and intermediate language courses designed to help students develop fluency in understanding, speaking, reading, and writing Spanish. Courses numbered SPAN 200–299 seek to provide students with a broad but solid introduction to the fields of Hispanic literatures and cultures while strengthening their linguistic competence. Courses numbered 300–499 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 (DUS).

**PREREQUISITE**

Prerequisite to the major is SPAN 140, 142, or 145, or the equivalent through advanced placement or study abroad. Equivalent preparation to SPAN 140, 142, or 145 may be demonstrated by the test scores indicated below under "Language Courses and Placement Procedures."

**LANGUAGE COURSES AND PLACEMENT PROCEDURES**

Students with no previous formal or informal Spanish study ordinarily enroll in SPAN 110. Students who take SPAN 110 are strongly encouraged to continue with 120 in the following term. 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 SPAN 132 and 142 is based on results of the departmental placement examination; interested students should contact the instructor.

All 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. The only exception to this rule is made for students who have demonstrated advanced ability in the language by (1) receiving a score of 5 on either of the Spanish Advanced Placement tests; (2) receiving a score of 6 or 7 on the Advanced-Level International Baccalaureate examination; or (3) attaining a proficiency level of C1 in the Common European Framework of Reference for Languages. These students may enroll directly in any L5 course.

Information about the departmental placement examination and about preregistration procedures for Spanish L1–L4 language courses is available on the department website.

REQUIREMENTS OF THE MAJOR

Beyond the prerequisite, ten term courses numbered SPAN 200 or higher are required, five of which must be numbered SPAN 300 or higher. SPAN 491, The Senior Essay, counts as one of the ten required courses. A maximum of one course may be numbered SPAN 200–230. First-year seminars taught in Spanish count toward the major in the SPAN 231–299 range. A maximum of one course taught in English may be counted toward the major requirements.

Intensive major Students in the intensive major fulfill the requirements for the standard major, and take an additional two courses numbered SPAN 300 or higher.

Roadmap See visual roadmap of the requirements.

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 DUS by 4 p.m. on December 9 in the fall term, or by 4 p.m. on April 28 in the spring 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.

ADVISING

Two majors Students electing Spanish as one of two majors should consult the DUS about a specialized course of study.

Courses in the Graduate School Juniors and seniors majoring in Spanish may, with 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 DUS.

STUDY ABROAD

Students at the intermediate level of language study are encouraged to apply to the eight-week summer language courses offered by Yale Summer Session in New Haven and Bilbao, Spain, or in Quito, Ecuador. Advanced students may apply for the five-week Yale Summer Session courses offered in Valencia, Spain, and in Quito, Ecuador. More information about these programs is available on the Yale Summer Session website. For information about the Year or Term Abroad program, see Academic Regulations, section K, Special Academic Programs. Students who wish to count
courses taken abroad toward the major should consult with the DUS before going abroad.

REQUIREMENTS OF THE MAJOR

Prerequisite 1 course from SPAN 140, 142, 145, or equivalent

Number of courses 10 term courses (including senior requirement)

Distribution of courses 10 term courses numbered SPAN 200 or higher, 5 of which are numbered SPAN 300 or higher; max of one course numbered SPAN 200–230; max of one SPAN course taught in English

Senior requirement Senior essay (SPAN 491)

Intensive major 2 addtl courses numbered SPAN 300 or higher, totaling 12 term courses

CERTIFICATE OF ADVANCED LANGUAGE STUDY

The Department of Spanish and Portuguese offers a Certificate of Advanced Language Study in Spanish. A certificate adviser, typically the director of undergraduate studies (DUS), advises students on the certification process and certifies to the University Registrar’s Office that students have completed the stated requirements before the end of eight terms of study. The Certificate of Advanced Language Study, once certified, is listed on the student’s transcript.

Requirements

Students seeking to earn the certificate are required to take four courses, all beyond the L4 level in their chosen language, at least two of which must be Yale courses designated as L5, and at least one of which must be a Yale 300-level course advanced undergraduate lecture or seminar. All Yale Spanish courses at the 200- or 300-level, which carry an L5 designation, count toward the requirement. First-Year Seminars taught in Spanish count as courses in the SPAN 231–299 range. All courses must be taken for a letter grade, and students must achieve a grade of B or above. With the approval of the certificate adviser, one advanced non-L5 course conducted in the target language, such as an independent study course, a graduate seminar, or an advanced seminar may count toward certification requirements.

The certificate adviser may approve the substitution of one credit earned as part of a Yale or Yale-designated study abroad program and taught in the target language to count toward the certificate requirements. If the adviser approves courses taken outside of Yale for inclusion in the certificate requirements, students must take the necessary steps to ensure that those courses appear on their transcripts.

Credit/D/Fail No courses taken Credit/D/Fail may be counted toward the requirements of the certificate.

FACULTY OF THE DEPARTMENT OF SPANISH AND PORTUGUESE

Professors Aníbal González-Pérez, K. David Jackson, Noël Valis, Jesús R. Velasco (Chair)

Senior Lectors II Sybil Alexandrov, Margherita Tortora

Senior Lectors I María Pilar Asensio-Manrique, Mercedes Carreras, Sebastián Díaz, María de la Paz García, Ximena González Parada, María José Gutiérrez Barajas, María
Jordán, Rosamaría León, Luna Nájera, Juliana Ramos-Ruano, Lissette Reymundi, Lourdes Sabé-Colom, Virginia Santos, Terry Seymour, Giseli Tordin, María M. Vázquez

Lectors Carolina Baffi, Sarah Glenski, Ian Russell, Igor de Souza
Special Divisional Majors

Director of undergraduate studies: Sarah Mahurin (sarah.mahurin@yale.edu), Dean’s Office TD, 432-0754

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 many of these majors 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 the Renaissance Studies program website. 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 (DUSes) 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.

PREREQUISITES

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.

REQUIREMENTS OF THE MAJOR

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. No distinction is made in the Special Divisional Major between standard and intensive majors.

The DUS 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 DUS. 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.

Credit/D/Fail Courses taken Credit/D/Fail may not be counted toward the major.

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.

ADVISING AND APPLICATION TO THE MAJOR

Advisers Candidates must arrange for faculty advisers before applying. DUSes 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.

Application Students considering a Special Divisional Major are invited to talk with DUSes 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 (DUS) 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 Timothy Dwight 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 Timothy Dwight 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 DUSes and other faculty members to judge whether or not this is the case.

**REQUIREMENTS OF THE MAJOR**

**Prerequisite** Approval of 2 or more 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, grad course, or tutorial
Statistics and Data Science

**Director of undergraduate studies:** Sekhar Tatikonda (sekhar.tatikonda@yale.edu), Rm. 338, 17 Hillhouse Ave., 432-4714; statistics.yale.edu; Major FAQ and guide; undergraduate major checklist

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. Data science expands on statistics to encompass the entire life cycle of data, from its specification, gathering, and cleaning, through its management and analysis, to its use in making decisions and setting policy. This field is a natural outgrowth of statistics that incorporates advances in machine learning, data mining, and high-performance computing, along with domain expertise in the social sciences, natural sciences, engineering, management, medicine, and digital humanities.

Students majoring in Statistics and Data Science take courses in both mathematical and practical foundations. They are also encouraged to take courses in the discipline areas listed below.

The B.A. in Statistics and Data Science is designed to acquaint students with fundamental techniques in the field. The B.S. prepares students to participate in research efforts or to pursue graduate school in the study of data science.

**COURSES FOR NONMAJORS AND MAJORS**

S&DS 100 and S&DS 101–109 and S&DS 123 (YData) assume knowledge of high-school mathematics only. Students who complete one of these courses should consider taking S&DS 230. This sequence provides a solid foundation for the major. Other courses for nonmajors include S&DS 110 and 160.

**PREREQUISITES**

Multivariable calculus is required and should be taken before or during the sophomore year. This requirement may be satisfied by one of MATH 120, ENAS 151, MATH 230, MATH 302, or the equivalent.

**REQUIREMENTS OF THE MAJOR**

Students who wish to major in Statistics and Data Science are encouraged to take S&DS 220 or a 100-level course followed by S&DS 230. Students should complete the calculus prerequisite and linear algebra requirement (MATH 222 or 225 or 226) as early as possible, as they provide mathematical background that is required in many courses.

**B.A. degree program** The B.A. degree program requires eleven courses, ten of which are from the seven discipline areas described below: MATH 222 or 225 or MATH 226 from Mathematical Foundations and Theory; two courses from Core Probability and Statistics; two courses that provide Computational Skills; two courses on Methods of Data Science; and three courses from any of the discipline areas subject to DUS approval. The remaining course is fulfilled through the senior requirement.
The B.S. degree program requires fourteen courses, including all the requirements for the B.A. degree. Specifically, B.S. degree candidates must take S&DS 242 and starting with the Class of 2024, S&DS 365 to fulfill the B.A. requirements. The three remaining courses include one course chosen from the Mathematical Foundations and Theory discipline and two courses chosen from Core Probability and Statistics (not including S&DS 242), Computational Skills, Methods of Data Science (not including S&DS 365), Mathematical Foundations and Theory, or Efficient Computation and Big Data discipline areas subject to DUS approval.

Discipline Areas

Core Probability and Statistics These are essential courses in probability and statistics. Every major should take at least two of these courses, and should probably take more. Students completing the B.S. degree must take S&DS 242.

Examples of such courses include: S&DS 238, 241, 242, 312, 351

Computational Skills Every major should be able to compute with data. While the main purpose of some of these courses is not computing, students who have taken at least two of these courses will be capable of digesting and processing data. While there are other courses that require more programming, at least two courses from the following list are essential.

Examples of such courses include: S&DS 220 or 230, 262, 265, 425, CPSC 100 or 112, or 201 or ENAS 130

Methods of Data Science These courses teach fundamental methods for dealing with data. They range from practical to theoretical. Every major must take at least two of these courses. Students completing the B.S. degree must take S&DS 365, starting with the Class of 2024.

Examples of such courses include: S&DS 312, 317, 361, 363, 365, 430, 431, 468, EENG 400, CPSC 446, 452, 477

Mathematical Foundations and Theory All students in the major must know linear algebra as taught in MATH 222 or 225 or 226. Students who have learned linear algebra through other courses (such as MATH 230, 231) may substitute another course from this category. Students pursuing the B.S. degree must take at least two courses from this list and those students contemplating graduate school should take additional courses from this list as electives.

Examples of such courses include: S&DS 364, 400, 410, 411, CPSC 365, 366, 469, MATH 222, 225, MATH 226, 244, 250, MATH 255, MATH 256, 260, 300, 301, or MATH 302

Efficient Computation and Big Data These courses are for students focusing on programming or implementation of large-scale analyses and are not required for the major. Students who wish to work in the software industry should take at least one of these.

Examples of such courses include: CPSC 223, 323, 424, 437

Data Science in Context Students are encouraged to take courses that involve the study of data in application areas. Students learn how data are obtained, how reliable they
are, how they are used, and the types of inferences that can be made from them. These course selections should be approved by the director of undergraduate studies (DUS).

Examples of such courses include: ANTH 376, EVST 362, GLBL 191, 195, LING 229, 234, 380, PLSC 454, PSYC 258

Methods in Application Areas These are methods courses in areas of applications. They help expose students to the cultures of fields that explore data. These course selections should be approved by the DUS.

Examples of such courses include: CPSC 453, 470, 475, ECON 136, 420, EENG 445, S&DS 352, LING 227

Substitution Some substitution, particularly of advanced courses, may be permitted with DUS approval.

Credit/D/Fail Credit/D/Fail may not be counted toward the requirements of the major (this includes prerequisite courses).

Roadmap See visual roadmap of the requirements.

SENIOR REQUIREMENT

Students in both the B.A. degree program and B.S. degree program complete the senior requirement by taking a capstone course (S&DS 425) or an individual research project course. Courses for research opportunities include S&DS 491 or S&DS 492, and must be advised by a member of the department of Statistics and Data Science or by a faculty member in a related discipline area. Students must complete a research project to be eligible for Distinction in the Major.

ADVISING

Students intending to major in Statistics and Data Science should consult the department guide and FAQ. Statistics and Data Science can be taken either as a primary major or as one of two majors, in consultation with the DUS. Appropriate majors to combine with Statistics and Data Science include programs in the social sciences, natural sciences, engineering, computer science, or mathematics. A statistics concentration is also available within the Applied Mathematics major.

Combined B.S./M.A. degree program Exceptionally able and well-prepared students may complete a course of study leading to the simultaneous award of the B.S. in S&DS and M.A. in Statistics after eight terms of enrollment. See Academic Regulations, section L, Special Academic Arrangements, "Simultaneous Award of the Bachelor's and Master's Degrees." Interested students should consult the DUS at the beginning of their fifth term of enrollment for specific requirements in Statistics and Data Science.

REQUIREMENTS OF THE MAJOR

Prerequisites Both degrees — one of MATH 120, ENAS 151, MATH 230, MATH 302, or equivalent

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. — MATH 222 or 225 or MATH 226; B.S. — same, plus 1 Core Probability and Statistics course must be S&DS 242; and for the Class of 2024 and beyond, 1 Methods of Data Science course must be S&DS 365
Distribution of courses  

**B.A.** — 2 courses from Core Probability and Statistics, 2 courses from Computational Skills, 2 courses from Methods of Data Science, and 3 electives chosen from any discipline area with DUS approval; **B.S.** — same, plus 1 Mathematical Foundations and Theory course and 2 additional electives from any discipline area (except Data Science in Context and Methods in Application Areas) with DUS approval

**Substitution permitted** With DUS approval

**Senior requirement** Both degrees — Senior Project (S&DS 491 or S&DS 492) or Statistical Case Studies (S&DS 425)

**CERTIFICATE IN DATA SCIENCE**

The Certificate in Data Science is designed for students majoring in disciplines other than Statistics & Data Science to acquire the knowledge to promote mature use of data analysis throughout society. Students gain the necessary knowledge base and useful skills to tackle real-world data analysis challenges. Students who complete the requirements for the certificate are prepared to engage in data analysis in the humanities, social sciences, and sciences and engineering and are able to manage and investigate quantitative data research and report on that data.

Refer to the S&DS website for more information.

**PREREQUISITE**

The suggested prerequisite for the certificate is an introductory course, selected from one of the following courses: S&DS 100, 101–109, 123 or 220, or an introductory data analysis course from another department.

**REQUIREMENTS OF THE CERTIFICATE**

To fulfill the requirements of the certificate, students must take five courses from four different areas of statistical data analysis. No course may be applied to satisfy the requirements of both a major and the certificate. No single course may count for two areas of study. Students are required to earn at least a B– for each course.


- **Statistical Methodology and Data Analysis** Two from S&DS 230, 242, 312, 361, 363, PLSC 349. ECON 136 may be substituted for S&DS 242.

- **Computation & Machine Learning** One from S&DS 262, 265, 317, 365, CPSC 223, 477, PHYS 378, PLSC 468. CPSC 323 may be substituted for CPSC 223.

- **Data Analysis in a Discipline Area** Two half-credit courses or one full-credit course from those approved for this requirement and listed on the S&DS website.

**ADVISING**

More information about the certificate, including how to register, is available on the S&DS website.

**REQUIREMENTS**

**Prerequisite** 1 term course from S&DS 100, 101–109, 123 or 220 (or an introductory data analysis course in another department)
Statistics and Data Science

Number of courses  5 term courses

Distribution of courses  1 probability and statistical theory course; 2 statistical methodology and data analysis courses; 1 computational and machine learning course; and 2 half-credit courses or 1 course in discipline area, as specified

FACULTY OF THE DEPARTMENT OF STATISTICS AND DATA SCIENCE

Professors  †Donald Andrews, Andrew Barron, †Jeffrey Brock, Joseph Chang, †Katarzyna Chawarska, †Xiaohong Chen, †Nicholas Christakis, †Ronald Coifman, †James Duncan, John Emerson (Adjunct), †Debra Fischer, †Alan Gerber, †Mark Gerstein, Anna Gilbert, John Hartigan (Emeritus), †Edward Kaplan, †Harlan Krumholz, John Lafferty, David Pollard (Emeritus), †Nils Rudi, Jasjeet Sekhon, †Donna Spiegelman, Daniel Spielman, †Hemant Tagare, †Van Vu, †Heping Zhang, †Hongyu Zhao, Harrison Zhou, †Steven Zucker

Associate Professors  †Peter Aronow, †Forrest Crawford, Ethan Meyers (Visiting), Sahand Negahban, Sekhar Tatikonda, Yihong Wu

Assistant Professors  Elisa Celis, Zhou Fan, †Joshua Kalla, †Amin Karbasi, Roy Lederman, †Vahideh Manshadi, †Fredrik Savje, Zhuoran Yang, †Ilker Yildirim

Senior Lecturer  Jonathan Reuning-Scherer

Lecturer  Brian Macdonald

†A joint appointment with primary affiliation in another department or school.
Theater and Performance Studies

**Director of undergraduate studies:** Shilarna Stokes (shilarna.stokes@yale.edu), Rm. 102C, 220 York St., 432-1310; theaterstudies.yale.edu; dance studies; musical theater

The mission of the program in Theater and Performance Studies (TAPS) is to cultivate adventurous artists and scholars with a serious commitment to craft and extensive understanding of the contexts in which cultural productions emerge. Introductory, term, and capstone courses reiterate the core learning objectives of the program: collaboration, compositional craft, the integration of practice and theory, interdisciplinarity, and new work development.

Students are encouraged to gain experience in an array of disciplines including theater, dance, performance studies, musical theater, intermedia arts, and design. As research in theater, dance, and performance studies 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 languages. The major provides a solid education in the humanities, as well as preparation for graduate studies or for careers in theater, dance, and the performing arts.

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 that reflects their developing interests. Faculty affiliated with the David Geffen School of Drama at Yale regularly teach for TAPS, and TAPS students have ample opportunities to interact with graduate students in the various departments of DGSD. Courses across the TAPS curriculum provide opportunities for students to attend performances by professional companies and artists, as well as to learn from discussions, workshops, and lectures offered by prominent guest artists and scholars.

Special features of the program are its production seminars, independent studies, and production-based senior projects. Production seminars, taken with permission of the instructor, offer immersive, semester-long performance research and development, culminating in public campus productions. Independent studies, taken under the supervision of a faculty adviser, give students the freedom to pursue individual and group-generated projects and to investigate areas of scholarship not offered elsewhere in the curriculum. Independent study courses are typically open only to majors. Production-based senior projects are described in the section on Senior Requirements below.

In addition to the theater and performance studies curricula, three additional programs are integrated into the vision for the major.

The **Dance Studies curriculum** features studio and seminar courses that cover the practice, history, and theory of diverse dance forms and movement phenomena. Students are guided in physical techniques and movement research across a wide range of temporal, geographic, and cultural sites, linking dance to the other arts, the humanities, sciences, and social sciences, and explore the fluid and fraught relationship between movement and language. Contact: Emily Coates (emily.coates@yale.edu), Director of Dance.
The Shen Curriculum for Musical Theater examines the American Musical Theater as an indigenous art form, one informed and influenced by changing cultural and socio-economic conditions as well as musical tastes and styles. Shen courses combine a grounding in skill-based study with history, analysis, and theory. The faculty consists of scholars and working professionals, including composers, directors, lyricists, librettists, directors, and performers. Additionally, the Shen Curriculum supports a co-curricular program that includes the Fridays at Five series of master classes, and voice lessons in musical theater technique. Contact: Daniel Egan (dan.egan@yale.edu), Coordinator of the Shen Curriculum.

Computing and the Arts (TAPS) is an interdepartmental major designed for students who wish to work at and across intersections between computing and theater, dance and/or performance studies. Through a mix of practical and theoretical exploration, students consider how the live body on stage is reconfigured, reimagined, and reified through technological intervention. Contact: Elise Morrison (elise.morrison@yale.edu), affiliated faculty in Computing and the Arts.

TAPS also supports three substantial co-curricular initiatives: the Performance Studies working group, the Yale Playwrights Festival, and the Yale Dance Lab.

Students in the Class of 2023 With approval from the director of undergraduate studies (DUS), the following changes to the prerequisites and requirements of the major may be fulfilled by students who declared their major under previous requirements.

Students in the Class of 2024 and subsequent classes follow the prerequisites and major requirements as indicated.

PREREQUISITES
The prerequisites for the major are THST 110 and THST 111.

Acting and Directing Students wishing to take regularly offered upper-level courses in acting (THST 211, THST 230) and directing (THST 300) must first take THST 210, which does not require an audition.

Dance Studies There are no prerequisites for courses in dance studies, though many require an audition or application process, and the permission of the instructor.

Shen Curriculum for Musical Theater There are no prerequisites for Shen curriculum courses, though all courses require an audition or application process, as well as permission of the instructor.

REQUIREMENTS OF THE MAJOR
The major consists of ten term courses beyond the introductory prerequisites (THST 110, 111). Of the ten required term courses, students must take two courses in each of four domains of knowledge: Artistic Practice; Interarts; Histories; and Performance Theory. Most courses are listed in more than one domain, though they may only count for one domain requirement for a given student.

Artistic Practice This domain encompasses techniques and compositional strategies in theater, dance, musical theater, design, and intermedia performance. Practice-based courses emphasize the knowledge of doing, moving, creating, devising, composing,
designing, and craft. Courses move through existing aesthetic practices and histories as a means of cultivating individual and collective expression and new creation. Skills: heightened attention to energy, time, and space; the artist’s self-knowledge and body; fluency synthesizing movement and language in compositions; and innovative approaches to researching history and culture through performance.

**Interarts** This domain invites students to experience art-making in between disciplines and within interdisciplinary forms. Courses in this area may draw connections and inspiration between established artistic disciplines, such as theater and dance, or reach beyond the program, putting the performing arts in conversation with ideas and approaches in diverse fields including film, visual art, new media, psychology, and science. Ideally, students use the Interarts requirement to explore disciplinary practices outside of their main track and comfort zone, expanding the boundaries of methods, resources, and questioning that feed into their creative practice. Skills: collaboration; interdisciplinary research and creation; the integration of methods and systems of knowledge drawn from diverse fields.

**Histories** This domain includes courses in which the scope of study is defined by period, genre, and/or geographic region, in which students research past practices, texts, performances, and cultures. Courses in Histories may also ask students to employ performance-based research methods to analyze, discover, reconstruct, or intervene in diverse global, local, and personal historical narratives. Skills: engaging with material from disparate time periods, geographies, and cultural forms; methods of archival research and oral histories; reenacting historical performance and adaptation in new forms.

**Performance Theory** Courses in this domain introduce students to foundational theories of performativity and theatricality as applied to a range of cultural contexts and global histories. Theory courses bring together intersecting literatures of feminist and queer theory, linguistic theory, critical race studies, dance studies, and anthropology that together form the theories and methods of Performance Studies and Dance Studies as fields of study and practice. These courses may also invite students to respond to and use theoretical concepts in the creation of live art. Skills: facility with performance studies analysis; application of theory to dramatic texts and embodied practices; investigating dynamic relationship between archives and repertoires.

**Credit/D/Fail** Courses taken Credit/D/Fail may not be counted toward the requirements of the major in Theater and Performance Studies.

**SENIOR REQUIREMENTS**

Majors satisfy the senior project requirement in one of two ways. They may, with the approval of the DUS, take a THST seminar as a senior seminar. In such cases, the expectations for the final essay (minimum of thirty pages) are substantially higher for students using the course to fulfill their senior requirement. Or, under the supervision of a faculty adviser, a student may undertake a one-term senior project in either the fall or spring semester (THST 491). Depending upon an individual student’s preparation, course work, and research objectives, a senior project may take many forms. A senior may direct, design, or devise a theatrical production, write a play, musical, or thesis-length essay, create a documentary film or digital media production, perform a role, choreograph a dance piece, or design an original performance-based or performance
studies research project. Seniors engaging in production-based senior projects must also complete a shorter senior essay (minimum of fifteen pages), as a requirement of THST 491.

To ensure that their course work aligns with their goals, students should begin discussing senior project ideas and plans with the DUS at the start of their junior year. Senior Project meetings for all juniors are held early in the spring semester, with research and production proposals due the Friday before spring break.

ADVISING

Courses in Theater and Performance Studies are open to all undergraduate students. Most are limited enrollment courses and therefore require a short application, writing sample, or audition. When there are more applicants for a course than can be admitted, priority is given to juniors and seniors who have declared a major in Theater and Performance Studies or first-year students and sophomores who have informed the DUS of their intent to declare the major. TAPS majors in their junior and senior years are required to meet with the DUS at the beginning of each of their final four terms. Students in their first and second years of study who may be interested in the TAPS major are encouraged to meet with the DUS once a semester in order to discuss goals, learn about opportunities, and ask questions.

COURSES IN THE DAVID GEFFEN SCHOOL OF DRAMA AT YALE

 Majors in Theater and Performance Studies are eligible to take DGSD courses in design, theory, dramaturgy, and theater management, with permission of the instructor, the DUS, the DGSD Registrar, and "blue form" approval submitted by their academic dean to the Registrar’s Office. Undergraduates may not, however, enroll in acting or directing courses offered by the David Geffen School of Drama at Yale. Students enrolling in DGSD courses should note that a maximum of four term courses from the professional schools (of which DGSD is one) may be offered toward the bachelor’s degree. Students also should note that the academic calendars of DGSD and of Yale College differ. The DGSD calendar should be consulted for scheduling. A student interested in taking a course at the David Geffen School of Drama at Yale should begin by seeking the permission of the instructor and contacting their academic dean.

REQUIREMENTS OF THE MAJOR

Prerequisites THST 110, 111
Number of courses 10 term courses beyond prerequisites (including senior requirement)
Distribution of courses 2 courses in each of four domains: Artistic Practice, Interarts, Histories, Performance Theory
Senior requirement Senior seminar or senior project (THST 491)

FACULTY ASSOCIATED WITH THE PROGRAM OF THEATER AND PERFORMANCE STUDIES

Professors James Bundy (School of Drama, Theater and Performance Studies), David Chambers (Adjunct) (Theater and Performance Studies), *Toni Dorfman (Adjunct) (Theater and Performance Studies), Joan MacIntosh (Practice) (Theater and Performance Studies, School of Drama), *Lawrence Manley (English), *Deb Margolin (Practice) (Theater and Performance Studies), Donald Margulies (Adjunct) (English, Theater and Performance Studies), *Charles Musser (Film & Media Studies, American Studies, Theater
Tavia Nyong’o (Theater and Performance Studies, American Studies), *Marc Robinson (School of Drama, Theater and Performance Studies, English), Gregory Wallace (Practice) (School of Drama, Theater and Performance Studies)

**Associate Professor** Emily Coates (Adjunct) (Theater and Performance Studies, School of Drama)

**Assistant Professor** Elise Morrison (Theater and Performance Studies)

**Lecturers** Hal Brooks, Lacina Coulibaly, Alan Edwards, Daniel Egan, Grant Herreid, Irène Hultman, Annette Jolles, Michael Korie, Bronwen MacArthur, Marsha Norman, Nathan Roberts, Renee Robinson, Michael Rossmy, Brian Seibert, Shilarna Stokes, Daniel Ulbricht

*Member of the Executive Committee for the program.*
Translation Studies Certificate

Certificate director: Marijeta Bozovic (marijeta.bozovic@yale.edu), Slavic Languages and Literatures; Film and Media Studies; Women’s, Gender, and Sexuality Studies

As human migration and globalization alter the manner and speed of language change, translation has become increasingly central to the workings of the contemporary world. This certificate in Translation Studies promotes the interdisciplinary study of translation, and at the same time facilitates existing and burgeoning translation practices, encompassing literary, social, political, economic, legal, technological, and medical dimensions.

This certificate offers students a coursework-focused track to develop expertise in translation research and practice.

REQUIREMENTS

Students must successfully complete five course credits on translation-themed topics, drawn from the list of approved courses posted each semester on the Translation Studies Initiative website. Other course credits may be approved by permission of the Certificate Director and the course instructor. In addition, each student must attend three lectures or events listed through the Translation Initiative in order to be awarded the certificate. After each lecture, students are asked to submit a brief written response to the lecture to the Certificate Director to be credited for attendance. Other translation activity or other events may be counted toward this requirement at the discretion of the director.

Of the five credits, no more than three may originate in the same department.

Additionally, no more than two course credits may overlap in the fulfillment of the requirements of the Translation Studies certificate or of a major, a simultaneous degree, a multidisciplinary academic program, or another certificate; and no course credit may be applied toward the requirements of more than two curricular programs. For example, the same course credit may not be used to fulfill the requirements of two certificates and a major. Approved graduate and professional school courses may count toward the certificate.

Declaration of Candidacy

Students may apply for the certificate as early as their first semester at Yale, but must apply for the certificate at the latest one week before final schedules are due in their final semester of study. Students should submit the form on the Translation Studies Initiative website to the Certificate Director. Final approval of the certificate rests with the Certificate committee. The Certificate Director certifies to the University Registrar’s Office that students have completed the stated requirements before the end of eight terms of study.

REQUIREMENTS OF THE CERTIFICATE

Number of courses 5 course credits
Distribution of courses Up to 3 courses in any originating department
Additional requirements Attendance at 3 lectures sponsored by the Translation Initiative, each followed by a 1-page written response to the event
Urban Studies

**Director of undergraduate studies:** Elihu Rubin, (elihu.rubin@yale.edu) RDH, 180 York St., 436-4641; urbanstudies.yale.edu

Urban Studies is an interdisciplinary field grounded in the physical and social spaces of the city and the larger built environment. The Urban Studies major is situated within Yale’s liberal arts framework and draws on the broader academic context and expertise of the Yale School of Architecture, including the areas of urban design and development, urban and architectural history, urban theory and representation, globalization and infrastructure, transportation and mobility, heritage and preservation, and community-based planning. The major introduces students to the following bodies of knowledge: history, theory, and contemporary analysis of urban morphologies, spaces, societies, and political economies; conceptual tools and analytical methods to understand urban environments and issues through spatial terms; and practices of and speculative approaches to urban planning and design.

The major prepares undergraduates for a variety of future careers and fields of graduate study related to urban planning, design, and development. These include professional and practice-oriented fields such as urban planning, landscape architecture, law, nonprofit management, public policy, real estate, and architecture; as well as research-oriented fields such as geography, sociology, anthropology, history and theory of urban planning, and urban and architectural history. For additional information visit the Urban Studies website.

**Requirements of the Major**

Thirteen course credits are required for the major, including the senior requirement. Each student, in consultation with the director of undergraduate studies (DUS) or a departmental faculty adviser, bears the responsibility for designing a coherent program, which must include the following elements: 3 surveys; 3 methods courses; 4, 5, or 6 electives (depending on the senior requirement); and a one- or two-term senior requirement.

**Surveys** Students choose three survey courses from the following list, of which one URBN course is required. Surveys should be completed by the end of the second year.

Surveys: URBN 160, 280, 341, 345, AMST 163, 196, ANTH 414, ARCH 385, EVST 226, HSHM 211

**Methods courses** Students choose URBN 353, 360, or 362 as one of the three required courses from the following list that introduces various methods of understanding and analyzing urbanism and the city. Students should consider completing at least two of these courses by the end of their junior year.

Methods Courses: URBN 200, 230, 353, 360, 362, AMST 348, ANTH 303, EVST 290, SOCY 160, 169

**Electives** Students choose five electives if enrolling in the two-term senior requirement; six electives if opting for the one-term senior requirement. Each student is responsible for selecting their elective courses from the approved list or by petition of
the DUS. Students who take two Urban Labs (1.5 credits each) may take 4–5 electives depending on the selected senior requirement.

**Credit/D/Fail** No course taken Credit/D/Fail may be counted toward the Urban Studies major.

**SENIOR REQUIREMENT**
All majors must satisfy a senior requirement undertaken during the senior year. Students have the option of pursuing a yearlong senior project, which includes URBN 490, Senior Research Colloquium, in the fall and URBN 491, Senior Project, in the spring. The senior project may be a written paper or a project that could encompass a variety of media. The primary adviser must be a member of the architecture faculty. Students not choosing a yearlong project may enroll in an advanced seminar (URBN 400–490), and produce a final paper of twenty to twenty-five pages in addition to existing course work. The seminar should be selected in consultation with the DUS. Note that students pursuing this option must also take an additional elective.

**ADVISING AND INTENT TO MAJOR**
Students are encouraged to declare their intent to major by the end of their second year. The intent to major process includes submission of an Intent to Major form with requested materials followed by a meeting with the DUS to discuss the intended course of study. More information regarding this process, the relevant forms, and the submission link are available on the program website. Schedules for majors must be discussed with, and approved by, the DUS in Urban Studies.

**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 available for the Credit/D/Fail option. Students are admitted on the basis of their previous coursework and previous performance.

**REQUIREMENTS OF THE MAJOR**

**Prerequisites** None

**Number of courses** 13 course credits (incl senior req)

**Distribution of courses** 3 surveys, incl 1 URBN course (to be completed by second year); 3 methods courses, one of which is URBN 353, 360 or 362; 4–6 electives as specified

**Senior requirement** URBN 490 and 491; or adv seminar (URBN 400–490) and an addtl elective

**FACULTY ASSOCIATED WITH URBAN STUDIES**

**Professors** Elijah Anderson (Sociology), Keller Easterling (School of Architecture), Jennifer Klein (History), Marcella Nunez-Smith (School of Medicine), Alan Plattus (School of Architecture), Karen Seto (School of Environment), Helen Siu (Anthropology), Jing Tsu (Comparative Literature, East Asian Languages and Literature)
**Associate Professors** Laura Barraclough (*American Studies*), Erik Harms (*Anthropology*), Bill Rankin (*History of Science, Medicine, and Public Health*), Elihu Rubin (*School of Architecture, American Studies*)

**Assistant Professors** Anthony Acciavatti (*Visiting*; *School of Architecture*), Joyce Hsiang (*School of Architecture*), Bimal Mendis (*Adjunct*; *School of Architecture*)

**Lecturer** Jay Gitlin (*History*)

**Critics** Marta Caldeira (*School of Architecture*), Andrei Harwell (*School of Architecture*), Surry Schlabs (*School of Architecture*), Beka Sturges (*School of Architecture*)
Women's, Gender, and Sexuality Studies

Directors of undergraduate studies: Igor De Souza
(igor.h.desouza@yale.edu); wgss.yale.edu

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. 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 yearlong or single-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

Twelve term courses are required and this major may be taken either as a primary major or as one of two majors. Requirements include two intermediate courses selected from WGSS 205, 206, 207, or 340. Majors are strongly encouraged to take these intermediate courses during their first two years. The major also requires two methodology courses, five courses in an area of concentration, the junior research seminar (WGSS 398), and a two-course senior requirement. The area of concentration consists of at least five courses, the majority of which should be drawn from program offerings. Substitutions to the major requirements may be made only with the written permission of the director of undergraduate studies (DUS).

Methodology courses 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 two methodologies relevant to their own concentration and planned senior essay. Students are advised to take the first of these courses during their first two years and to complete the two-course methods requirement in the junior year, in preparation for the senior essay.

Junior research seminar All students in the major must take WGSS 398, Junior Research Seminar, which provides majors opportunity to examine, synthesize, and apply the interdisciplinary theory and methods to which they have been exposed while completing the intermediate course sequence and methodology requirement. (Individualized alternatives are found for students who study abroad during the junior year.)
SENIOR REQUIREMENT

The yearlong senior essay The two-term senior sequence consists of WGSS 490, Senior Colloquium, in which students begin researching and writing a senior essay, followed by WGSS 491, Senior Essay, 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.

The single-term senior essay Majors may opt to complete the senior essay requirement in an approved upper-level WGSS seminar in the fall or spring term, with the approval of the instructor, by writing a senior essay of twenty-five to forty-five pages in lieu of the course's normal writing requirements. Students who choose the single-term senior essay take one additional WGSS course of their choosing to fulfill the twelve-term-course requirement.

REQUIREMENTS OF THE MAJOR

Prerequisites None
Number of courses 12 term courses (incl senior requirement)
Specific courses required WGSS 398
Distribution of courses 2 intermediate courses; 2 methodology courses; 5 electives in area of concentration
Senior requirement Senior colloquium and senior essay (WGSS 490, 491); or single-term senior essay in an upper-level seminar and one additional elective

FACULTY ASSOCIATED WITH THE PROGRAM OF WOMEN’S, GENDER, AND SEXUALITY STUDIES

Professors Roderick Ferguson (Chair), Scott Herring (American Studies), Margaret Homans (English), Regina Kunzel (History), Gail Lewis (Visiting Presidential Fellow), Dara Strolovitch, Laura Wexler (American Studies)

Associate Professor Joseph Fischel

Assistant Professors Eda Pepi, Evren Savci

Senior Lecturer Maria Trumpler

Lecturers Melanie Boyd, Graeme Reid, Craig Canfield

Affiliated Faculty Julia Adams (Sociology), Rene Almeling (Sociology), Carol Armstrong (History of Art), Daniel Botsman (History), Claire Bowern (Linguistics), Marijeta Bozovic (Slavic Languages and Literatures), Rosie Bsheer (History), Jill Campbell (English), Hazel Carby (Emeritus) (African American Studies, American Studies), Kang-i Sun Chang (East Asian Languages and Literatures), Becky Conekin (History), Deborah Davis (Sociology, East Asian Studies), Rohit De (History), Igor De Souza (English, Humanities), Carolyn Dean (History, French), Kathryn Dudley (American Studies, Anthropology), Ziv Eisenberg (History), Ron Eyerman (Sociology), Crystal Feimster (African American Studies), Marta Figlerowicz (Comparative Literature, English), Moira Fradinger (Comparative Literature), Glenda Gilmore (Emeritus) (History), Jacqueline Goldsby (African American Studies, American Studies, English), Gregg Gonsalves (Law School, Public Health), Inderpal Grewal (Emeritus) (American Studies), Zareena Grewal (American Studies, Religious Studies), Dolores Hayden
(Emeritus) (School of Architecture, American Studies), Janet Henrich (School of Medicine), Marcia Inhorn (Anthropology, Global Affairs), Alice Kaplan (French), Jennifer Klein (History), Greta LaFleur (American Studies), Marianne LaFrance (Emeritus) (Psychology), Hélène Landemore-Jelaca (Political Science), Kathryn Lofton (American Studies, History, Religious Studies), Lisa Lowe (American Studies, Ethnicity, Race and Migration), Mary Lui (American Studies, History), Karuna Mantena (Political Science), Deb Margolin (Adjunct) (Theater Studies), Kobena Mercer (History of Art, African American Studies), Joanne Meyerowitz (American Studies, History), Alice Miller (Law School, Public Health), Elise Morrison (Theater Studies), Laura Nasrallah (Religious Studies), Tavia Nyong’o (Theater Studies, American Studies), John Pachankis (Public Health), Sally Promey (American Studies, Institute of Sacred Music), Ana Ramos-Zayas (American Studies, Ethnicity, Race & Migration), Judith Resnik (Law School), Jill Richards (English), Naomi Rogers (History, History of Science, Medicine & Public Health), Frances Rosenbluth (Political Science), Alicia Schmidt Camacho (American Studies, Ethnicity, Race & Migration), William Summers (Emeritus) (Molecular, Cellular, & Developmental Biology, History of Science, Medicine, & Public Health), George Syrimis (Hellenic Studies), Rebecca Tannenbaum (History), Linn Tonstad (Divinity School), Jing Tsu (East Asian Languages and Literatures, Comparative Literature), Claudia Valeggia (Anthropology), Noel Valis (Spanish & Portuguese), Michael Warner (English, American Studies), Elisabeth Wood (Political Science)
THE WORK OF YALE UNIVERSITY

The work of Yale University is carried on in the following schools:

**Yale College**  Est. 1701. Courses in humanities, social sciences, natural sciences, mathematical and computer sciences, and engineering. Bachelor of Arts (B.A.), Bachelor of Science (B.S.). 203 432-9300  https://admissions.yale.edu

**Graduate School of Arts and Sciences**  Est. 1847. Courses for college graduates. Master of Arts (M.A.), Master of Science (M.S.), Master of Philosophy (M.Phil.), Doctor of Philosophy (Ph.D.). 203 432-2771 https://gsas.yale.edu

**School of Medicine**  Est. 1810. Courses for college graduates and students who have completed requisite training in approved institutions. Doctor of Medicine (M.D.). Postgraduate study in the basic sciences and clinical subjects. Five-year combined program leading to Doctor of Medicine and Master of Health Science (M.D./M.H.S.). Combined program with the Graduate School of Arts and Sciences leading to Doctor of Medicine and Doctor of Philosophy (M.D./Ph.D.). Master of Medical Science (M.M.Sc.) from the Physician Associate Program and the Physician Assistant Online Program. 203 785-2643 https://medicine.yale.edu/edu/

**Divinity School**  Est. 1822. Courses for college graduates. Master of Divinity (M.Div.), Master of Arts in Religion (M.A.R.). Individuals with an M.Div. degree may apply for the program leading to the degree of Master of Sacred Theology (S.T.M.). 203 432-5360 https://divinity.yale.edu

**Law School**  Est. 1824. Courses for college graduates. Juris Doctor (J.D.). Graduate Programs: Master of Laws (LL.M.), Doctor of the Science of Law (J.S.D.), Master of Studies in Law (M.S.L.). Doctor of Philosophy (Ph.D.) awarded by the Graduate School of Arts and Sciences. 203 432-4995 https://law.yale.edu

**School of Engineering & Applied Science**  Est. 1852. Courses for college graduates. Master of Science (M.S.) and Doctor of Philosophy (Ph.D.) awarded by the Graduate School of Arts and Sciences. 203 432-4252 https://seas.yale.edu

**School of Art**  Est. 1869. Professional courses for college and art school graduates. Master of Fine Arts (M.F.A.). 203 432-2600 http://art.yale.edu


**School of the Environment**  Est. 1900. Courses for college graduates. Master of Forestry (M.F.), Master of Forest Science (M.F.S.), Master of Environmental Science (M.E.Sc.), Master of Environmental Management (M.E.M.). Doctor of Philosophy (Ph.D.) awarded by the Graduate School of Arts and Sciences. 800 825-0330 https://environment.yale.edu
School of Public Health  Est. 1915. Courses for college graduates. Master of Public Health (M.P.H.). Master of Science (M.S.) and Doctor of Philosophy (Ph.D.) awarded by the Graduate School of Arts and Sciences. 203 785-2844 https://publichealth.yale.edu

School of Architecture  Est. 1916. Courses for college graduates. Professional and post-professional degree: Master of Architecture (M.Arch.); nonprofessional degree: Master of Environmental Design (M.E.D.). Doctor of Philosophy (Ph.D.) awarded by the Graduate School of Arts and Sciences. 203 432-2296 https://www.architecture.yale.edu

School of Nursing  Est. 1923. Courses for college graduates. Master of Science in Nursing (M.S.N.), Post Master’s Certificate (P.M.C.), Doctor of Nursing Practice (D.N.P.). Doctor of Philosophy (Ph.D.) awarded by the Graduate School of Arts and Sciences. 203 785-2389 https://nursing.yale.edu


School of Management  Est. 1976. Courses for college graduates. Master of Business Administration (M.B.A.), Master of Advanced Management (M.A.M.), Master of Management Studies (M.M.S.). Doctor of Philosophy (Ph.D.) awarded by the Graduate School of Arts and Sciences. https://som.yale.edu

COURSES

A

• Accounting (ACCT)
• Aerospace Studies (USAF)
• African American Studies (AFAM)
• African Studies (AFST)
• Akkadian (AKKD)
• American Sign Language (ASL)
• American Studies (AMST)
• Ancient Greek (GREK)
• Anthropology (ANTH)
• Applied Mathematics (AMTH)
• Applied Physics (APHY)
• Arabic (ARBC)
• Archaeological Studies (ARCG)
• Architecture (ARCH)
• Armenian (ARMN)
• Art (ART)
• Astronomy (ASTR)

B

• Biology (BIOL)
• Biomedical Engineering (BENG)
• Bosnian-Serbian-Croatian (SBCR)
• British Studies (BRST)
• Burmese (BURM)

C

• Chemical Engineering (CENG)
• Chemistry (CHEM)
• Child Study (CHLD)
• Chinese (CHNS)
• Classical Civilization (CLCV)
• Classics (CLSS)
• Cognitive Science (CGSC)
• Comparative Literature (LITR)
• Computer Science (CPSC)
• Computer Science and Economics (CSEC)
• Computing and the Arts (CPAR)
• Czech (CZEC)
D
• Directed Studies (DRST)
• Dutch (DUTC)

E
• Earth and Planetary Sciences (EPS)
• East Asian Languages and Literatures (EALL)
• East Asian Studies (EAST)
• Ecology & Evolutionary Biology (E&EB)
• Economics (ECON)
• Education Studies (EDST)
• Egyptian (EGYP)
• Electrical Engineering (EENG)
• Energy Studies (ENRG)
• Engineering & Applied Science (ENAS)
• English Language and Literature (ENGL)
• Environmental Engineering (ENVE)
• Environmental Studies (EVST)
• Ethics, Politics, & Economics (EP&E)
• Ethnicity, Race, & Migration (ER&M)

F
• Film and Media Studies (FILM)
• Finnish (FNSH)
• Forestry and Environment Studies (F&ES)
• French (FREN)

G
• German Studies (GMAN)
• Global Affairs (GLBL)
• Global Health Studies (HLTH)

H
• Hebrew (HEBR)
• Hindi (HNDI)
• History (HIST)
• History of Art (HSAR)
• History of Science, Medicine, and Public Health (HSHM)
• Human Rights Studies (HMRT)
• Humanities (HUMS)
• Hungarian (HGRN)
I
• Indonesian (INDN)
• Italian Studies (ITAL)

J
• Japanese (JAPN)
• Judaic Studies (JDST)

K
• Khmer (KHMR)
• Kiswahili (SWAH)
• Korean (KREN)

L
• Latin (LATN)
• Latin American Studies (LAST)
• Linguistics (LING)

M
• Mathematics (MATH)
• Mechanical Engineering (MENG)
• Modern Greek/Hellenic Studies (MGRK)
• Modern Middle East Studies (MMES)
• Modern Tibetan (MTBT)
• Molecular Biophysics and Biochemistry (MB&B)
• Molecular, Cellular, and Developmental Biology (MCDB)
• Music (MUSI)

N
• Naval Science (NAVY)
• Near Eastern Languages and Civilizations (NELC)
• Neuroscience (NSCI)

O
• Ottoman (OTTM)

P
• Persian (PERS)
• Philosophy (PHIL)
• Physics (PHYS)
• Polish (PLSH)
• Political Science (PLSC)
• Portuguese (PORT)
• Psychology (PSYC)
• Punjabi (PNJB)

R
• Religious Studies (RLST)
• Romanian (ROMN)
• Russian (RUSS)
• Russian, East European, and Eurasian Studies (RSEE)

S
• Sanskrit (SKRT)
• Science (SCIE)
• Sinhala (SNHL)
• Slavic Languages and Literatures (SLAV)
• Sociology (SOCY)
• South Asian Studies (SAST)
• Spanish (SPAN)
• Special Divisional Major (SPEC)
• Statistics and Data Science (S&DS)
• Study of the City (STCY)

T
• Tamil (TAML)
• The DeVane Lecture Course (DEVN)
• Theater and Performance Studies (THST)
• Tibetan (TBTN)
• Turkish (TKSH)
• Twi (TWI)

U
• Ukrainian (UKRN)
• Urban Studies (URBN)

V
• Vietnamese (VIET)

W
• Wolof (WLOF)
• Women's Gender and Sexuality Studies (WGSS)

Y
• Yoruba (YORU)

Z
• Zulu (ZULU)
**Accounting (ACCT)**

* ACCT 270a, Foundations of Accounting and Valuation  Rick Antle  
Modern accounting practices and their use in distinguishing value creation from value redistribution. Basic determinants of value and the techniques used to assess it; the creation of value through the production and delivery of goods or services; the conversion of that value into cash flows; basic financial statements, balance sheets, income statements, and cash flow statements, and the accounting mechanics with which they are built. Undergraduate enrollment limited to 50. Juniors and seniors only.

**Aerospace Studies (USAF)**

* USAF 101a, Heritage and Values of the U.S. Air Force I  Staff  
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. Students attend one 50-minute lecture and one 110-minute laboratory each week. For enrollment credit only; cannot be applied toward the 36-course-credit requirement for the Yale bachelor’s degree. Grades earned in this course do not count toward GPA or eligibility for General Honors.

* USAF 201a, Team and Leadership Fundamentals II  Staff  
This course focuses on laying the foundation for teamwork and leadership, particularly the skills that allow cadets to improve their leadership on a personal level and within a team. The course prepares cadets for their field training experience, where they are able to put the concepts learned into practice. The purpose of this course is to instill a leadership mindset and to motivate sophomore students to transition from AFROTC cadet to AFROTC officer candidate. For enrollment credit only; cannot be applied toward the 36-course-credit requirement for the Yale bachelor’s degree. Grades earned in this course do not count toward GPA or eligibility for General Honors.

* USAF 301a, Leading People and Effective Communication I  Holly Hermes  
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. For enrollment credit only; cannot be applied toward the 36-course-credit requirement for the Yale bachelor’s degree. Grades earned in this course do not count toward GPA or eligibility for General Honors.

* USAF 411a, Foundations of American Airpower  George Granholm  
This course is an exploration of the evolution and employment of airpower in the United States military. The course is designed to give students an understanding of what role modern airpower plays in the use of national instruments of power; how American airpower has shaped U.S. grand strategy and vice versa. The course traces the development of airpower doctrine and strategy from World War I to modern day. Applications to deterrence theory, the role of technology, counterinsurgency/counterterrorism, and the “information revolution” are discussed.
African American Studies (AFAM)

* AFAM 060b / AMST 060b / HIST 016b, Significance of American Slavery  Edward Rugemer
This first-year seminar explores the significance of racial slavery in the history of the Americas during the eighteenth and nineteenth centuries. We read the work of historians and we explore archival approaches to the study of history. Taught in the Beinecke Library with the assistance of curators and librarians, each week is organized around an archival collection that sheds light on the history of slavery. The course also includes visits to the Department of Manuscripts and Archives in the Sterling Library, the British Art Center, and the Yale University Art Gallery. Each student writes a research paper grounded in archival research in one of the Yale Libraries. Topics include slavery and slaveholding, the transatlantic slave trade, resistance to slavery, the abolitionist movement, the coming of the American Civil War, the process of emancipation, and post-emancipation experiences. Enrollment limited to first-year students. Preregistration required; see under First-Year Seminar Program. WR, HU

AFAM 115a / WGSS 125a, “We Interrupt this Program: The Multidimensional Histories of Queer and Trans Politics”  Staff
In 1991, the arts organizations Visual AIDS and The Kitchen collaborated with video artist and filmmaker Charles Atlas to produce the live television broadcast "We Interrupt this Program." Part educational presentation, part performance piece, the show was aired in millions of homes across the nation. The program, in The Kitchen’s words, “sought to feature voices that had often been marginalized within many discussions of AIDS, in particular people of color and women.”This course builds upon and is inspired by this aspect of Atlas’s visionary presentation, an aspect that used the show to produce a critically multicultural platform that could activate cultural histories and critical traditions from various communities. In effect, the course uses this aspect as a metonym for the racial, gender, sexual, and class heterogeneity of queer art and organizing. It conducts its investigation by looking at a variety of primary materials that illustrate the heterogeneous makeup of queer and trans politics. The course also draws on more recent texts and visual works that arose from the earlier contexts that the primary texts helped to illuminate and shape. HU RP

AFAM 121b / HSAR 222, Print the Legacy  Andrianna Campbell
Before Two Palms, Crown Point, Gemini G. E. L., and Tamarind presses, Robert Blackburn formed The Printmaking Workshop in 1947. The course surveys print production between 1945-1975, when print shops were sites of unparalleled black excellence, due to access and the opportunity for proprietorship. During a period in the mid-1940s, Roy DeCarava turned almost exclusively to printmaking. This course examines the artwork of artist printmakers and their master printers including Blackburn, DeCarava, Genichiro Inokuma, Samella Lewis, Sol LeWitt, Ruth G. Waddy, Elizabeth Catlett, Emory Douglas, Melvin Eugene Edwards, Emma Amos, Jasper Johns, Robert Rauschenberg, Faith Ringgold, and Sylvia Plimack Mangold. From the woodcuts of Catlett (made at Taller de Gráfica Popular after 1938) to the kimonos printed by LeWitt at Crown Point, prints traversed national borders and state lines. They were a means of experimenting with material, style, and production on an aesthetic and commercial scale. The print workshops themselves are evaluated
as sites of integration and disruption. Of focus is the significance of serialization and
distribution as necessary units of communication and visualization in the arts.  

AFAM 122a / HSAR 223a, Art Collectives: Protest, Entrepreneurship, and Praxis
Andrianna Campbell
A crowd formed at the Whitney Museum, as San Francisco artists occupied the
institution to protest Laura Owens’s solo exhibition opening. The gathering was in
successive date order to Patrick Bright’s protest of Dana Schultz’s Emmet Till painting.
It came a few years after the HowDoYouSayYaminAfrican? (YAMs collective) protest
of Joe Scalani’s Donelle Woolford performance artwork. The protest also foreshadowed
the Black Women Artists for Black Lives Matter (BWABLM) series of protests across
the country. From the Sackler family to Warren Kanders, those who peddle in rue and
misfortune are now being asked to resign from art boards as multiple allegations force
them out of planning positions, and remove their names from wings and museum
buildings. Hive-like sit-ins and stand-ins are the actions of political organizers to
make the democratic body heard in the public sphere. Today, these ethical shifts in
art communities criticize and disrupt the planned temple-like meditative space of the
museum. Between the cynical mole hill aims of a few of those San Franciscan artists
who capitulated after the Whitney offered them an exhibition, to the effective efforts of
BWABLM, we explore where the art object functions in relation to political discourse
and performative disruption as art practice.  

AFAM 146b / ECON 171b / EDST 271b, Urban Inequalities and Educational
Inequality  Gerald Jaynes
Analysis of contemporary policy problems related to academic under performance
in lower income urban schools and the concomitant achievement gaps among
various racial and ethnic groups in United States K-12 education. Historical review
of opportunity inequalities and policy solutions proposed to ameliorate differences
in achievement and job readiness. Students benefit from practical experience and
interdisciplinary methods, including a lab component with time spent in a New Haven
high school. Prerequisites: Any course offered by Education Studies, or one course
in history or any social science, either: Anthropology, Economics, Political Science,
Psychology, Sociology. EDST 110 is preferred, although not required.  

AFAM 160b / AFST 184b / AMST 160b / HIST 184b, The Rise and Fall of Atlantic
Slavery  Edward Rugemer
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.  

AFAM 162a / AMST 162a / HIST 187a, African American History from Emancipation
to the Present  Staff
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.  

AFAM 170b / HIST 479b / HSHM 241b / WGSS 270b, Sickness and Health in African
American History  Carolyn Roberts
A history of American medicine through the African American experience covering the
period of slavery through #BlackLivesMatter. Oriented around the complex dynamics
of medical abuse and medical resistance, key themes include medicine and slavery; gender and reproduction; medical experimentation and ethics; the rise of racial science; lynching and vigilante violence; segregation and public health; African-descended approaches to health and healing; the rise of the African American medical profession; and black health activism from slavery to #BlackLivesMatter.  

AFAM 186a / LAST 214a / PLSC 378a / SOCY 170a, Contesting Injustice  
Staff  
Exploration of why, when, and how people organize collectively to challenge political, social, and economic injustice. Cross-national comparison of the extent, causes, and consequences of inequality. Analysis of mobilizations for social justice in both U.S. and international settings. Intended primarily for freshmen and sophomores.  

AFAM 192a / AFST 238a / AMST 238a / ER&M 238a, Third World Studies  
Staff  
Introduction to the historical and contemporary theories and articulations of Third World studies (comparative ethnic studies) as an academic field and practice. Consideration of subject matters; methodologies and theories; literatures; and practitioners and institutional arrangements.  

AFAM 198a / CGSC 277a / EDST 177a / EP&E 494a / PHIL 177a, Propaganda, Ideology, and Democracy  
Jason Stanley  
Historical, philosophical, psychological, and linguistic introduction to the issues and challenges that propaganda raises for liberal democracy. How propaganda can work to undermine democracy; ways in which schools and the press are implicated; the use of propaganda by social movements to address democracy’s deficiencies; the legitimacy of propaganda in cases of political crisis.  

* AFAM 210b / AMST 445b / HIST 148Jb, Politics and Culture of the U.S. Color Line  
Matthew Jacobson  
The significance of race in U.S. political culture, from the “separate but equal” doctrine of Plessy v. Ferguson to the election of an African American president. Race as a central organizer of American political and social life.  

* AFAM 216a / FILM 433a, Family Narratives/Cultural Shifts  
Thomas Allen Harris  
This course looks at films that are redefining ideas around family and family narratives in relation to larger social movements. We focus on personal films by filmmakers who consider themselves artists, activists, or agents of change but are united in their use of the nonfiction format to speak truth to power. In different ways, these films use media to build community and build family and ultimately, to build family albums and archives that future generations can use to build their own practices. Just as the family album seeks to unite people across time, space, and difference, the films and texts explored in this course are also journeys that culminate in linkages, helping us understand nuances of identity while illuminating personal relationships to larger cultural, social, and historical movements.  

* AFAM 220b / FILM 434b, Archive Aesthetics and Community Storytelling  
Thomas Allen Harris  
This production course explores strategies of archive aesthetics and community storytelling in film and media. It allows students to create projects that draw from archives—including news sources, personal narratives, and found archives—to produce collaborative community storytelling. Conducted as a production workshop, the course explores the use of archives in constructing real and fictive narratives across a variety
of disciplines, such as—participants create and develop autobiographies, biographies, or fiction-based projects, tailored to their own work in film/new media around Natalie Goldberg’s concept that “our lives are at once ordinary and mythical.” HU

* AFAM 221a / HIST 120Ja, Writing Histories of Slavery  
   Edward Rugemer
   This seminar considers the historiography of slavery as it has developed from the 1950s until today. We also engage with a series of recent studies that suggest the latest methodologies and styles of writing that historians have developed to illustrate the significance of enslavement in human history. Most readings draw from United States and Caribbean history. Students conduct research in primary sources and write an historical essay.  WR, HU

* AFAM 227a / AMST 227a / ER&M 349a / HIST 137Ja, From the Voting Rights Act to #blacklivesmatter  
   Ferentz Lafargue
   This course explores the period beginning from 1964 through the emergence of the #blacklivesmatter movement in 2013. Key concepts covered in this course include the Black Panther Party and rise of the Black Power movement; political campaigns of Shirley Chisholm, Jesse Jackson, and Barack Obama. The seminar concludes with an examination of the #blacklivesmatter movement and broader efforts addressing mass incarceration, poverty, and opportunity gaps in education. HU

* AFAM 251b / AMST 397b, Critical Race Theory  
   Staff
   Introduction to critical race theory, a radical critique of relations among race, law, and power in U.S. politics and society. Intellectual foundations of the field, with emphasis on African American perspectives; key juridical acts. The centrality of U.S. law in producing social hierarchies of race and racial difference, gender, sexuality, and class. The extension of critical race theory to global analysis of race, immigration, and cultural difference. HU

* AFAM 259a / AMST 309a / EDST 255a, Education and Empire  
   Talya Zemach-Bersin
   This course offers an introduction to the transnational history of education in relation to the historical development of the U.S. empire both at home and abroad. By bringing together topics often approached separately—immigration, education, race, colonialism, and the history of U.S. empire—we interrogate the ways that education has been mobilized to deploy power: controlling knowledge, categorizing and policing differences, administering unequal paths to citizenship/belonging, forcing assimilation, promoting socio-economic divides, and asserting discipline and control. EDST 110 recommended. HU

* AFAM 271b / HSAR 224, The Venice Biennale, Art Fairs, and Foundations  
   Andrianna Campbell
   Since the 1970s, there has been a proliferation of commercial art fairs and new small foundations dedicated to the arts—FIAC, JoBurg, 1-54, Miami Basel, Fondation Cartier, Louis Vuitton Foundation, and the Foundation Zinsou. These and their correlative personal museums such as the Long Museum in China evidence a collecting class untethered from the traditions of encyclopedic, modern, and contemporary museums. The stalwart of these temporary art exhibitionary spaces is the Venice Biennale (1895), which is organized by country and imbricated in late-nineteenth century and twentieth-century representations of nationhood. By the 1950s already struggling to stay current alongside the São Paulo Biennial (1951), Biennale curators have been pushed into
constant reinvention and innovation. The course examines Katharine Kuh’s influence on a more gender diverse and racially inclusive Biennale in the 1950s, Sam Gilliam’s 1970s installation, and current comparisons to Documenta, Berlin, Gwangju and Shanghai Biennales. Alongside these new institutions, the hybridized commercial art fairs pair some of the most historically relevant exhibitions alongside transient booths with works for sale. In an era of changing hierarchies of culture and status, the novelty of these exhibition spaces requires a constant flow of new artists, while they interrupt and silence criticality. The course examines their future impact on art historical scholarship, and their, at times, paradoxical and troubling grandiosity.  

*AFAM 284a / AMST 282a / ENGL 414a / ER&M 284a, Black Life and the Human/Body  
Cera Smith  
African American activists have long demanded equal rights by asserting the humanity of Black people. These activists have rejected their racist treatment as animals and property by championing the qualities ascribed to Western Man. More recently, however, scholars have questioned whether claims to humanity really result in freedom and justice for all Black people. They ask, “Does mobilizing humanity as a strategy for recognition and respect benefit Black non-men, disabled people, or the working class? What impact does this assertion of humanity have on our species’ relationship to other living beings and our environments? Ultimately, are all people allowed to be ‘human?’” In this course, we evaluate the category of the “human” by studying the challenge that the U.S. Black past and present pose to the category’s assumed neutrality. We attend to how Black peoples’ bodily experiences confirm, deny, and complicate humanness. We read poetry, short fiction, novels, and creative nonfiction to investigate what it means to live a Black life. Analyzing historical, social scientific, legal, and theoretical texts alongside literature helps us explore the debates over the power dynamics that underlie claims to humanity. Through writing and in-class discussions, we explore the relationship between race, species, and political strategy.  

*AFAM 289a / ENGL 228a, Counternarratives: Black Historical Fictions  
Elleza Kelley  
While historical records have long been the source from which we draw our picture of the past, it is with literature and art that we attempt to speculatively work out that which falls between the cracks of conventional archival documentation, that which cannot be contained by historical record—emotion, gesture, the sensory, the sonic, the inner life, the afterlife, the neglected and erased. This course examines how contemporary black writers have imagined and attempted to represent black life from the late 17th to the early 20th centuries, it asks what fiction can tell us about history. Reading these works as alternative archives, or “counterarchives,” which index the excess and fugitive material of black histories in the Americas, we probe the uses, limits, and revelations of historical fictions, from the experimental and realist novel, to works of poetry and drama. Drawing on the work of various interdisciplinary scholars, we use these historical fictions to explore and enter into urgent and ongoing conversations around black life & death, African-American history & memory, black aesthetics, and the problem of “The Archive.” Some familiarity with the events and themes of African American history is strongly recommended, but not required. This course is not open to students who have already taken AFAM 013/ENGL 005.  

HU
* AFAM 309a / ER&M 318a / WGSS 318a, Race as Spectacle  Fatima El-Tayeb
In this course, we analyze how race is both naturalized and deconstructed through visual media. We center one aspect: race as spectacle—the multiple ways in which race is produced as a visual mass culture commodity. This happens in political campaigns, music videos, local news reports, fashion, kids’ cartoons, mug shots, and countless other sites. We explore the modes of production of these racialized images as well as the conditions of their reception and political and philosophical analyses of this process—particularly those relating to questions of gender, class, sexuality, religion, and nation. We also explore counterstrategies, which rather than rejecting visual mass culture attempt to use it to undermine dominant images. **HU, SO**

* AFAM 313a / THST 319a, Embodying Story  Renee Robinson
The intersection of storytelling and movement as seen through historical case studies, cross-disciplinary inquiry, and studio practice. Drawing on eclectic source materials from different artistic disciplines, ranging from the repertory of Alvin Ailey to journalism, architectural studies, cartoon animation, and creative processes, students develop the critical, creative, and technical skills through which to tell their own stories in movement. No prior dance experience necessary. **HU**

* AFAM 329a / SOCY 342a, Managing Blackness in a "White Space"  Elijah Anderson
White space" is a perceptual category that assumes a particular space to be predominantly white, one where black people are typically unexpected, marginalized when present, and made to feel unwelcome—a space that blacks perceive to be informally "off-limits" to people like them and where on occasion they encounter racialized disrespect and other forms of resistance. This course explores the challenge black people face when managing their lives in this white space. **SO**

* AFAM 349b / AMST 326b / HIST 115Jb / WGSS 388b, Civil Rights and Women’s Liberation  Staff
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 397b / ER&M 380b / WGSS 381b, New Developments in Global African Diaspora Studies  Fatima El-Tayeb
This course traces recent developments in African Diaspora Theory, among them Afropessimism, Queer of Color Critique, Black Trans Studies and Afropolitanism. We pay particular attention to interactions between theory, art, and activism. The scope is transnational with a focus on, but not restricted to, the Anglophone Diaspora Texts. Each session roughly follows this structure: One theoretical text representing a recent development in African diaspora studies, one earlier key text that the reading builds on, one theoretical text that does not necessarily fall under the category of diaspora studies but speaks to our topic and one text that relates to the topic but uses a non-theoretical format. Students are expected to develop their own thematically related project over the course of the semester. Preference give to juniors and seniors. Email instructor for more information. **HU, SO**
* AFAM 402b / RLST 435b, Black Religions in Slavery and Freedom  Nicole Turner
This course explores how enslaved and free black people created and sustained religious communities in the United States during the eras of slavery and freedom. It explores the resonances of African traditions, the role of conjure, Islam and Christianity in sustaining Black people through slavery and the transformations that developed after emancipation. The course challenges the paradigm of black religion as always pointing toward freedom while exploring how the transition in status from enslaved to free was reflected in and influenced by black religious practices and communities. This course explores the religious communities of the “slave quarters,” underground railroad, independent black churches on the political landscape of freedom through the end of the 19th century. This course aims to provide participants with a deeper exploration of the developments within the period from the 19th century through 1915 and the advent of Jim Crow and U.S. imperialism.

* AFAM 442b / ANTH 442b, Theory and Methods of Performance Ethnography  Aimee Cox
Study of the theoretical framework that defines performance ethnography; the methodologies developed and utilized by research practitioners; the similarities and distinctions between ethnography and performance ethnography; and the innovations made in performance ethnography that impact social justice and community-building initiatives in various parts of the world. HU, SO

* AFAM 449b / AFST 449b / ENGL 378b, Challenges to Realism in Contemporary African Fiction  Stephanie Newell
Introduction to experimental African novels that challenge realist and documentary modes of representation. Topics include mythology, gender subversion, politics, the city, migration, and the self. Ways of reading African and postcolonial literature through the lenses of identity, history, and nation. Formerly ENGL 449. WR, HU

* AFAM 455a / EDST 340a / ER&M 438a, Anti-Racist Curriculum and Pedagogy  Daniel HoSang
This seminar explores the pedagogical and conceptual tools, resources and frameworks used to teach about race and racism at the primary and secondary levels, across diverse disciplines and subject areas. Moving beyond the more limited paradigms of racial colorblindness and diversity, the seminar introduces curricular strategies for centering race and racism in ways that are accessible to students from a broad range of backgrounds, and that work to advance the overall goals of the curriculum. Prerequisite: ER&M 200 or an equivalent course addressing histories of race, ethnicity, and migration. SO

* AFAM 459a / AMST 479a / ER&M 402a, The Displaced: Migrant and Refugee Narratives of the 20th and 21st Centuries  Leah Mirakhorr
This course examines a series of transnational literary texts and films that illuminate how the displaced—migrants, exiles, and refugees—remake home away from their native countries. The twentieth and twenty-first centuries have produced massive displacements due to wars, genocides, racial, ethnic and religious conflicts, economic and climate change, among other factors. Our course focuses on several texts that explore questions of home, nation, and self in the context of specific historical events such as the Holocaust, civil rights movements in the U.S., internment, the Indian partition, African decolonization, and Middle Eastern/Arab ethno-religious conflicts and wars. We examine these events alongside the shifting legal and political policies
and categories related to asylum, humanitarian parole, refugee, and illegal alien status. Exploring themes such as nostalgia, longing, trauma, and memory, we look at the possibilities and limitations of creating, contesting, and imagining home in the diaspora. Our objective is to debate and develop the ethical, political, geographic, and imaginative articulations of home in an era of mass displacements and geo-political crises. We examine how notions of home are imagined alongside and against categories of race, gender, and sexuality.  

* AFAM 471a and AFAM 472b, Independent Study: African American Studies  
Staff  
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 479a / MUSI 480a, Music of the Caribbean: Cuba and Jamaica  
Michael Veal  
An examination of the Afro-diasporic music cultures of Cuba and Jamaica, placing the historical succession of musical genres and traditions into social, cultural, and political contexts. Cuban genres studied include religious/folkloric traditions (Lucumi/Santeria and Abakua), rumba, son, mambo, pachanga/charanga, salsa, timba and reggaeton. Jamaican genres studied include: folkloric traditions (etu/tambu/kumina), Jamaican R&B, ska, rock steady, reggae, ragga/dancehall. Prominent themes include: slavery, Afro-diasporic cultural traditions, Black Atlantic culture, nationalism/independence/post-colonial culture, relationships with the United States, music & gender/sexuality, technology.  

* AFAM 480a, Senior Colloquium: African American Studies  
Carolyn Roberts  
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  
Staff  
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 Studies (AFST)  

* AFST 001b / ARCG 001b / NELC 001b, Egypt and Northeast Africa: A Multidisciplinary Approach  
John Darnell  
An introduction to Egyptology, examining approximately 10,000 years of Nile Valley cultural records and 3,000 years of Egyptian history. The course presents an overview of the historical and archaeological study of Egypt and her southern neighbor
Nubia. Various original written and visual sources are used, including the collections of the Peabody Museum and the Yale Art Gallery, with some material accessible in the classroom. Students gain a basic understanding of the hieroglyphic script and the Ancient Egyptian language, and are able to read some inscriptions in museum visits at the end of the course. Enrollment limited to first-year students. Preregistration required; see under First-Year Seminar Program. WR, HU

* AFST 028b / ENGL 028b / LITR 025b, African Literature in the World Căzetan Iheka

This seminar introduces students to a subset of African literature that has entered the canon of world literature. Bookended by the writings of Chinua Achebe and Chimamanda Adichie, we explore the marks of regional specificity in these works and how they transcend local geographical markers to become worldly artifacts. Our considerations include why certain texts cross the boundaries of nation and region while others remain confined within territorial bounds. We also examine advantages of the global circulation of African literary works and the pitfalls of a global readership. The class moves from an introductory unit that orients students to African and world literature to focus on close reading of primary texts informed by historical and theoretical nuances. From analyzing works responding to the colonial condition and the articulation of anticolonial sensibilities, to those narrating the African nation at independence and the postcolonial disillusionment that followed, the seminar attends to the formal and thematic implications of globalization for African literary writing. Authors include Chinua Achebe, Mariama Ba, Ngugi wa Thiong’o, Mbolo Mbue, NoViolet Bulawayo, Taiye Selasi, and Chimamanda Adichie. Enrollment limited to first-year students. Preregistration required; see under First-Year Seminar Program. WR, HU

* AFST 128b / ARCG 128b / EGYP 128b / NELC 129b / RLST 251b, Magic and Ritual in Ancient Egypt and the Near East John Darnell

Introduction to ancient Egyptian magic and rituals with an overview on the use of magic and discussion of the different rituals and festivals attested in Ancient Egypt and the Near East. HU

AFST 175a / PLSC 175a, Africa in International Relations David Simon

This course examines key facets of how African countries interact with the rest of the world, and with other countries on the continent. Focusing mostly on Sub-Saharan African countries, it looks at international economic relations (focusing on aid but also addressing trade, investment, and debt); peacemaking and peacebuilding; and regional governance institutions. SO

AFST 184b / AFAM 160b / AMST 160b / HIST 184b, The Rise and Fall of Atlantic Slavery Edward Rugemer

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. WR, HU

AFST 220a / HIST 417a / HSHM 220a, Histories of Confinement: From Atlantic Slavery to Social Distancing Staff

This course looks closely at the history of asylums, hospitals, prisons, and schools. It seeks to understand their workings and the interplay between bureaucratic forms, spatial and material organization, and modes of discipline, control, and remediation.
It asks, how is institutional power organized, displayed, deployed, and disputed, and what are the limits and contradictions inherent in these efforts? Our readings draw from a range of contexts and disciplines to consider the relationship between the built environment and institutional life.  

**AFST 238a / AFAM 192a / AMST 238a / ER&M 238a, Third World Studies**  
Staff  
Introduction to the historical and contemporary theories and articulations of Third World studies (comparative ethnic studies) as an academic field and practice. Consideration of subject matters; methodologies and theories; literatures; and practitioners and institutional arrangements.  

*AFST 324a / EP&E 317a / HIST 368Ja / PLSC 324a, Nelson and Winnie Mandela*  
Jonny Steinberg  
A study of Nelson and Winnie Mandela’s marriage and public careers and the political and philosophical questions the marriage raises. Students examine the Mandelas’ conflicting ideas on race and on the colonial experience and compare them to those of Mohandas Gandhi and Franz Fanon. Students also read recent philosophical work on forgiveness and on violence in order critically to assess the politics of reconciliation that so divided the Mandelas. The course examines the politics of global celebrity and the portrayal of men and women in public media.  

**AFST 335b / ER&M 325b / HIST 335b, A History of South Africa**  
Daniel Magaziner  
An introduction to the history of southern Africa, especially South Africa. Indigenous communities; early colonial contact; the legacies of colonial rule; postcolonial mismanagement; the vagaries of the environment; the mineral revolution; segregationist regimes; persistent inequality and crime since the end of apartheid; the specter of AIDS; postcolonial challenges in Zimbabwe, Angola, and Mozambique.  

**AFST 340b / HIST 340b, 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.  

*AFST 344a / HIST 344a, African Independence: A Cup of Plenty or a Poisoned Chalice?*  
Staff  
In every African colony after World War Two there emerged nationalist movements which no longer called for civil rights as in the pre-war years but demanded self-determination. While many of them got it easy, some had to fight long and bloody wars for it. By the 1960s the colonial edifice had crumbled except for the few settler colonies in southern Africa. But even here the winds of change could not be stopped. But what did decolonization and independence mean to Africa? Did Africans get what they wanted? Was independence a cup of plenty or a poisoned chalice? In addressing these questions, this course charts the economic, political, and cultural transformations of postcolonial Africa from the 1960s to the present. The argument is this: there can be no understanding of Africa’s challenges today without an inquiry into the nature of what the continent got from the departing colonial powers.  

*AFST 368a / EVST 369a / HIST 366Ja, Commodities of Colonialism in Africa*  
Robert Harms  
This course examines historical case studies of several significant global commodities produced in Africa to explore interactions between world market forces and African
resources and societies. Through the lens of four specific commodities—ivory, rubber, cotton, and diamonds—this course evaluates diverse industries and their historical trajectories in sub-Saharan Africa within a global context from ~1870-1990s. Students become acquainted with the historical method by developing their own research paper on a commodity using both primary and secondary sources. WR, HU

* AFST 385a / EP&E 350a / HIST 391Ja / HLTH 385a / PLSC 429a, Pandemics in Africa: From the Spanish Influenza to Covid-19  Jonny Steinberg

The overarching aim of the course is to understand the unfolding Covid-19 pandemic in Africa in the context of a century of pandemics, their political and administrative management, the responses of ordinary people, and the lasting changes they wrought. The first eight meetings examine some of the best social science-literature on 20th-century African pandemics before Covid-19. From the Spanish Influenza to cholera to AIDS, to the misdiagnosis of yaws as syphilis, and tuberculosis as hereditary, the social-science literature can be assembled to ask a host of vital questions in political theory: on the limits of coercion, on the connection between political power and scientific expertise, between pandemic disease and political legitimacy, and pervasively, across all modern African epidemics, between infection and the politics of race. The remaining four meetings look at Covid-19. We chronicle the evolving responses of policymakers, scholars, religious leaders, opposition figures, and, to the extent that we can, ordinary people. The idea is to assemble sufficient information to facilitate a real-time study of thinking and deciding in times of radical uncertainty and to examine, too, the consequences of decisions on the course of events. There are of course so many moving parts: health systems, international political economy, finance, policing, and more. We also bring guests into the classroom, among them frontline actors in the current pandemic as well as veterans of previous pandemics well placed to share provisional comparative thinking. This last dimension is especially emphasized: the current period, studied in the light of a century of epidemic disease, affording us the opportunity to see path dependencies and novelties, the old and the new. SO

* AFST 396b / HIST 396Jb, Revolutions and Socialist Experiments in Africa  Benedito Machava

This seminar explores the contours of Africa’s embrace and engagement with the most influential ideology of the twentieth-century. Why, and through which channels, were Africans attracted to socialism? Did particular forms of colonialism and decolonization push African political actors towards revolution and socialist experiments? Is it legitimate, as some scholars have suggested, to speak of genuinely African socialisms? If so, what was the nature of these socialisms and how did they differ from the versions of socialism around the world? What political, social, economic, and cultural ends did socialism serve in Africa? And what were the consequences and legacies of African socialist experiments? The seminar addresses these questions. Our goal is to place Africa in the mainstream of conversations about socialism. We begin with the assumption that, like any doctrine, socialism was the object of multiple interpretations, modification, and appropriation from its inception. In so doing, we challenge orthodox understandings of socialism, which hold the European versions as the pure models and the rest as diluted if not populist façades of the ‘true’ doctrine. We begin with theoretical readings that help us situate the major debates about socialism in general and socialism in Africa. We then proceed to examine the overall historical context in which African nationalists adopted socialism. We differentiate the first branch
of “African Socialism” from the second wave of “Afro-Marxism.” We also pay close attention to issues of decolonization and political imagination; ideas and experiments of development; gender, morality, and social engineering.  

WR, HU

* AFST 435a / THST 335a, 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

* AFST 443b / FREN 442b / LITR 484b / MMES 402b, Decolonizing Memory: Africa & the Politics of Testimony  
Jill Jarvis

This seminar explores the politics and poetics of memory in a time of unfinished decolonization. It also provides students with a working introduction to anticolonial, postcolonial, and decolonial critique. Together we bring key works on the topics of state violence, trauma, and testimony into contact with literary works and films by artists of the former French and British empires in Africa. Reading literary and theoretical works together permits us to investigate archival silences and begin to chart a future for the critical study of colonial violence and its enduring effects. Literary readings may include works by Djebar, Rahmani, Ouologuem, Sebbar, Diop, Head, Krog. Films by Djebar, Leuvrey, Sembène, and Sissako. Theoretical readings may include works by Arendt, Azoulay, Césaire, Derrida, Fanon, Mbembe, Ngugi, Spivak, and Trouillot.  
WR, HU

* AFST 449b / AFAM 449b / ENGL 378b, Challenges to Realism in Contemporary African Fiction  
Stephanie Newell

Introduction to experimental African novels that challenge realist and documentary modes of representation. Topics include mythology, gender subversion, politics, the city, migration, and the self. Ways of reading African and postcolonial literature through the lenses of identity, history, and nation. Formerly ENGL 449.  
WR, HU

* AFST 486a / HIST 374Ja / HSHM 486a, African Systems of Thought  
Nana Osei Quarshie

This seminar explores the effects of colonialism and post-colonial power relations on the production of scientific, medical, and embodied knowledge about Africa. The course focuses on three broad themes covered across four units. First, we read debates over the nature and definition of science and tradition. How have colonialism and post-colonial power relations defined the tasks of an African science? What does it mean to decolonize African thought or culture? Second, we examine the nature of rationality. Is reason singular or plural? Culturally-bound or universal? To what extent are witchcraft, African healing practices, and ancestor veneration rational practices? Is there a “traditional” rationality? Third, we explore the relationship between scientific representations, social practices, and local culture. What relationship exists between social practices and culturally shared categories of knowledge? Lastly, we examine the intersection of capital and medical expertise. How have shifting conceptions of value and capital, reshaped scientific and medical authority in Africa?  
WR, HU

* AFST 491a, The Senior Essay  
Veronica Waweru

Independent research on the senior essay. By the end of the sixth week of classes, a rough draft of the entire essay should be completed. By the end of the last week of
classes (fall term) or three weeks before the end of classes (spring term), two copies of the final essay must be submitted.

Akkadian (AKKD)

AKKD 110a, Elementary Akkadian I  Eckart Frahm
Akkadian was one of the primary languages of ancient Mesopotamia (modern Iraq), with an attested history of more than 2000 years (from the second half of the 3rd millennium BCE to the beginning of the Common Era). It is a Semitic language, similar to Arabic, Aramaic, and Hebrew, written on clay tablets in the Cuneiform script. Hundreds of thousands of documents in Akkadian have come down to us. They include everything from great works of literature like the Gilgamesh Epic, to everyday texts such as letters that document the lives of people from all walks of life, from great kings to commoners and slaves. Whether it be a letter to a paranoid emperor who refuses to eat and shuts himself in his own palace, or a particularly inept spy reporting to his superiors about the suspicious dreams of a suspected enemy of the state, knowledge of Akkadian opens a window into the world of those who lived thousands of years ago, the struggles they faced and the stories they told. Akkadian for Beginners provides students with the tools to begin to explore that ancient and once-forgotten world of ancient Mesopotamia. After finishing the course, students will have acquired a sound knowledge of Akkadian grammar and syntax, along with practice in Cuneiform.  L1

AKKD 120b, Elementary Akkadian II  Kathryn Slanski
Continuation of AKKD 110. Prerequisite: AKKD 110. L2 RP

AKKD 130a, Intermediate Akkadian I  Eckart Frahm
Close reading of selected Akkadian texts; introduction to Akkadian dialects, cuneiform epigraphy, and research techniques of Assyriology. Prerequisite: AKKD 120. L3 RP

American Sign Language (ASL)

ASL 110a, American Sign Language I  Staff
An introduction to American Sign Language (ASL), with emphasis on vocabulary, ASL grammar, Deaf Culture and Conversational skills. Use of visual material (DVD), communicative activities, grammar drills, classifiers and Deaf Culture study. ASL 120 is not required to earn credit for ASL 110 L1 1½ Course cr

ASL 120b, American Sign Language II  Staff
A continuation to American Sign Language (ASL) I, with emphasis on ASL grammar, expressive and receptive skills in storytelling and dialogues. Use of visual materials (DVD), grammar drills, proper use of non-manual markers and body language. Emphasis on character development, role shifting and story cohesion. Prerequisite: ASL 110. L2 1½ Course cr

* ASL 130a, American Sign Language III  Staff
Building on ASL 120, this course covers in depth the structure of ASL grammar, fingerspelling, narratives, and visual communication. Students develop expressive and receptive skills in storytelling and dialogue. Prerequisites: ASL 120 or a placement evaluation by professor. L3 1½ Course cr
* ASL 140b, American Sign Language IV  Julia Silvestri
Building on ASL 130, this course increases the emphasis on more abstract and challenging conversational and narrative range; cultural values and behavioral rules of the deaf community in the U.S.; receptive and expressive activities, including vocabulary, grammatical structures, and aspects of the Deaf Culture in debate format. Prerequisite: ASL 130; or as evaluated by professor.  L4  1½ Course cr

American Studies (AMST)

* AMST 007a / HSAR 002a, Furniture and American Life  Edward Cooke
In-depth study and interpretation of American furniture from the past four centuries. Hands-on experience with furniture in the collection of the Yale University Art Gallery to explore such topics as materials, techniques, styles, use, and meaning. Enrollment limited to first-year students. Preregistration required; see under First-Year Seminar Program.  WR, HU

* AMST 029b / ENGL 029b, Henry Thoreau  Michael Warner
Henry Thoreau played a critical role in the development of environmentalism, American prose, civil rights, and the politics of protest. We read his writing in depth, and with care, understanding it both in its historical context and in its relation to present concerns of democracy and climate change. We read his published writing and parts of the journal, as well as biographical and contextual material. The class makes a field trip to Walden Pond and Concord, learning about climate change at Walden as revealed by Thoreau's unparalleled documentation of his biotic surroundings. Student's consider Thoreau's place in current debates about the environment and politics, and are encouraged to make connection with those debates in a final paper. Enrollment limited to first-year students. Preregistration required; see under First-Year Seminar Program.  HU

* AMST 060b / AFAM 060b / HIST 016b, Significance of American Slavery  Edward Rugemer
This first-year seminar explores the significance of racial slavery in the history of the Americas during the eighteenth and nineteenth centuries. We read the work of historians and we explore archival approaches to the study of history. Taught in the Beinecke Library with the assistance of curators and librarians, each week is organized around an archival collection that sheds light on the history of slavery. The course also includes visits to the Department of Manuscripts and Archives in the Sterling Library, the British Art Center, and the Yale University Art Gallery. Each student writes a research paper grounded in archival research in one of the Yale Libraries. Topics include slavery and slaveholding, the transatlantic slave trade, resistance to slavery, the abolitionist movement, the coming of the American Civil War, the process of emancipation, and post-emancipation experiences. Enrollment limited to first-year students. Preregistration required; see under First-Year Seminar Program.  WR, HU

* AMST 095a / ER&M 095a / SAST 061a / THST 095a, South Asian American Theater and Performance  Shilarna Stokes
South Asian Americans have appeared on U.S. stages since the late nineteenth century, yet only in the last quarter century have plays and performances by South Asian Americans begun to dismantle dominant cultural representations of South Asian and South Asian American communities and to imagine new ways of belonging. This
seminar introduces you to contemporary works of performance (plays, stand-up sets, multimedia events, and more) written and created by U.S.-based artists of South Asian descent as well as artists of the South Asian diaspora whose works have had an impact on U.S. audiences. With awareness that the South Asian American diaspora comprises multiple, contested, and contingent identities, we investigate how artists have worked to manifest complex representations of South Asian Americans onstage, challenge institutional and professional norms, and navigate the perils and pleasures of becoming visible. Enrollment limited to first-year students. Preregistration required; see under First-Year Seminar Program. HU

**AMST 133b / ER&M 187b / HIST 107b, Introduction to American Indian History**  
Ned Blackhawk
Survey of American Indian history, beginning with creation traditions and migration theories and continuing to the present day. Focus on American Indian nations whose homelands are located within the contemporary United States. Complexity and change within American Indian societies, with emphasis on creative adaptations to changing historical circumstances. HU

**AMST 160b / AFAM 160b / AFST 184b / HIST 184b, The Rise and Fall of Atlantic Slavery**  
Edward Rugemer
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. WR, HU

**AMST 162a / AFAM 162a / HIST 187a, African American History from Emancipation to the Present**  
Staff
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. WR, HU 0 Course cr

* **AMST 184b / ENGL 437b / HUMS 184b, Writing and Reading Biography**  
Karin Roffman
The art of biography explored through groundbreaking examples, with particular emphasis on contemporary texts that explore the lives and work of artists. Topics on biographical theory and practice include: the balance of life and work; the relationship between biographer and subject; creative approaches to archives and research; and imaginative narrative strategies. Some classes take place at the Beinecke Library and there are some visits by working biographers. Students must complete an original biographical project by the end of the semester. HU

**AMST 197a / ARCH 280a / HSAR 219a / URBN 280a, American Architecture and Urbanism**  
Elihu Rubin
Introduction to the study of buildings, architects, architectural styles, and urban landscapes, viewed in their economic, political, social, and cultural contexts, from precolonial times to the present. Topics include: public and private investment in the built environment; the history of housing in America; the organization of architectural practice; race, gender, ethnicity and the right to the city; the social and political nature of city building; and the transnational nature of American architecture. HU
* AMST 206b / ER&M 221b / WGSS 222b, Introduction to Critical Refugee Studies
  Quan Tran
Reconfiguring refugees as fluid subjects and sites of social, political, and cultural
critiques. Departing from dominant understandings of refugees as victims,
consideration instead of refugees as complex historical actors, made visible through
processes of colonization, imperialism, war, displacement, state violence, and
globalization, as well as ethical, social, legal, and political transformations. Focus on
second-half of the twentieth century.  SO

* AMST 227a / AFAM 227a / ER&M 349a / HIST 137Ja, From the Voting Rights Act
to #blacklivesmatter  Ferentz Lafargue
This course explores the period beginning from 1964 through the emergence of the
#blacklivesmatter movement in 2013. Key concepts covered in this course include the
Black Panther Party and rise of the Black Power movement; political campaigns of
Shirley Chisholm, Jesse Jackson, and Barack Obama. The seminar concludes with an
examination of the #blacklivesmatter movement and broader efforts addressing mass
incarceration, poverty, and opportunity gaps in education.  HU

AMST 228a / GLBL 201a / HIST 128a, Origins of U.S. Global Power  Staff
This course examines the causes and the consequences of American global power in the
“long 20th century,” peeking back briefly into the 19th century as well as forward into
the present one. The focus is on foreign relations, which includes but is not limited to
foreign policy; indeed, America’s global role was rooted as much in its economic and
cultural power as it was in diplomacy and military strength. We study events like wars,
crisis, treaties, and summits—but also trade shows and movie openings. Our principal
subjects include plenty of State Department officials, but also missionaries, business
people, and journalists. We pay close attention also to conceptions of American power;
how did observers in and beyond the United States understand the nature, origins, and
operations of American power?  HU  o Course cr

AMST 234b / ER&M 243b / HIST 188b / RLST 342b, Spiritual But Not Religious
  Zareena Grewal
Study of the historical and contemporary “unchurching” trends in American religious
life in a comparative perspective and across different scales of analysis in order to think
about the relationship between spirituality, formal religion, secular psychology and the
self-help industry.  HU, SO

* 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 238a / AFAM 192a / AFST 238a / ER&M 238a, Third World Studies  Staff
Introduction to the historical and contemporary theories and articulations of Third
World studies (comparative ethnic studies) as an academic field and practice.
Consideration of subject matters; methodologies and theories; literatures; and
practitioners and institutional arrangements.  SO  o Course cr

AMST 239a / ENGL 187a, Love and Hate in the American South  Staff
An introduction to the literature and culture of the American South, a region of the
mind identified with the former Confederate States of America and fabricated from

* AMST 241a / ENGL 256a / HUMS 245a, Poets and their Papers  Karin Roffman  
This Beinecke-intensive course considers the published works of living poets alongside the processes they used to create them: drafts, letters, journals, fragments, objects and other artworks that were directly or indirectly part of their artistic development. The course includes the participation of some of the poets themselves, a generation of writers who grew up with an acute awareness that their papers would someday be in a library. That long-term recognition of a public future for often seemingly private thoughts and ideas gives these papers particularly vital value and interest. The kinds of casual phrases and inclusions that were a crucial part of postwar American poetry one sees being worked out in poets’ attitudes of curiosity and attention toward works-in-progress, collaborative experiments and correspondence. Like the poets themselves, this course takes the Beinecke archives as primary not secondary to the production of late 20th and early 21st century poetry. An aspect of the course is the opportunity to talk with multiple generations of poets about their processes of creation, collection and organization and to capture their vision of archives as distinct from (and not merely preparatory to) publication.  

* AMST 245a / ENGL 246a / PLSC 247a, The Media and Democracy  Joanne Lipman  
In an era of “fake news,” when mainstream media is attacked as the "enemy of the people" and social platforms are enabling the spread of misinformation, how do journalists hold power to account? Students explore topics including objectivity versus advocacy, and hate speech versus First Amendment speech protections. Case studies will span from 19th century yellow journalism to the media’s role in #MeToo and #BlackLivesMatter movements.  

* 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.  

* AMST 282a / AFAM 284a / ENGL 414a / ER&M 284a, Black Life and the Human/Body  Cera Smith  
African American activists have long demanded equal rights by asserting the humanity of Black people. These activists have rejected their racist treatment as animals and property by championing the qualities ascribed to Western Man. More recently, however, scholars have questioned whether claims to humanity really result in freedom and justice for all Black people. They ask, “Does mobilizing humanity as a strategy for recognition and respect benefit Black non-men, disabled people, or the working class? What impact does this assertion of humanity have on our species’ relationship to other living beings and our environments? Ultimately, are all people allowed to
be ‘human?’ In this course, we evaluate the category of the “human” by studying the challenge that the U.S. Black past and present pose to the category’s assumed neutrality. We attend to how Black peoples’ bodily experiences confirm, deny, and complicate humanness. We read poetry, short fiction, novels, and creative nonfiction to investigate what it means to live a Black life. Analyzing historical, social scientific, legal, and theoretical texts alongside literature helps us explore the debates over the power dynamics that underlie claims to humanity. Through writing and in-class discussions, we explore the relationship between race, species, and political strategy.

* AMST 309a / AFAM 259a / EDST 255a, Education and Empire  Talya Zemach-Bershin

This course offers an introduction to the transnational history of education in relation to the historical development of the U.S. empire both at home and abroad. By bringing together topics often approached separately—immigration, education, race, colonialism, and the history of U.S. empire—we interrogate the ways that education has been mobilized to deploy power: controlling knowledge, categorizing and policing differences, administering unequal paths to citizenship/belonging, forcing assimilation, promoting socio-economic divides, and asserting discipline and control. EDST 110 recommended.

* AMST 326b / AFAM 349b / HIST 115Jb / WGSS 388b, Civil Rights and Women’s Liberation  Staff

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.

* 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.

* AMST 345a / ER&M 409a / WGSS 408a, Latinx Ethnography  Ana Ramos-Zayas

Consideration of ethnography within the genealogy and intellectual traditions of Latinx Studies. Topics include: questions of knowledge production and epistemological traditions in Latin America and U.S. Latino communities; conceptions of migration, transnationalism, and space; perspectives on “(il)legality” and criminalization; labor, wealth, and class identities; contextual understandings of gender and sexuality; theorizations of affect and intimate lives; and the politics of race and inequality under white liberalism and conservatism in the United States.

* AMST 353b / HIST 196Jb, 21st-Century US History: The First Decade  Joanne Meyerowitz

Students conduct collaborative primary source research on the first ten years of the 21st century. Topics include September 11th, the wars in Iraq and Afghanistan, Hurricane Katrina, the financial crisis of 2008, the election of Barack Obama, and battles over domestic surveillance, immigration, policing, gun control, same-sex marriage, and reproductive rights.
* AMST 358b / ENGL 281b, Animals in Modern American Fiction  
James Berger  
Literary portrayals of animals are 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 395a / FILM 327a, Studies in Documentary Film  
Charles Musser  
This course examines key works, crucial texts, and fundamental concepts in the critical study of non-fiction cinema, exploring the participant-observer dialectic, the performative, and changing ideas of truth in documentary forms.  
HU  RP

* AMST 397b / AFAM 251b, Critical Race Theory  
Staff  
Introduction to critical race theory, a radical critique of relations among race, law, and power in U.S. politics and society. Intellectual foundations of the field, with emphasis on African American perspectives; key juridical acts. The centrality of U.S. law in producing social hierarchies of race and racial difference, gender, sexuality, and class. The extension of critical race theory to global analysis of race, immigration, and cultural difference.  
HU

* AMST 403b, Introduction to Public Humanities  
Staff  
Introduction to the various media, topics, debates, and issues framing public humanities. The relationship between knowledge produced in the university and the circulation of ideas among a broader public, including modes of inquiry, interpretation, and presentation. Public history, museum studies, oral and community history, public art, documentary film and photography, public writing and educational outreach, and the socially conscious performing arts.  
HU

* AMST 425a / ENGL 283a / EVST 430a, American Culture and the Rise of the Environment  
Michael Warner  
U.S. literature from the late eighteenth century to the Civil War explored in the context of climate change. Development of the modern concept of the environment; the formation and legacy of key ideas in environmentalism; effects of industrialization and national expansion; utopian and dystopian visions of the future. Formerly ENGL 430.  
WR, HU

* AMST 427b / PLSC 269b / WGSS 427b, Politics of Gender and Sexuality in the United States  
Dara Strolovitch  
The 2016 Presidential election made clear that gender matters a great deal in American politics, but it also revealed that how gender matters is far from obvious. This course explores the ways in which gender and sexuality shape and are shaped by American politics and public policy. We explore the history, findings, and controversies in research about gender and sexuality in American politics from a range of approaches, examining what political science research helps us understand about questions such as: Does gender influence political campaigns and whether people will vote for particular candidates? Once elected, are gender and sexuality related to legislators’ behavior in office? How are norms related to race, class, gender, and sexuality reflected in and constructed by public policy? We also explore feminist, queer, and intersectional theories and methodologies and important work from other disciplines and interdisciplines, paying particular attention to the implications of intersectionality for understanding gender, sexuality, and politics. We also analyze the ways in which gender and sexuality intersect with other politically salient categories, identities, and
forms of marginalization, including race, ethnicity, class, and ideological and partisan identification, paying particular attention to their implications for the 2016, 2018, and 2020 elections. SO

* AMST 435b / ANTH 366b, Inequality in America  Kathryn Dudley
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

* AMST 439a / ER&M 439a, Fruits of Empire  Gary Okihiro
Readings, discussions, and research on imperialism and "green gold" and their consequences for the imperial powers and their colonies and neo-colonies. Spatially conceived as a world-system that enmeshes the planet and as earth's latitudes that divide the temperate from the tropical zones, imperialism as discourse and material relations is this seminar’s focus together with its implantations—an empire of plants. Vast plantations of sugar, cotton, tea, coffee, bananas, and pineapples occupy land cultivated by native and migrant workers, and their fruits move from the tropical to the temperate zones, impoverishing the periphery while profiting the core. Fruits of Empire, thus, implicates power and the social formation of race, gender, sexuality, class, and nation. HU, SO

* AMST 441a / ER&M 370a / HIST 130Ja, Indians and the Spanish Borderlands  Ned Blackhawk
The experiences of Native Americans during centuries of relations with North America's first imperial power, Spain. The history and long-term legacies of Spanish colonialism from Florida to California. WR, HU

* AMST 445b / AFAM 210b / HIST 148Jb, Politics and Culture of the U.S. Color Line  Matthew Jacobson
The significance of race in U.S. political culture, from the “separate but equal” doctrine of Plessy v. Ferguson to the election of an African American president. Race as a central organizer of American political and social life. HU RP

* AMST 453b / HIST 119Jb, The United States Constitution of 1787  Mark Peterson
This undergraduate seminar is organized around developing a deep historical understanding of one of our most important documents, the United States Constitution, as it emerged in the late 1780s. In addition to close reading and analysis of this fundamental text, we read a series of other primary sources relevant to the evolution of constitutional thought and practice in the Anglo-American tradition of the early modern period. And we engage relevant secondary scholarship produced by professional historians over the past century or more, in an effort to grapple with the evolution of changing approaches to the Constitution and its meaning over time. This course carries PI credit in History. WR, HU

* AMST 459a / ANTH 465a, Multispecies Worlds  Kathryn Dudley
This seminar explores the relational and material worlds that humans create in concert with other-than-human species. Through an interdisciplinary analysis of the problematic subject of anthropology—Anthropos—we seek to pose new questions about the fate of life worlds in the present epoch of anthropogenic climate change. Our readings track circuits of knowledge from anthropology and philosophy to geological
history, literary criticism, and environmental studies as we come to terms with the loss of biodiversity, impending wildlife extinctions, and political-economic havoc wrought by global warming associated with the Anthropocene. A persistent provocation guides our inquiry: What multispecies worldings become possible to recognize and cultivate when we dare to decenter the human in our politics, passions, and aspirations for life on a shared planet?

* AMST 462b / ER&M 462b / WGSS 463b, The Study of Privilege in the Americas  
  Ana Ramos-Zayas  
  Examination of inequality, not only through experiences of the poor and marginal, but also through institutions, beliefs, social norms, and everyday practices of the privileged. Topics include: critical examination of key concepts like “studying up,” “elite,” and “privilege,” as well as variations in forms of capital; institutional sites of privilege (elite prep schools, Wall Street); living spaces and social networks (gated communities, private clubs); privilege in intersectional contexts (privilege and race, class, and gender); and everyday practices of intimacy and affect that characterize, solidify, and promote privilege.

* AMST 463a / EVST 463a / FILM 455a / THST 457a, Documentary Film Workshop  
  Charles Musser  
  A yearlong workshop designed primarily for majors in Film and Media Studies or American Studies who are making documentaries as senior projects. Seniors in other majors admitted as space permits.

* AMST 471a and AMST 472b, Individual Reading and Research for Juniors and Seniors  
  Laura Wexler  
  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 479a / AFAM 459a / ER&M 402a, The Displaced: Migrant and Refugee Narratives of the 20th and 21st Centuries  
  Leah Mirakhor  
  This course examines a series of transnational literary texts and films that illuminate how the displaced—migrants, exiles, and refugees—remake home away from their native countries. The twentieth and twenty-first centuries have produced massive displacements due to wars, genocides, racial, ethnic and religious conflicts, economic and climate change, among other factors. Our course focuses on several texts that explore questions of home, nation, and self in the context of specific historical events such as the Holocaust, civil rights movements in the U.S., internment, the Indian partition, African decolonization, and Middle Eastern/Arab ethno-religious conflicts and wars. We examine these events alongside the shifting legal and political policies and categories related to asylum, humanitarian parole, refugee, and illegal alien status. Exploring themes such as nostalgia, longing, trauma, and memory, we look at the possibilities and limitations of creating, contesting, and imagining home in the diaspora. Our objective is to debate and develop the ethical, political, geographic, and imaginative articulations of home in an era of mass displacements and geo-political
We examine how notions of home are imagined alongside and against categories of race, gender, and sexuality. HU

* **AMST 491a or b, Senior Project**  Laura Wexler
  Independent research and proseminar on a one-term senior project. For requirements see under “Senior requirement” in the American Studies program description.

* **AMST 493a and AMST 494b, Senior Project for the Intensive Major**  Staff
  Independent research and proseminar on a two-term senior project. For requirements see under "Senior requirement" in the American Studies program description.

**Ancient Greek (GREK)**

**GREK 110a, Beginning Greek: The Elements of Greek Grammar**  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 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 423a, Sappho and the Lyric**  Pauline LeVen
  This advanced ancient Greek seminar focuses on the works of the 7th/6th-century BCE Lesbian singer-songwriter Sappho and some of her lyric contemporaries. It examines the stylistic, generic, and historical questions raised by her song production and investigates some of the major themes of her fragments (love, sex, friendship, time, memory, mythical revisions) while situating them in the larger context of other lyric poets and on the background of the Homeric tradition. Attention is also be paid to features of the reception of Sappho (starting with her ancient biographies, down to her reception in Latin America) and to the question of lyric as a genre (or mode) of performance and personal expression. Prerequisite: 4 semesters of college-level language study or equivalent (in which case, please contact the instructor). L5, HU

* **GREK 435a, The Greek Historians**  Joseph Solodow
  Close reading of the major Greek historians, Herodotus, Thucydides, Polybius, also Eastern and pre-Herodotean Greek writings, Hellenistic histories, including Acts of the Apostles and II Maccabees: their aims, historical methods, literary techniques, influence on historiography. Readings in both Greek and English. Prerequisite: Two years of college-level Greek. L5, HU 0 Course cr

* **GREK 494a, Independent Tutorial in Greek Language and Literature**  Andrew Johnston
  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. Offered subject to faculty availability.

**GREK 723a, Sappho and the Lyric**  Pauline LeVen
This advanced ancient Greek seminar focuses on the works of the 7th/6th-century BCE Lesbian singer-songwriter Sappho and some of her lyric contemporaries. It examines the stylistic, generic, and historical questions raised by her song production and investigates some of the major themes of her fragments (love, sex, friendship,
time, memory, mythical revisions) while situating them in the larger context of other lyric poets and on the background of the Homeric tradition. Attention is also paid to features of the reception of Sappho (starting with her ancient biographies, down to her reception in Latin America) and to the question of lyric as a genre (or mode) of performance and personal expression.

Anthropology (ANTH)

* ANTH 011a, 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 first-year students. Preregistration required; see under First-Year Seminar Program.  SO

* ANTH 040a, The Evolution of Human Uniqueness  David Watts
Current ideas in anthropology about what facilitated the evolutionary success of *Homo sapiens* and what distinguishes humans from other primates. The fossil and archaeological records for human evolution and the evolution of social behavior; research on nonhuman primate behavior and cognitive abilities, with an emphasis on chimpanzees; insights and limitations of comparative primate research. Enrollment limited to freshmen. Preregistration required; see under Freshman Seminar Program.  SO

* ANTH 061a, Understanding Human Origins  Jessica Thompson
This course deals with scientific questions of what we know about human origins and human evolution. It presents evidence from evolutionary and life history theory, geochronology, paleontology, paleoenvironmental reconstruction, phylogenetic analysis, genetics, archaeology, and functional morphology. It also tackles the issue of how we know what we think we know of our own ancestry over the past 6 million years. In other words, what constitutes evidence for human evolution and how is that evidence interpreted? Students are introduced to basic milestones in human evolution and learn how they have shaped us into the species we are today, using diverse lines of evidence from evolutionary and life history theory, geochronology, paleontology, paleoenvironmental reconstruction, phylogenetic analysis, genetics, archaeology, and functional morphology. We critically examine key debates that have taken place over the last century of exploration in human evolutionary research, learning how unconventional thinking and spectacular discoveries have shaped current knowledge of our origins. Students meet strange and fascinating historical characters, and then meet our fossil ancestors via the cast collection. Students also receive hands-on and interactive learning about the morphology, life history patterns, locomotion, social behavior, and diet of our nearest fossil relatives; observe living primates to assess what they can tell us about our own deep past; dive into data collection by locating real archaeological and fossil sites; and learn how molecular techniques such as ancient DNA have transformed understanding of the origins of our own species. By formally debating controversial issues with classmates, students learn what a surprising amount of information scientists can discern from fragmentary fossils, and are brought up to
date with the most current discoveries in human evolution. Enrollment limited to first-
year students. Preregistration required; see under First-Year Seminar Program.  

**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.  

**ANTH 116a, Introduction to Biological Anthropology**  
Jessica Thompson  
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.  

**ANTH 119b, Law as Culture**  
Louisa Lombard  
Introduction to anthropological understanding of what law is, how it holds its  
authority, and how it is shaped by cultural assumptions about justice, rights,  
and morality. Readings from classic and contemporary texts in legal and political  
anthropology. Cultural dimensions of law and its changing relationship to discipline,  
power, and governance.  

**ANTH 140a / ER&M 241a / SOCY 138a, The Corporation**  
Douglas Rogers  
Survey of the rise, diversity, and power of the capitalist corporation in global contexts,  
with a focus on the 20th and 21st centuries. Topics include: the corporation as  
legal entity and the social and cultural consequences of this status; corporations in  
the colonial era; relationships among corporations, states, and non-governmental  
organizations in Western and non-Western contexts; anti-corporate critique and  
response; corporate social responsibility; and race, gender, and indigeneity.  

**ANTH 171a / ARCG 171a, Great Civilizations of the Ancient World**  
Anne Underhill  
A survey of selected prehistoric and historical cultures through examination of  
archaological sites and materials. Emphasis on the methodological and theoretical  
approaches by which archaeologists recover, analyze, and interpret the material remains  
of the past.  

**ANTH 203b, Primate Conservation**  
David Watts  
A study of nonhuman primates threatened by deforestation, habitat disturbance,  
hunting, and other human activities; the future of primate habitats, especially tropical  
forest areas, as they are affected by local and global economic and political forces.  
Examination of issues in primate conservation, from the principles of conservation  
biology and rainforest ecology to the emergence of diseases such as AIDS and Ebola and  
the extraction of tropical resources by local people and by transnational corporations.  

**ANTH 204b, Molecular Anthropology**  
Serena Tucci  
This course is a perfect introduction for anyone interested in understanding how  
genetics can help us answer fundamental questions in human evolution and population  
history. The course studies the basic principles of population genetics, molecular
evolution, and genetic data analysis. Topics include DNA and human origins, human migrations, genetic adaptation, ancient DNA, and Neandertals. By the end of this course, students learn about the processes that generate and shape genetic variation, as well as the molecular and statistical tools used to reconstruct human evolutionary history. sc

**ANTH 213a / EAST 313a, Contemporary Japan and the Ghosts of Modernity**  Yukiko Koga

This course introduces students to contemporary Japan, examining how its defeat in the Second World War and loss of empire in 1945 continue to shape Japanese culture and society. Looking especially at the sphere of cultural production, it focuses on the question of what it means to be modern as expressed through the tension between resurgent neonationalism and the aspiration to internationalize. The course charts how the legacy of Japan’s imperial failure plays a significant role in its search for renewal and identity since 1945. How, it asks, does the experience of catastrophic failure—and failure to account for that failure—play into continued aspirations for modernity today? How does Japanese society wrestle with modernity’s two faces: its promise for progress and its history of catastrophic violence? The course follows the trajectory of Japan's postwar nation-state development after the dissolution of empire, from its resurrection out of the ashes after defeat, to its identity as a US ally and economic superpower during the Cold War, to decades of recession since the 1990s and the search for new relations with its neighbors and new reckonings with its own imperial violence and postwar inactions against the background of rising neonationalism.  HU, SO

**ANTH 217a, Hormones, Evolution, and Human Behavior**  Richard Bribiescas

This course examines the evolution of human behavior through the lens of endocrinology and life history theory. Topics include the evolution of social behavior, pair bonding, parental investment, aggression, sex, feeding behavior, and risk tolerance. This course also addresses these topics with a mindful eye towards variation throughout the human life course from birth to death. Specific attention is made towards examining behavioral endocrinology within the context of human diversity in all its forms, social, biological, and ecological as well as in comparison with other species including non-human primates. ANTH 116, ANTH 242, or a similar course is recommended before enrolling in this course.  so o Course cr

**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 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 253b / ARCG 253b, Introduction to Experimental Archaeology**  Ellery Frahm

Experimental archaeology is one of the most important tools to develop and test models which link human behaviors and natural forces to the archaeological record. This class explores the elements of good experimental design and procedures. ANTH 316L, ARCG 316L recommended.  SO
ANTH 264a / ARCG 264a / SPAN 404a, Aztec Archaeology and Ethnohistory
Oswaldo Chinchilla Mazariegos
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 267b / ARCG 267b, Human Evolution Jessica Thompson
The main objective of this course is for students to learn how evidence and theory intersect with some of the peculiarities of history to form the modern discipline of paleoanthropology. It deals with scientific questions of human origins and evolution, and what we think we know of our own ancestry over the past 6 million years. We cover key tools such as evolutionary theory, paleontology, archaeology, paleoenvironmental reconstruction, phylogenetic analysis, genetics, and functional morphology. Using these tools, we critically examine what key debates have taken place over the last century of exploration and discovery in human evolution research, learning how unconventional thinking and spectacular discoveries have shaped current knowledge of our origins. Students learn what a surprising amount of information scientists can discern from fragmentary fossils, and are brought up to date with the most current discoveries and debates in human evolution. Students also see how human origins are conveyed to a broader audience, and how misunderstandings about how it happened can propagate and be misused. Knowledge of introductory biological anthropology or biology are helpful. SC, SO o Course cr

ANTH 280a, Evolution of Primate Intelligence David Watts
Discussion of the extent and evolutionary origins of cognitive abilities in primates (prosimians, monkeys, apes, and humans). Topics include the role of ecological and social factors as evolutionary forces; "ape language" studies; and whether any nonhuman primates possess a "theory of mind." SO

ANTH 294a / ARCG 294a, The Ancient Maya Oswaldo Chinchilla Mazariegos
Introduction to the archaeological study of ancient Maya civilization in southern Mexico and northern Central America. Maya origins and modes of adaptation to a tropical forest environment; political history of the Classic Maya and competing theories about their collapse; overviews of Maya art, calendar, and writing. SO

* ANTH 303b, Field Methods in Cultural Anthropology Yukiko Koga
The fundamentals of cultural anthropology methods. The foundations of fieldwork approaches, including methods, theories, and the problem of objectivity. WR, SO

* ANTH 308b / WGSS 407b, Feminist & Queer Ethnographies: Family, Community, Nation Eda Pepi
This seminar centers the analytics and methods that feminist and queer ethnographic analyses have brought to the fore to revisit a cluster of topical issues, this year assembled around the theme: Family, Community, Nation. As a site in which personhood is distributed and contested, the “family” is one of the building blocks of social scientific analysis – along with “community” and “nation.” Seen as ideological lynchpins for the reproduction of the social order, processes of family-making – like marriage, divorce, childbirth, and intergenerational flows – have been codified differently across historical and cultural contexts. This course engages the feminist and queer ethnographies that revealed the political hierarchies that emerge from seemingly natural categories and distinctions of kinship. We trace the gendered, sexualized, class-making, and
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racialized concepts, processes, and implicit understandings of family-making that chart the public and private spheres of community and national terrains. Students grapple with the processes of naturalization and denaturalization through which the “political” is mobilized and dyads like kin/kith, blood/soil, human/nonhuman, citizen/noncitizen, us/them, are made to appear. We also engage with feminist and queer methodologies that conjure up speculative fabulations for, what Saidiya Hartman has called, “the radical hope for living otherwise.” We do so at a time when the global Covid-19 pandemic has demanded the resurgence of the state, tested community ties, transformed family arrangements, and isolated most of the world’s population within domestic domains.  

* ANTH 309a, Language and Culture  
Paul Kockelman  
The relations between language, culture, and cognition. What meaning is and why it matters. Readings in recent and classic works by anthropologists, linguists, psychologists, and philosophers.  

* ANTH 311a, Anthropological Theory and the Post Colonial Encounter  
Jane Lynch  
Key texts in the theoretical development of sociocultural anthropology. Theorists include Karl Marx, Max Weber, Emile Durkheim, Franz Boas, Zora Neale Hurston, Sidney Mintz, Bernard Cohn, Michel Foucault, Edward Said, Antonio Gramsci, Sherry Ortner, and Joan Scott.  

ANTH 316La / ARCG 316La, Introduction to Archaeological Laboratory Sciences  
Ellery Frahm  
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.

* ANTH 322b / EVST 324b / SAST 306b, Environmental Justice in South Asia  
Kalyanakrishnan Sivaramakrishnan  
Study of South Asia’s nation building and economic development in the aftermath of war and decolonization in the 20th century. How it generated unprecedented stress on natural environments; increased social disparity; and exposure of the poor and minorities to environmental risks and loss of homes, livelihoods, and cultural resources. Discussion of the rise of environmental justice movements and policies in the region as the world comes to grips with living in the Anthropocene.  

* ANTH 324a / ANTH 824a, Politics of Memory  
Yukiko Koga  
This course explores the role of memory as a social, cultural, and political force in contemporary society. How societies remember difficult pasts has become a contested site for negotiating the present. Through the lens of memory, we examine complex roles that our relationships to difficult pasts play in navigating issues we face today. This course explores this politics of memory that takes place in the realm of popular culture and public space. The class asks such questions as: How do you represent difficult and contested pasts? What does it mean to enable long-silenced victims’ voices to be heard? What are the consequences of re-narrating the past by highlighting past injuries and trauma? Does memory work heal or open wounds of a society and a nation? Through examples drawn from the Holocaust, the atomic bombing in Hiroshima, the Vietnam War, genocide in Indonesia and massacres in Lebanon, to debates on confederacy statues, slavery, and lynching in the US, this course approaches
these questions through an anthropological exploration of concepts such as memory, trauma, mourning, silence, voice, testimony, and victimhood.  

* ANTH 331b / ARCG 000b / ARCG 354b / EVST 354b / HIST 204Jb / NELC 000b / NELC 324b, The Ancient State: Genesis and Crisis from Mesopotamia to Mexico  
  Harvey Weiss  
Ancient states were societies with surplus agricultural production, classes, specialization of labor, political hierarchies, monumental public architecture and, frequently, irrigation, cities, and writing. Pristine state societies, the earliest civilizations, arose independently from simple egalitarian hunting and gathering societies in six areas of the world. How and why these earliest states arose are among the great questions of post-Enlightenment social science. This course explains (1) why this is a problem, to this day, (2) the dynamic environmental forces that drove early state formation, and (3) the unresolved fundamental questions of ancient state genesis and crisis, –law-like regularities or a chance coincidence of heterogenous forces?  

* ANTH 346b, Anthropological Approaches to Capitalism  
  Douglas Rogers  
An introduction to the anthropological study of capitalism. Focus on how markets and commodities are embedded in social, cultural, and political contexts. Discussion of the many ways people have embraced, reinterpreted, and resisted capitalism worldwide. Consideration of the implications of this diversity for theories of capitalism as a whole. Enrollment limited to sophomores.  

* ANTH 362b, Unity and Diversity in Chinese Culture  
  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 366b / AMST 435b, Inequality in America  
  Kathryn Dudley  
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.  

* ANTH 367b, Technology and Culture  
  Lisa Messeri  
This class examines how technology matters in our daily lives. How do technologies shape understandings of ourselves, the worlds we inhabit, and each other? How do the values and assumptions of engineers and innovators shape our behaviors? How do technologies change over time and between cultures. Students learn to think about technology and culture as co-constituted. We read and discuss texts from history and anthropology of science, as well as fictional explorations relevant to course topics.  

* ANTH 377a / EVST 379a, Observing and Measuring Behavior, Part II: Data Analyses and Reporting  
  Eduardo Fernandez-Duque  
This is the second course in a spring-fall sequence. The course is primarily for students who have already taken "Observing and Measuring Behavior I: Study Design" (ANTH 376) and who have conducted summer research as part of an NSF-funded Summer Program in Argentina (https://www.owlmonkeyproject.com/open-calls). In this course
students learn how to analyze the data they have collected, strategies for interpreting and presenting results, including considerations of study design issues and a priori statistical protocols; predictive and/or explanatory power and interpretation of statistical significance, scientific inference and research relevance. Students practice writing and oral skills associated with how to write communicating the results of their study. Prerequisite: ANTH 376. QR, SC, SO

* ANTH 383a / SAST 303a, In Ordinary Fashion  Jane Lynch
Clothing fashions not only our bodies but also our experiences in and claims about the world. It has been used to define the nature and radical possibilities of indigeneity, anti-colonial nationalism, counter-cultural narratives, and capitalist critiques. At the same time, dress—and its social and legal regulation—also creates and reinforces social hierarchies, systems of morality, and forms of exclusion. This course centers these competing social realities and histories using clothing as a way into understanding the poetics and politics of everyday life. Readings include ethnographies and social histories of textiles, fashion, and the manufacture of garments including cases from India, Guatemala, Italy, China, Sri Lanka, Bangladesh, Trinidad, and the United States. SO

* ANTH 385a / ARCG 385a, 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 386b / GLBL 393b, Humanitarian Interventions: Ethics, Politics, and Health  Catherine Panter-Brick
Analysis of humanitarian interventions from a variety of social science disciplinary perspectives. Issues related to policy, legal protection, health care, morality, and governance in relation to the moral imperative to save lives in conditions of extreme adversity. Promotion of dialogue between social scientists and humanitarian practitioners. WR, SO

* ANTH 401a, Meaning and Materiality  Paul Kockelman
The interaction of meaning and materiality. Relations among significance, selection, sieving, and serendipity explored through classic work in biosemiosis, technocognition, and sociogenesis. Sources from sociocultural and linguistic anthropology, philosophy, and cognitive sciences such as psychology. SO

* ANTH 409a / ER&M 394a / EVST 422a / F&ES 422a / GLBL 394a, Climate and Society: Perspectives from the Social Sciences and Humanities  Michael Dove
Discussion of the major currents of thought regarding climate and climate change; focusing on equity, collapse, folk knowledge, historic and contemporary visions, western and non-western perspectives, drawing on the social sciences and humanities. WR, SO

* ANTH 410b / ARCG 410b, Ethnohistory and Archaeology  Roderick McIntosh
Review of the major problems and methodologies associated with the use of ethnohistory by archaeologists. The construction of a historical imagination. Sources include colonial and “visitor” documents, peoples’ written descriptions of themselves, oral traditions, classic ethnographies, and writings in art history. SO
* ANTH 414b / EAST 417b, Hubs, Mobilities, and World Cities  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.  

* ANTH 415a, Culture, History, Power, and Representation  Anne Aronsson
This seminar critically explores how anthropologists use contemporary social theories to formulate the junctures of meaning, interest, and power. It thus aims to integrate symbolic, economic, and political perspectives on culture and social process. If culture refers to the understandings and meanings by which people live, then it constitutes the conventions of social life that are themselves produced in the flux of social life, invented by human activity. Theories of culture must therefore illuminate this problematic of agency and structure. They must show how social action can both reproduce and transform the structures of meaning, the conventions of social life. Even as such a position becomes orthodox in anthropology, it raises serious questions about the possibilities for ethnographic practice and theoretical analysis. How, for example, are such conventions generated and transformed where there are wide differentials of power and unequal access to resources? What becomes of our notions of humans as active agents of culture when the possibilities for maneuver and the margin of action for many are overwhelmed by the constraints of a few? How do elites—ritual elders, Brahmanic priests, manorial lords, factory-managers—secure compliance to a normative order? How are expressions of submission and resistance woven together in a fabric of cultural understandings? How does a theory of culture enhance our analyses of the reconstitution of political authority from traditional kingship to modern nation-state, the encapsulation of pre-capitalist modes of production, and the attempts to convert “primordial sentiments” to “civic loyalties”? How do transnational fluidities and diasporic connections make instruments of nation-states contingent? These questions are some of the questions we immediately face when probing the intersections of culture, politics and representation, and they are the issues that lie behind this seminar.

* ANTH 438b, Culture, Power, Oil  Douglas Rogers
The production, circulation, and consumption of petroleum as they relate to globalization, empire, cultural performance, natural resource extraction, and the nature of the state. Case studies include the United States, Saudi Arabia, Nigeria, Venezuela, and the former Soviet Union.

* ANTH 441a / MMES 430a / WGSS 430a, Gender and Citizenship in the Middle East  Eda Pepi
This seminar explores the gendered and ethnic-based social processes and forms of power that citizenship, statelessness, and migration crises fuel, and are fueled by, in the Middle East and North Africa. The history of gender and citizenship in the region is imbricated in ethnosexual and orientalist colonial legacies that articulate a racialized problematic of “modernity.” Part of these legacies involve obscuring the role that women, sexual minorities, and gender, more broadly, have played in framing citizenship and statehood in the Middle East in global, regional, and local imaginations not only as border policing and legal doctrine, but as signifier—and reifier—of culture, race, and ethnicity. By examining the gendered and sexual dimensions of war, conflict, and partition, and the formation of modern citizenship in the Middle East, the seminar presents ethnographic, historical, literary and visual scholarship that theorizes the
role of kinship and citizenship in gendered and racialized narratives of the nation and political sovereignty.

* ANTH 442b / AFAM 442b, Theory and Methods of Performance Ethnography
  Aimee Cox
  Study of the theoretical framework that defines performance ethnography; the methodologies developed and utilized by research practitioners; the similarities and distinctions between ethnography and performance ethnography; and the innovations made in performance ethnography that impact social justice and community-building initiatives in various parts of the world.

* ANTH 447b / MMES 447b, Culture and Politics in the Contemporary Middle East
  Marcia Inhorn
  In the decade since the 2011 Arab uprisings, the challenges facing the Middle East have been profound. They include various forms of war and displacement, political and economic instability, social upheaval and societal rupture. Indeed, by 2015, millions of Middle Eastern men, women, and children had been driven from their homes by conflict. This advanced undergraduate/graduate seminar is designed to explore some of the most important contemporary cultural and political shifts that are shaping life across the Middle East and North Africa (MENA). The course aims for broad regional coverage, with particular focus on a variety of important Middle Eastern nation-states (e.g., Egypt, Lebanon, Palestine, Saudi Arabia, Turkey, Iran). Students should emerge from the course with a keener sense of Middle Eastern regional histories and contemporary social issues, as described by a new generation of leading scholars in the field of Middle East Studies and particularly Middle East Anthropology. This course is thus designed for students in Anthropology, Modern Middle East Studies, and Global Affairs, but also from the disciplines of Sociology, History, Political Science, Near Eastern Languages and Cultures, and the like. The course is also intended for students in the CMES Graduate Certificate Program.

* ANTH 455b / WGSS 459b, Masculinity and Men’s Health
  Marcia Inhorn
  Ethnographic approaches to masculinity and men’s health around the globe. Issues of ethnographic research design and methodology; interdisciplinary theories of masculinity; contributions of men’s health studies from Western and non-Western sites to social theory, ethnographic scholarship, and health policy.

* ANTH 464b / ARCG 464b / E&EB 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.

* ANTH 465a / AMST 459a, Multispecies Worlds
  Kathryn Dudley
  This seminar explores the relational and material worlds that humans create in concert with other-than-human species. Through an interdisciplinary analysis of the problematic subject of anthropology—Anthropos—we seek to pose new questions about the fate of life worlds in the present epoch of anthropogenic climate change. Our readings track circuits of knowledge from anthropology and philosophy to geological history, literary criticism, and environmental studies as we come to terms with the loss of biodiversity, impending wildlife extinctions, and political-economic havoc wrought
by global warming associated with the Anthropocene. A persistent provocation guides our inquiry: What multispecies worldings become possible to recognize and cultivate when we dare to decenter the human in our politics, passions, and aspirations for life on a shared planet? SO

* ANTH 471a or b and ANTH 472a or b, Readings in Anthropology Staff
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 491a or b, The Senior Essay Staff
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.

* ANTH 492b / ARCG 492b / NELC 321b, Imaging Ancient Worlds Klaus Wagensonner and Agnete Lassen
The interpretation of epigraphic and archaeological material within the broader context of landscape, by means of creating a virtual model to reconstruct the sensory experiences of the ancient peoples who created those sites. Use of new technologies in computer graphics, including 3D imaging, to support current research in archaeology and anthropology.

Applied Mathematics (AMTH)

AMTH 160b / MATH 160b / S&DS 160b, The Structure of Networks 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 Staff
AMTH 244a or b / MATH 244a or b, Discrete Mathematics  Staff  
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

AMTH 247b / MATH 247b, Intro to Partial Differential Equations  Erik Hiltunen  
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 or 226, MATH 246 or ENAS 194 or equivalents.  QR

AMTH 260b / MATH 260b, 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 or 226.  QR

AMTH 262b / CPSC 262b / S&DS 262b, Computational Tools for Data Science  Roy Lederman  
Introduction to the core ideas and principles that arise in modern data analysis, bridging statistics and computer science and providing students the tools to grow and adapt as methods and techniques change. Topics include principal component analysis, independent component analysis, dictionary learning, neural networks and optimization, as well as scalable computing for large datasets. Assignments include implementation, data analysis and theory. Students require background in linear algebra, multivariable calculus, probability and programming. Prerequisites: after or concurrently with MATH 222, 225, or 231; after or concurrently with MATH 120, 230, or ENAS 151; after or concurrently with CPSC 100, 112, or ENAS 130; after S&DS 100-108 or S&DS 230 or S&DS 241 or S&DS 242. Enrollment is limited; requires permission of the instructor.  QR

AMTH 322a / MATH 322a, Geometric and Topological Methods in Machine Learning  Smita Krishnaswamy and Ian Adelstein  
This course provides an introduction to geometric and topological methods in data science. Our starting point is the manifold hypothesis: that high dimensional data live on or near a much lower dimensional smooth manifold. We introduce tools to study the geometric and topological properties of this manifold in order to reveal relevant features and organization of the data. Topics include: metric space structures, curvature, geodesics, diffusion maps, eigenmaps, geometric model spaces, gradient descent, data embeddings and projections, and topological data analysis (TDA) in the form of persistence homology and their associated “barcodes.” We see applications of these methods in a variety of data types. Prerequisites: MATH 225 or 226; MATH 255 or 256; MATH 302; and CPSC 112 or equivalent programming experience. Students who completed MATH 231 or 250 may substitute another analysis course level 300 or above in place of MATH 302.  QR, SC

* AMTH 342a / EENG 432a, 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
AMTH 361b / S&DS 361b, Data Analysis  Brian Macdonald
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. After S&DS 242 and MATH 222 or 225, or equivalents.  QR

AMTH 364b / EENG 454b / S&DS 364b, Information Theory  Yihong Wu
Foundations of information theory in communications, statistical inference, statistical mechanics, probability, and algorithmic complexity. Quantities of information and their properties: entropy, conditional entropy, divergence, redundancy, mutual information, channel capacity. Basic theorems of data compression, data summarization, and channel coding. Applications in statistics and finance. After STAT 241.  QR

AMTH 420a / MATH 421a, The Mathematics of Data Science  Kevin O’Neill
This course aims to be an introduction to the mathematical background that underlies modern data science. The emphasis is on the mathematics but occasional applications are discussed (in particular, no programming skills are required). Covered material may include (but is not limited to) a rigorous treatment of tail bounds in probability, concentration inequalities, the Johnson-Lindenstrauss Lemma as well as fundamentals of random matrices, and spectral graph theory. Prerequisite: MATH 305.  QR, SC

AMTH 428a / E&EB 428a / EPS 428a / PHYS 428a, Science of Complex Systems  Jun Korenaga
Introduction to the quantitative analysis of systems with many degrees of freedom. Fundamental components in the science of complex systems, including how to simulate complex systems, how to analyze model behaviors, and how to validate models using observations. Topics include cellular automata, bifurcation theory, deterministic chaos, self-organized criticality, renormalization, and inverse theory. Prerequisite: PHYS 301, MATH 247, or equivalent.  QR, SC

AMTH 431a / S&DS 431a, Optimization and Computation  Staff
This course is designed for students in Statistics & Data Science who need to know about optimization and the essentials of numerical algorithm design and analysis. It is an introduction to more advanced courses in optimization. The overarching goal of the course is teach students how to design algorithms for Machine Learning and Data Analysis (in their own research). This course is not open to students who have taken S&DS 430. Prerequisites: Knowledge of linear algebra, multivariate calculus, and probability. Linear Algebra, by MATH 222, 223 or 230 or 231; Graph Theory, by MATH 244 or CPSC 365 or 366; and comfort with proof-based exposition and problem sets, such as is gained from MATH 230 and 231, or CPSC 366.

* AMTH 482a or b, Research Project  John Wettlaufer
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.

* AMTH 491a or b, Senior Project  John Wettlaufer
Individual research that fulfills the senior requirement. 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.
Applied Physics (APHY)

* APHY 050a or b / ENAS 050a or b / PHYS 050a or b, Science of Modern Technology and Public Policy  Daniel Prober
Examination of the science behind selected advances in modern technology and implications for public policy, with 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, renewable energy technologies, 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 first-year students. Preregistration required; see under First-Year Seminar Program. SC

* APHY 100b / ENAS 100b / EPS 105b / EVST 100b / PHYS 100b, Energy, Environment, and Public Policy  Daniel Prober
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. QR, SC

APHY 110b / ENAS 110b, The Technological World  Owen Miller
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. QR, SC

APHY 151a or b / ENAS 151a or b / PHYS 151a or b, Multivariable Calculus for Engineers  Staff
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

APHY 194a or b / ENAS 194a or b, Ordinary and Partial Differential Equations with Applications  Staff
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 MATH 120 or equivalent, and knowledge of matrix-based operations. QR

APHY 320a / EENG 320a, Introduction to Semiconductor Devices  Hong Tang
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. Recommended preparation: EENG 200. PHYS 180 and 181 or permission of instructor QR, SC
APHY 322b, Electromagnetic Waves and Devices  Michel Devoret  
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 420a / PHYS 420a, Thermodynamics and Statistical Mechanics  Nicholas Read  
This course is subdivided into two topics. We study thermodynamics from a purely macroscopic point of view and then we devote time to the study of statistical mechanics, the microscopic foundation of thermodynamics. Prerequisites: PHYS 301, 410, and 440 or permission of instructor. QR, SC

APHY 439a / PHYS 439a, Basic Quantum Mechanics  Peter Rakich  
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 / PHYS 448a, Solid State Physics I  Sohrab Ismail-Beigi  
The first term of a two-semester 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, PHYS 420. QR, SC

APHY 449b / PHYS 449b, Solid State Physics II  Yu He  
The second term of the sequence described under APHY 448. QR, SC

* APHY 450b / ENAS 450b / MENG 450b, Advanced Synchrotron Techniques and Electron Spectroscopy of Materials  Charles Ahn  
Introduction to concepts of advanced x-ray and electron-based techniques used for understanding the electronic, structural, and chemical behavior of materials. Students learn from world-leading experts on fundamentals and practical applications of various diffraction, spectroscopy, and microscopy methods. Course highlights the use of synchrotrons in practical experiments. Prerequisites: physics and quantum mechanics/physical chemistry courses for physical science and engineering majors, or by permission of instructor. QR, SC

APHY 458a / PHYS 458a, Principles of Optics with Applications  Hui Cao  
Introduction to the principles of optics and electromagnetic wave phenomena with applications to microscopy, optical fibers, laser spectroscopy, and nanostructure physics. Topics include propagation of light, reflection and refraction, guiding light, polarization, interference, diffraction, scattering, Fourier optics, and optical coherence. Prerequisite: PHYS 430. QR, SC

* APHY 469a, Special Projects  Daniel Prober  
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. This course may be taken more than once, is graded pass/fail, is limited to Applied Physics majors, and does not count toward the senior requirement. Permission of the faculty adviser and of the director of undergraduate studies is required.

* APHY 471a and APHY 472b, Senior Special Projects  Daniel Prober
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. This course may be taken more than once and is limited to Applied Physics majors in their junior and senior years. Permission of the faculty adviser and of the director of undergraduate studies is required.

Arabic (ARBC)

ARBC 110a, Elementary Modern Standard Arabic I  Staff
Development of a basic knowledge of Modern Standard Arabic. Emphasis on grammatical analysis, vocabulary acquisition, and the growth of skills in speaking, listening, reading, and writing. L1 1½ Course cr

ARBC 120b, Elementary Modern Standard Arabic II  Staff
Continuation of ARBC 110. Prerequisite: ARBC 110 or requisite score on a placement test. L2 RP 1½ Course cr

* ARBC 130a, Intermediate Modern Standard Arabic I  Jonas Elbousty
Intensive review of grammar; readings from contemporary and classical Arab authors with emphasis on serial reading of unwoveled Arabic texts, prose composition, and formal conversation. Prerequisite: ARBC 120 or requisite score on a placement test. L3 RP 1½ Course cr

ARBC 136a, Intermediate Classical Arabic I  Staff
Introduction to classical Arabic, with emphasis on grammar to improve analytical reading skills. Readings include Qur’anic passages, literary material in both poetry and prose, biographical entries, and religious texts. 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  Sarab Al Ani
Continuation of ARBC 130. Prerequisite: ARBC 130 or requisite score on a placement test. L4 RP 1½ Course cr

ARBC 146b, Intermediate Classical Arabic II  Staff
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  Sarab Al Ani
Further development of listening, writing, and speaking skills. For students who already have a substantial background in Modern Standard Arabic. Prerequisite: ARBC 140 or requisite score on a placement test. L5 RP

* ARBC 151b, Advanced Modern Standard Arabic II  Randa Muhammed
Continuation of ARBC 150. Prerequisite: ARBC 150 or requisite score on a placement test. L5 RP
* ARBC 173a / ARBC 598a / NELC 338a / NELC 614a, Tracing the Image of the Arab "Other"  Jonas Elbousty

This advanced Arabic language course places the modern Arabic novel in conversation with the west in an effort to uncover both dominant narratives regarding Arab identity, as well as counter narratives that present a challenge to these dominant narratives. We study the tradition of modern Arabic literature, looking specifically to the ways in which the image of the “other” is presented in Arabic narratives as well as the ways in which the image of the Arab is constructed through the others’ literature. Readings, discussions, and written assignments will be in Arabic. Prerequisite: ARBC 151.  L5

Archaeological Studies (ARCG)

* ARCG 000b / ANTH 331b / ARCG 354b / EVST 354b / HIST 204Jb / NELC 000b / NELC 324b, The Ancient State: Genesis and Crisis from Mesopotamia to Mexico  Harvey Weiss

Ancient states were societies with surplus agricultural production, classes, specialization of labor, political hierarchies, monumental public architecture and, frequently, irrigation, cities, and writing. Pristine state societies, the earliest civilizations, arose independently from simple egalitarian hunting and gathering societies in six areas of the world. How and why these earliest states arose are among the great questions of post-Enlightenment social science. This course explains (1) why this is a problem, to this day, (2) the dynamic environmental forces that drove early state formation, and (3) the unresolved fundamental questions of ancient state genesis and crisis, –law–like regularities or a chance coincidence of heterogenous forces?  HU, SO

* ARCG 001b / AFST 001b / NELC 001b, Egypt and Northeast Africa: A Multidisciplinary Approach  John Darnell

An introduction to Egyptology, examining approximately 10,000 years of Nile Valley cultural records and 3,000 years of Egyptian history. The course presents an overview of the historical and archaeological study of Egypt and her southern neighbor Nubia. Various original written and visual sources are used, including the collections of the Peabody Museum and the Yale Art Gallery, with some material accessible in the classroom. Students gain a basic understanding of the hieroglyphic script and the Ancient Egyptian language, and are able to read some inscriptions in museum visits at the end of the course. Enrollment limited to first-year students. Preregistration required; see under First-Year Seminar Program.  WR, HU

* ARCG 031b / EVST 030b / NELC 026b, Origins of Civilization: Egypt and Mesopotamia  Harvey Weiss

The origins of the earliest civilizations in Mesopotamia and Egypt along the Nile and Tigris-Euphrates Rivers explored with archaeological, historical and environmental data for the origins of agriculture, the classes and hierarchies that marked earliest cities, states and empires, the innovative monumental architecture, writing, imperial expansion, and new national ideologies. How and why these civilizational processes occurred with the momentous societal collapses at periods of abrupt climate change. Enrollment limited to first-year students. Preregistration required; see under First-Year Seminar Program.  HU, SO
128b / AFST 128b / EGYP 128b / NELC 129b / RLST 251b, Magic and Ritual in Ancient Egypt and the Near East  John Darnell
Introduction to ancient Egyptian magic and rituals with an overview on the use of magic and discussion of the different rituals and festivals attested in Ancient Egypt and the Near East.  HU

ARCG 161a / CLCV 161a / HSAR 247a, Art and Myth in Greek Antiquity  Staff
Visual exploration of Greek mythology through the study of ancient Greek art and architecture. Greek gods, heroes, and mythological scenes foundational to Western culture; the complex nature of Greek mythology; how art and architecture rendered myths ever present in ancient Greek daily experience; ways in which visual representations can articulate stories. Use of collections in the Yale University Art Gallery.  HU  0 Course cr

ARCG 171a / ANTH 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  0 Course cr

ARCG 232a / ANTH 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

ARCG 244a / NELC 109a / RLST 245a, The Age of Akhenaton  Staff
Study of the period of the Egyptian pharaoh Akhenaton (reigned 1353–1336 B.C.E.), often termed the Amarna Revolution, from historical, literary, religious, artistic, and archaeological perspectives. Consideration of the wider Egyptian, ancient Near Eastern, African, and Mediterranean contexts. Examination of the international diplomacy, solar theology, and artistic developments of the period. Reading of primary source material in translation.  HU  0 Course cr

ARCG 245a / NELC 243a, Archaeology of Ancient Egypt: An Introduction  Gregory Marouard
This seminar is an introductory class that examines in detail the archaeology of ancient Egypt following the chronological order of Egyptian history and covering almost 4000 years, from the late Neolithic period to the end of the Greco-Roman period. The aim is not only to give a comprehensive overview of major sites and discoveries but also to use as much as possible information from recent excavations, discuss problems and priorities concerning this field, offer an introduction to new fieldwork methods and approaches used in Egypt as well as a short history of this discipline.  HU

ARCG 253b / ANTH 253b, Introduction to Experimental Archaeology  Ellery Frahm
Experimental archaeology is one of the most important tools to develop and test models which link human behaviors and natural forces to the archaeological record. This class explores the elements of good experimental design and procedures. ANTH 316L, ARCG 316L recommended.  SO
ARGC 264a / ANTH 264a / SPAN 404a, Aztec Archaeology and Ethnohistory
Oswaldo Chinchilla Mazariegos

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

ARGC 267b / ANTH 267b, Human Evolution   Jessica Thompson

The main objective of this course is for students to learn how evidence and theory intersect with some of the peculiarities of history to form the modern discipline of paleoanthropology. It deals with scientific questions of human origins and evolution, and what we think we know of our own ancestry over the past 6 million years. We cover key tools such as evolutionary theory, paleontology, archaeology, paleoenvironmental reconstruction, phylogenetic analysis, genetics, and functional morphology. Using these tools, we critically examine what key debates have taken place over the last century of exploration and discovery in human evolutionary research, learning how unconventional thinking and spectacular discoveries have shaped current knowledge of our origins. Students learn what a surprising amount of information scientists can discern from fragmentary fossils, and are brought up to date with the most current discoveries and debates in human evolution. Students also see how human origins are conveyed to a broader audience, and how misunderstandings about how it happened can propagate and be misused. Knowledge of introductory biological anthropology or biology are helpful.

ARGC 294a / ANTH 294a, The Ancient Maya   Oswaldo Chinchilla Mazariegos

Introduction to the archaeological study of ancient Maya civilization in southern Mexico and northern Central America. Maya origins and modes of adaptation to a tropical forest environment; political history of the Classic Maya and competing theories about their collapse; overviews of Maya art, calendar, and writing.

ARGC 316La / ANTH 316La, Introduction to Archaeological Laboratory Sciences   Ellery Frahm

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 354b / ANTH 331b / ARCG 000b / EVST 354b / HIST 204Jb / NELC 000b / NELC 324b, The Ancient State: Genesis and Crisis from Mesopotamia to Mexico   Harvey Weiss

Ancient states were societies with surplus agricultural production, classes, specialization of labor, political hierarchies, monumental public architecture and, frequently, irrigation, cities, and writing. Pristine state societies, the earliest civilizations, arose independently from simple egalitarian hunting and gathering societies in six areas of the world. How and why these earliest states arose are among the great questions of post-Enlightenment social science. This course explains (1) why this is a problem, to this day, (2) the dynamic environmental forces that drove early state formation, and (3) the unresolved fundamental questions of ancient state genesis and crisis, –law-like regularities or a chance coincidence of heterogenous forces?
* ARCG 385a / ANTH 385a, 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.  

* ARCG 410b / ANTH 410b, Ethnohistory and Archaeology  
Roderick McIntosh
Review of the major problems and methodologies associated with the use of ethnohistory by archaeologists. The construction of a historical imagination. Sources include colonial and “visitor” documents, peoples’ written descriptions of themselves, oral traditions, classic ethnographies, and writings in art history. 

ARCG 464b / ANTH 464b / E&EB 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. 

* ARCG 492b / ANTH 492b / NELC 321b, Imaging Ancient Worlds  
Klaus Wagensonner and Agnete Lassen
The interpretation of epigraphic and archaeological material within the broader context of landscape, by means of creating a virtual model to reconstruct the sensory experiences of the ancient peoples who created those sites. Use of new technologies in computer graphics, including 3D imaging, to support current research in archaeology and anthropology.

Architecture (ARCH)

* ARCH 006a, Architectures of Urbanism: Thinking, Seeing, Writing the Just City  
Michael Schlabs
What is architecture, and how is it conceived, relative to notions of the urban – to the broader, deeper, messier web of ideas, forms, and fantasies constituting “the city?” Can architecture play a role in defining the city, as such, or does the city’s political and social construction place it outside the scope of specifically architectural concerns? Likewise, what role can the city play in establishing, interrogating, and extrapolating the limits of architecture, whether as a practice, a discourse, or a physical manifestation of human endeavor in the material environment? This course addresses these and other, related questions, seeking to position art and architecture in their broader urban, social, cultural, political, intellectual, and aesthetic contexts. It explores issues of social justice as they relate to the material spaces of the modern city, and the manner in which those spaces are identified, codified, and made operative in service of aesthetic, social, and political experience. Enrollment limited to first-year students. Preregistration required; see under First-Year Seminar Program. Prerequisite: general knowledge of 20th-century history.

ARCH 150a, Introduction to Architecture  
Alexander Purves and Trattie Davies
* ARCH 161a, Introduction to Structures  Erleen Hatfield
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 250a, Methods and Form in Architecture I  Trattie 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 260a / HSAR 326a, History of Architecture to 1750  Kyle Dugdale
Introduction to the history of architecture from antiquity to the dawn of the Enlightenment, focusing on narratives that continue to inform the present. The course begins in Africa and Mesopotamia, follows routes from the Mediterranean into Asia and back to Rome, Byzantium, and the Middle East, and then circulates back to mediaeval Europe, before juxtaposing the indigenous structures of Africa and America with the increasingly global fabrications of the Renaissance and Baroque. Emphasis on challenging preconceptions, developing visual intelligence, and learning to read architecture as a story that can both register and transcend place and time, embodying ideas within material structures that survive across the centuries in often unexpected ways.  HU 0 Course cr

ARCH 280a / AMST 197a / HSAR 219a / URBN 280a, American Architecture and Urbanism  Elihu Rubin
Introduction to the study of buildings, architects, architectural styles, and urban landscapes, viewed in their economic, political, social, and cultural contexts, from precolonial times to the present. Topics include: public and private investment in the built environment; the history of housing in America; the organization of architectural practice; race, gender, ethnicity and the right to the city; the social and political nature of city building; and the transnational nature of American architecture.  HU

* ARCH 327a / URBN 327a, Difference and the City  Justin Moore
Four hundred and odd years after colonialism and racial capitalism brought twenty and odd people from Africa to the dispossessed indigenous land that would become the United States, the structures and systems that generate inequality and white supremacy persist. Our cities and their socioeconomic and built environments continue to exemplify difference. From housing and health to mobility and monuments, cities small and large, north and south, continue to demonstrate intractable disparities. The disparate impacts made apparent by the COVID-19 pandemic and the reinvigorated and global Black Lives Matter movement demanding change are remarkable. Change, of course, is another essential indicator of difference in urban environments, exemplified by the phenomena of disinvestment or gentrification. This course explores how issues like climate change and growing income inequality intersect with politics, culture, gender equality, immigration and migration, technology, and other considerations and forms of disruption.
ARCH 345a / URBN 345a, Civic Art: Introduction to Urban Design  Alan Plattus
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 360a / URBN 360a, Urban Lab: An Urban World  Joyce Hsiang
Understanding the urban environment through methods of research, spatial analysis, and diverse means of representation that address historical, social, political, and environmental issues that consider design at the scale of the entire world. Through timelines, maps, diagrams, collages and film, students frame a unique spatial problem and speculate on urbanization at the global scale. Prerequisites: For non-majors: permission of the instructor is required. For ARCH majors: ARCH 150, 200, and 280.  HU 1½ Course cr

ARCH 363a / URBN 363a, Urban Lab: Stories and Counterstories  Anne Barrett
How do our constructed environments embody, maintain, and/or intensify dominant power structures and embedded biases, and how might we uncover fuller and more heterogeneous—if possibly discordant or uneasy—understandings of place? This is a multidisciplinary design-research seminar in which students learn and utilize visual methods of research and analysis to interrogate, exhume, examine, record, represent, and speculatively re-frame the social, political, architectural, ecological, economic, infrastructural, and material stories of place. We consider urban, suburban, and rural environments at multiple scales, from street names to planning resolutions, as we explore both visible and invisible spatial characteristics. Students select and work on their own research site, and respond to assignments organized around four conceptual themes/representational techniques (Monuments/Mappings; Spaces/Collage; Characters/Diagramming; Boundaries/Section). Work evolves cumulatively over the semester to produce the final project: a “visual anthology” of student sites.  1½ Course cr

* ARCH 380a / HSAR 437a / MMES 382a, The Global Museum  Kishwar Rizvi
When the Carters (Jay-Z and Beyonce) chose the Louvre Paris as the backdrop to their 2018 hit single, they were tapping into the cultural capital of the museum. Like its counterparts across the world, the Louvre has evolved from a princely collection to a national symbol and, today, to a global brand, with a franchise in Abu Dhabi which opened in 2017. This seminar analyzes how museums are utilized for a variety purposes, from the local to the transnational, and the relationship between their architectural design and their economic, social and urban impact. The class meets with curators and designers and takes a field trip to the Smithsonian museums in Washington, DC.  wr, hu

* ARCH 392b / ENGL 478a or b, Writing about Place  Cynthia Zarin
An exploration of reading and writing about place. Definitions of home; different meanings and intent of travel. Readings include exemplary contemporary essays from the eighteenth century to the present. Workshop for assigned student essays.  wr, hu

* ARCH 450a, Senior Studio  Turner Brooks
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 494. Enrollment limited to Architecture majors. 1½ Course cr

* ARCH 471a, Individual Tutorial  Michael Schlabs
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. For juniors and seniors with DUS approval; meetings by appointment with DUS.

* ARCH 472a, Individual Tutorial Lab  Michael Schlabs
RP ½ Course cr

* ARCH 490a / URBN 490a, Senior Research Colloquium  Marta Caldeira
Research and writing colloquium for seniors in the Urban Studies and History, Theory, and Criticism tracks. Under guidance of the instructor and members of the Architecture faculty, students define their research proposals, shape a bibliography, improve research skills, and seek criticism of individual research agendas. Requirements include proposal drafts, comparative case study analyses, presentations to faculty, and the formation of a visual argument. Guest speakers and class trips to exhibitions, lectures, and special collections encourage use of Yale's resources.

Armenian (ARMN)

Art (ART)

* ART 006a, Art of the Printed Word  Jesse Marsolais
Introduction to the art and historical development of letterpress printing and to the evolution of private presses. Survey of hand printing; practical study of press operations using antique platen presses and the cylinder proof press. Material qualities of printed matter, connections between content and typographic form, and word/image relationships. Enrollment limited to first-year students. Preregistration required; see under First-Year Seminar Program. HU

* ART 007b, Art of the Game  Sarah Stevens-Morling
Introduction to interactive narrative through video game programming, computer animation, and virtual filmmaking. Topics include interactive storytelling, video game development and modification, animation, and virtual film production. Students produce a variety of works including web-based interactive narratives, collaboratively built video games, and short game-animated film production (machinima). Enrollment limited to first-year students. Preregistration required; see under First-Year Seminar Program.

* ART 010a, Interdisciplinary Exploration For Making Fictional Worlds, Flying Machines, and Shaking Things Up  Nathan Carter
Whether you aspire to be an engineer, doctor, or astronaut, it can still be vital to dream and invent--by drawing and sculpting in order to generate ideas and develop strategies for learning how to make something out of nothing. In this course, students consider how artists and inventors have used seemingly unrelated materials and content in order to activate creative thinking and generative activity. Students engage in a wide variety of interdisciplinary activities such as drawing, sculpting, painting, printing,
photography, reprographics, instrument-building and sound broadcasting. This course emphasizes experimenting with strategies for generating ideas, images and objects, and employs broad modes of creating, including elements of chance, spontaneity, collaborating communally, and synthesizing disparate elements into the process of making. Enrollment limited to first-year students. Preregistration required; see under First-Year Seminar Program.  

* **ART 110b, Sculpture Basics**  Sandra Burns  
Concepts of space, form, weight, mass, and design in sculpture are explored and applied through basic techniques of construction and material, including gluing and fastening, mass/weight distribution, hanging/mounting, and surface/finishing. Hands-on application of sculptural techniques and review of sculptural ideas, from sculpture as a unified object to sculpture as a fragmentary process. The shops and classroom studio are available during days and evenings throughout the week. Enrollment limited to 12. Recommended to be taken before ART 120–125.  

* **ART 111a or b, Visual Thinking**  Staff  
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 the study of art history, popular culture, and art. Projects address all four major concentrations (graphic design, printing/printmaking, photography, and sculpture). No prior drawing experience necessary. Open to all undergraduates. Required for Art majors.  

* **ART 114a or b, Basic Drawing**  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. Open to all undergraduates. Required for Art majors.  

* **ART 116a, Color Practice**  Lisa Kereszi  
Study of the interactions of color, ranging from fundamental problem solving to individually initiated expression. The collage process is used for most class assignments.  

**ART 120a, Introduction to Sculpture: Wood**  Elizabeth Tubergen  
Introduction to wood and woodworking technology through the use of hand tools and woodworking machines. The construction of singular objects; strategies for installing those objects in order to heighten the aesthetic properties of each work. How an object works in space and how space works upon an object.  

**ART 121a, Introduction to Sculpture: Metal**  Desmond Lewis  
Introduction to working with metal through examination of the framework of cultural and architectural forms. Focus on the comprehensive application of construction in relation to concept. Instruction in welding and general metal fabrication. Ways in which the meaning of work derives from materials and the form those materials take.  

* **ART 130a or b, Painting Basics**  Staff  
A broad formal introduction to basic painting issues, including the study of composition, value, color, and pictorial space. Emphasis on observational study. Course
work introduces students to technical and historical issues central to the language of painting. Recommended for non-majors and art majors.  

* ART 132a or b, Introduction to Graphic Design  
Staff  
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.  

* ART 136a or b, Black & White Photography Capturing Light  
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.  

* ART 138a or b, Digital Photography Seeing in Color  
Staff  
The focus of this class is the digital making of still color photographs with particular emphasis on the potential meaning of images in an overly photo-saturated world. Through picture-making, students develop a personal visual syntax using color for effect, meaning, and psychology. Students produce original work using a required digital SLR camera. Introduction to a range of tools including color correction, layers, making selections, and fine inkjet printing. Assignments include regular critiques with active participation and a final project.  

* ART 142a or b / FILM 162a or b, Introductory Documentary Filmmaking  
A.L. Steiner  
The art and craft of documentary filmmaking. Basic technological and creative tools for capturing and editing moving images. The processes of research, planning, interviewing, writing, and gathering of visual elements to tell a compelling story with integrity and responsibility toward the subject. The creation of nonfiction narratives. Issues include creative discipline, ethical questions, space, the recreation of time, and how to represent "the truth."  

* ART 145b, Introduction to Digital Video  
Neil Goldberg  
Introduction to the formal principles and basic tools of digital video production. Experimental techniques taught alongside traditional HD camera operation and sound capture, using the Adobe production suite for editing and manipulation. Individual and collaborative assignments explore the visual language and conceptual framework for digital video. Emphasis on the spatial and visual aspects of the medium rather than the narrative. Screenings from video art, experimental film, and traditional cinema.  

* ART 184a, 3D Modeling for Creative Practice  
Justin Berry  
Through creation of artwork, using the technology of 3D modeling and virtual representation, students develop a framework for understanding how experiences are shaped by emerging technologies. Students create forms, add texture, and illuminate with realistic lights; they then use the models to create interactive and navigable spaces in the context of video games and virtual reality, or to integrate with photographic
images. Focus on individual project development and creative exploration. Frequent visits to Yale University art galleries. This course is a curricular collaboration with The Center for Collaborative Arts and Media at Yale (CCAM). RP

**ART 185a, Principles of Animation**  Ben Hagari
The physics of movement in animated moving-image production. Focus on historical and theoretical developments in animation of the twentieth and twenty-first centuries as frameworks for the production of animated film and visual art. Classical animation and digital stop-motion; fundamental principles of animation and their relation to traditional and digital technologies. RP

* **ART 210b, Sculpture as Object**  Alex Adams
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. HU RP

* **ART 216a / THST 216a, The Body as Stage: Experiments in Performance Art**  Shilarna Stokes
Your (Body + Space + Time + Labor + Inquiry + Experience) = Performance Art? Working through experiences of oppression, isolation, illness, and individual/collective trauma, how do artists use their immediate material conditions to investigate and document their own survival as well as to imagine new forms of resistance and collective flourishing? Alternating between seminar discussions (remote) and performance-based experiments (in-person) this course explores the theory and practice of performance art. Beginning with an examination of the ground-breaking bodies of work created by Antonin Artaud and Marina Abramovic, we go on to consider works by more than a dozen twentieth- and twenty-first century artists including Carolee Schneemann, Dread Scott, Rirkit Tiravanija, Ana Mendieta, Stelarc, Yoko Ono, Aliza Shvarts, and others. We investigate topics including ritual, gesture, duration, suffering, dwelling, prosthesis, citation, relationality, protest, intermediality, and interactivity, and we interrogate performance art’s accessibility, efficacy, and marketing. Students create several small studies over the course of the semester, sharing them in safe, informal settings and are guided in the development of a culminating work of performance-based research. All physical capabilities are welcome, no prior experience in theater, visual art, or performance is required, and all assignments will be adaptable to the remote environment. HU RP

* **ART 225b, Adventures in Self-Publishing**  Alexander Valentine
This course introduces students to a wide range of directions and legacies within arts publishing, including the development of fanzines, artists’ books, small press comics, exhibition catalogues, “just in time” publications, and social media. Students are given instruction in the Yale School of Art’s Print Shop on various printing and binding methods leading to the production of their own publications both individually and in collaboration. Attention is paid to ways artists’ publishing has been used to bypass traditional cultural and institutional gatekeepers, to foster community and activism, to increase visibility and representation, and to distribute independent ideas and narratives. Students explore the codex as it relates to contemporary concepts of labor, economics, archives, media forms, information technologies, as well as interdisciplinary
and social art practices. Supplemental readings and visits to the Haas Arts Library, the Beinecke Rare Book and Manuscript Library, YUAG’s prints and drawings study room, and the Odds and Ends Art Book Fair provide case studies and key examples for consideration. Prerequisite: ART 111.

* ART 239a, Photographic Storytelling  Danna Singer
An introductory course that explores the various elements of photographic storytelling, artistic styles, and practices of successful visual narratives. Students focus on creating original bodies of work that demonstrate their unique artistic voice. Topics include camera handling techniques, photo editing, sequencing, and photographic literacy. Student work is critiqued throughout the term, culminating in a final project. Through a series of lectures, readings and films, students are introduced to influential works in the canon of photographic history as well as issues and topics in contemporary photography.

* ART 241a / FILM 161a, Introductory Film Writing and Directing  Jonathan Andrews
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. Emphasis on the writing and production of short dramatic scenes. Priority to majors in Art and in Film & Media Studies. RP

* ART 245b, Digital Drawing  Anahita Vossoughi
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. Enrollment limited.

* ART 264a or b, Typography!  Alice Chung
An intermediate graphic-design course in the fundamentals of typography, with emphasis on ways in which 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. Prerequisite: ART 132. RP

* ART 265b, Typography: Expression, Structure, and Sequence  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. Prerequisite: ART 264. RP

* ART 266b, Graphic Design Histories  Staff
This course studies how graphic design responded to (and affected) international, social, political, and technological developments from its inception in ancient Sumeria, Egypt, and China. Emphasis is on examples of identity, persuasive messages, exhibit and environmental, information and data visualization, typography and publication, and design theories from 1450 to 2010 and the relationship of that work to other visual
arts and design disciplines. In addition to lectures, assignments include two studio projects in which design is integrated with research and writing. HU

* ART 285b, Digital Animation  Michael Rader
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. Prerequisites: ART 111, 114, or 145, and familiarity with Macintosh-based platforms.

* ART 294b, Technology and the Promise of Transformation  Justin Berry
Inherent transformative qualities are embedded within technology; it transforms our lives, the way we perceive or make art, and conversely, art can reflect on these transformations. Students explore the implementation of technologies in their art making from pneumatic kinetics, bioengineering, AR, VR, and works assisted by artificial intelligence—modes of production that carry movement, degradation, and displacement of authorship. The student practice is supported by readings, independent research, and essays on diverse artists and designers who make use of technology in their work or, on the contrary, totally avoid it. This course is a curricular collaboration with The Center for Collaborative Arts and Media at Yale (CCAM).

* ART 331b, Intermediate Painting  Oscar Cornejo
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. Prerequisite: ART 130, 230, 231, or permission of instructor. RP

ART 332a, Painting Time  Sophy Naess
Painting techniques paired with conceptual ideas that explore how painting holds time both metaphorically and within the process of creating a work. Use of different Yale locations as subjects for observational on-site paintings. Prerequisite: ART 130, 230, or 231, or with permission of instructor. HU RP

* ART 338b, Contemporary Problems in Color with Digital Photography  Theodore Partin
How do you make a contemporary portrait? What is an effective portrait? What makes a portrait today? Can one be made through observation? Is consent required? This class confronts these questions, among others, while addressing the often uneasy relationship between photographer and sitter. Using digital capture with an emphasis on color photography students produce original work in portraiture by committing to a regular and rigorous photographic practice. Range of tools addressed include working with RAW files, masks, compositing and grayscale, and medium and large-scale color inkjet printing. Students produce original work for critique, with special attention to ways in which their technical decisions can clarify their artistic intentions in representing a person. Course fee charged per term. Prerequisite: ART 138 or permission of the instructor. RP

ART 341b / FILM 355b, Intermediate Film Writing and Directing  Jonathan Andrews
In the first half of the term, students write three-scene short films and learn the tools and techniques of staging, lighting, and capturing and editing the dramatic scene.
the second half of the term, students work collaboratively to produce their films. Focus on using the tools of cinema to tell meaningful dramatic stories. Priority to majors in Art and in Film & Media Studies. Prerequisites: ART 241. RP

**ART 342b / FILM 356b, Intermediate Documentary Filmmaking**  Michel Auder
Students explore the storytelling potential of the film medium by making documentary art. The class concentrates 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 are considered using examples of students’ work. Exercises in storytelling principles. Limited enrollment. Priority to majors in Art and in Film & Media Studies. Prerequisites: ART 141 or 142, and FILM 150. HU RP

* **ART 348b, Body, Space, and Time**  Staff
Exploration of time-based art mediums such as moving-image work, performance, sound, and installation, with emphasis on the integration and manipulation of different mediums and materials. Ways in which the history of time-based works informs contemporary practice. Individual studio projects as well as workshops in the use of various processes, practices, and techniques. Prerequisite: ART 122 or permission of instructor. HU RP

* **ART 355a, Silkscreen Printing**  Alexander Valentine
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. Prerequisite: ART 114 or equivalent. HU

**ART 356a, Printmaking I**  Oscar Cornejo
An introduction to intaglio (dry point and etching), relief (woodcut), and screen printing (stencil), as well as to the digital equivalents of each technique, including photo screen printing, laser etching, and CNC milling. How the analog and digital techniques inform the outcome of the printed image, and ways in which they can be combined to create more complex narratives. Prerequisite: ART 114 or equivalent. RP

* **ART 368a, Graphic Design Methodologies**  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. Analysis and refinement of an individual design methodology. Attention to systematic procedures, techniques, and modes of inquiry that lead to a particular result. Prerequisites: ART 132 and 264, or permission of instructor. RP

* **ART 369b, Interactive Design and the Internet: Software for People**  Rosa McElheny
In this studio course, students create work within the web browser to explore where the internet comes from, where it is today, and where it’s going—recognizing that there is no singular history, present, or future, but many happening in parallel. The course in particular focuses on the internet’s impact on art—and vice versa—and how technological advance often coincides with artistic development. Students will learn foundational, front-end languages HTML, CSS, and JavaScript in order to develop unique graphic forms for the web that are considered alongside navigation, pacing, and adapting to variable screen sizes and devices. Open to Art majors. No prior programming experience required. Prerequisite: ART 132 or permission of instructor. RP
ART 370a, Motion Design: Communicating with Time, Motion, and Sound  Lisa Kereszi
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. Prerequisite: ART 265; ART 368 recommended.  RP

* ART 379b, Form For Content In Medium and Large Format  Benjamin Donaldson
A course for experienced photography students to become more deeply involved with the important technical and aesthetic aspects of the medium, including a concentrated study of operations and conceptual thinking required in the use of loaned analog view cameras, added lighting and advanced printing techniques. Scanning and archival printing of negatives are included. Student work is discussed in regular rigorous critiques. Review of significant historic photographic traditions is covered. Students are encouraged to employ any previous digital training although this class is primarily analog. Prerequisite: ART 237 or permission of instructor.  RP

* ART 395a or b, Junior Seminar  Staff
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.  HU RP

* ART 401a, Photography Project Seminar  Lisa Kereszi
A further exploration of the practice of photography through a sustained, singular project executed in a consistent manner over the course of the semester, either by analog or digital means. Student work is discussed in regular critiques, the artist statement is discussed, and lectures are framed around the aesthetic concerns that the students’ work provokes. Students are exposed to contemporary issues though visits to Yale’s collections and in lectures by guest artists, and are asked to consider their own work within a larger context. Students must work with the technical skills they have already gained in courses that are the pre-reqs, as this is not a skills-based class. Required of art majors concentrating in photography. Prerequisites: ART 136 or 138 and preferably, 237, 338 or 379, or permission of the instructor. ART 136 for those working in analog and, for those working digitally, ART 138.  RP

ART 421b, Advanced Drawing  Staff
Further instruction in drawing related to all four disciplines taught in the Art major. Emphasis on the development of students’ conceptual thinking in the context of the physical reality of the drawing process. Class time is divided between studio work, group critiques, discussion of assigned readings, and visits to working artists’ studios. Enrollment limited to senior Art majors who have taken two terms of drawing, except by permission of instructor.  RP

ART 432b, Painting Studio: The Narrative Figure  Sophy Naess
A course for intermediate and advanced painting students exploring historical and contemporary issues in figurative painting including portraiture, narrative and history painting. Studio work is complemented by an in-depth study of the gaze, subjectivity, memory, and imagination. After guided assignments, ultimate emphasis will be on self-
directed projects. May be taken more than once. Prerequisites: ART 230 and one course from ART 331, 332, or 342, or with permission of instructor. **HU RP**

* **ART 442a and ART 443b / FILM 483a and FILM 484b, Advanced Film Writing and Directing**  Jonathan Andrews
A yearlong workshop designed primarily for majors in Art and in Film & Media Studies 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. Priority to majors in Art and in Film & Media Studies. Prerequisite: ART 341.

**ART 446b, Advanced Sculpture**  Desmond Lewis
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. Prerequisite: ART 345 or 346 or equivalent, or permission of instructor. **RP**

* **ART 457b, Interdisciplinary Printmaking**  Alexander Valentine
An in-depth examination of planographic techniques, including screen printing, lithography, and digital pigment printing. Relationships to more dimensional forms of printing such as collography, embossment, vacuum bag molding, and 3D printing. Creation of editions as well as unique objects, focusing on both individual techniques and creating hybrid forms. Recommended for Art majors to be taken concurrently with ART 324 or 433. Prerequisite: at least one term of printmaking. **RP**

**ART 468a, Advanced Graphic Design: Ad Hoc Series and Systems**  Julian Bittiner
A probe into questions such as how artists can be present as idiosyncratic individuals in their 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. Prerequisites: ART 264 or 265, and 367 or 368, or permission of instructor. **RP**

* **ART 469b, Advanced Graphic Design: Interpretation, Translation**  Henk Van Assen
A probe into questions such as how artists can be present as idiosyncratic individuals in their 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. Prerequisites: ART 264 or 265, and 367 or 368, or permission of instructor. **RP**

* **ART 471a and ART 472b, Independent Projects**  Lisa Kereszi
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.

* **ART 495a or b, Senior Project I**  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.  

* ART 496a or b, Senior Project II  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.

Astronomy (ASTR)

* ASTR 040a / PHYS 040a, Expanding Ideas of Time and Space  Meg Urry  
Discussions on astronomy, and the nature of time and space. Topics include the shape and contents of the universe, special and general relativity, dark and light matter, and dark energy. Observations and ideas fundamental to astronomers’ current model of an expanding and accelerating four-dimensional universe. Enrollment limited to first-year students. Preregistration required; see under First-Year Seminar Program.  

ASTR 110a, Planets and Stars  Michael Faison  
Astronomy introduction to stars and planetary systems. Topics include the solar system and extrasolar planets, planet and stellar formation, and the evolution of stars from birth to death. No prerequisite other than a working knowledge of elementary algebra.  

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.  

ASTR 130b, Origins and the Search for Life in the Universe  Michael Faison  
Origins of the universe, stars, and planets; evolution of conditions that were conducive to the emergence of life on Earth; leading theories for the origin of life; the discovery of exoplanets; comparison of Earth’s solar system with other systems that have been discovered; the possibility of habitable conditions where life might have arisen on other worlds; methods of searching for life elsewhere. No prerequisite other than a working knowledge of elementary algebra.  

ASTR 155a, Introduction to Astronomical Observing  Michael Faison  
A hands-on introduction to techniques used in astronomy to observe astronomical objects. 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.
ASTR 160a, Frontiers and Controversies in Astrophysics  Marla Geha
A detailed study of three fundamental areas in astrophysics that are currently subjects of intense research and debate: planetary systems around stars other than the sun; pulsars, black holes, and the relativistic effects associated with them; and the age and ultimate fate of the universe. No prerequisite other than a working knowledge of elementary algebra.  QR, SC

ASTR 210b, Stars and Their Evolution  Robert Zinn
Foundations of astronomy and astrophysics, focusing on 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. How extrasolar planets are studied; the results of such studies. Prerequisite: a strong background in high school calculus and physics. May not be taken after ASTR 220.  QR, SC

ASTR 255a / PHYS 295a, Research Methods in Astrophysics  Hector Arce
An introduction to research methods in astronomy and astrophysics. 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. Use of the Python programming language. Prerequisite: background in high school calculus and physics. No previous programming experience required.  QR, SC RP

ASTR 310a, Galactic and Extragalactic Astronomy  Jeffrey Kenney
Structure of the Milky Way galaxy and other galaxies; stellar populations and star clusters in galaxies; gas and star formation in galaxies; the evolution of galaxies; galaxies and their large-scale environment; galaxy mergers and interactions; supermassive black holes and active galactic nuclei. Prerequisites: MATH 115, PHYS 201, and ASTR 210 or 220, or equivalents, or with permission of instructor.  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 330b, Scientific Computing in Astrophysics  Marla Geha
Scientific computer programming in Astrophysics with a focus on the Python Programming language. Algorithms and workflows for reducing and analyzing Astrophysical datasets, both observational and computational. Emphasis is placed on best coding practices, including readability, version control, documentation, and computational efficiency. Weekly lectures, in-depth tutorial/workshops, and invited outside expert guest speakers. Students complete a programming project based on real astrophysical datasets. Prerequisite: ASTR 255 or permission of instructor. Some basic programming experience in Python is strongly recommended.

ASTR 343a / PHYS 343a, Gravity, Astrophysics, and Cosmology  Daisuke Nagai
Introduction to frontier areas of research in astrophysics and cosmology exploring ideas and methods. In-depth discussion of the physics underlying several recent discoveries
including extrasolar planets—their discovery, properties, and issues of habitability; black holes—prediction of their properties from GR, observational signatures, and detection; and the accelerating universe—introduction to cosmological models and the discovery of dark energy. Prerequisites: PHYS 170, 171, or 180, 181, or 200, 201, or 260, 261, or permission of instructor.  QR, SC

**ASTR 420a, 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 471a, Independent Project in Astronomy**  Gregory Laughlin
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.

* **ASTR 490a, The Two-Term Senior Project**  Gregory Laughlin
A two-term independent research project to fulfill the senior requirement for the B.S. degree. The project must be supervised by a member of the department and approved by the director of undergraduate studies.

* **ASTR 492a, The One-Term Senior Project**  Gregory Laughlin
A one-term independent research project or essay to fulfill the senior requirement for the B.A. degree. The project must be supervised by a member of the department and approved by the director of undergraduate studies.

**Biology (BIOL)**

**BIOL 101a or b, Biochemistry and Biophysics**  Staff
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 foundational biology sequence; meets for the first half of the term.  SC  o Course cr

**BIOL 102a or b, Principles of Cell Biology**  Staff
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 foundational biology sequence; meets for the second half of the term. Prerequisite: BIOL 101.  SC  o Course cr

* **BIOL 103a or b, Genetics and Development**  Staff
Foundation principles for the study of 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 foundational biology sequence; meets for the first half of the term. Prerequisites: BIOL 101 and 102.  SC  o Course cr
**BIOL 104a or b, Principles of Ecology and Evolutionary Biology**  Staff  
The study of 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  
modes in a yearlong foundational biology sequence; meets for the second half of the  
term. Prerequisites: BIOL 101, 102, and 103.  SC  0 Course cr

**Biomedical Engineering (BENG)**

* **BENG 205a, Discovery and Design in Biomedical Research**  Jay Humphrey  
Multi-disciplinary and team-based research approach to the study of clinical dilemma.  
Focus on an important health care problem, bringing to bear concepts and principles  
from diverse areas to identify possible solutions. Study of precision regenerative  
medicine as it involves aspects of bioengineering, materials science, immunobiology,  
mechanobiology, computational modeling, and experimental design, as well as hands-  
on fabrication and materials testing (i.e., data collection and analysis). Prerequisites:  
MATH 115 and MATH 120 or ENAS 151.  SC

**BENG 230a / MB&B 330a / MCDB 330a / NSCI 324a, Modeling Biological Systems I**  Staff  
Biological systems make sophisticated decisions at many levels. This course explores  
the molecular and computational underpinnings of how these decisions are made, with  
a focus on modeling static and dynamic processes in example biological systems. This  
course is aimed at biology students and teaches the analytic and computational methods  
needed to model genetic networks and protein signaling pathways. Students present  
and discuss original papers in class. They learn to model using MatLab in a series of  
in-class hackathons that illustrate the biological examples discussed in the lectures.  
Biological systems and processes that are modeled include: (i) gene expression,  
including the kinetics of RNA and protein synthesis and degradation; (ii) activators  
and repressors; (iii) the lysogeny/lysis switch of lambda phage; (iv) network motifs  
and how they shape response dynamics; (v) cell signaling, MAP kinase networks and  
cell fate decisions; and (vi) noise in gene expression. Prerequisites: MATH 115 or 116.  
BIOL 101-104, or with permission of instructors. This course also benefits students  
who have taken more advanced biology courses (e.g. MCDB 200, MCDB 310, MB&B  
300/301).  QR, SC  0 Course cr

**BENG 249b, Introduction to Biomedical Computation**  Staff  
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  0 Course cr

* **BENG 280a, Sophomore Seminar in Biomedical Engineering**  Kathryn Miller-Jensen  
Study of past successes and future needs of the multidisciplinary field of biomedical  
engineering. Areas of focus include: biomolecular engineering, including drug delivery  
and regenerative medicine; biomechanics, including mechanobiology and multiscale  
modeling; biomedical imaging and sensing, including image construction and analysis;  
and systems biology.  ½ Course cr
* **BENG 350a / MCDB 310a, Physiological Systems**  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 165 or 167 (or CHEM 113 or 115), or PHYS 180 and 181; MCDB 120, or BIOL 101 and 102.  SC 0 Course cr

**BENG 351b / CENG 351b, Biotransport and Kinetics**  Staff
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: MATH 115, ENAS 194; BIOL 101 and 102; CHEM 161, 163, or 167; BENG 249.  QR 0 Course cr

**BENG 352b, Biomedical Signals and Images**  James Duncan and 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 / PHYS 353a, Introduction to Biomechanics**  Michael Murrell
An introduction to the biomechanics used in biosolid mechanics, biofluid mechanics, biothermomechanics, 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 0 Course cr

* **BENG 355La, Physiological Systems Laboratory**  Staff
Introduction to laboratory techniques and tools used in biomedical engineering for physiological measurement. Topics include bioelectric measurement, signal processing, and bone mechanics. Enrollment limited to majors in Biomedical Engineering, except by permission of the director of undergraduate studies.  SC 0 Course cr

* **BENG 356Lb, Biomedical Engineering Laboratory**  Staff
Continuation of BENG 355L, introducing laboratory techniques and tools used in biomedical engineering. Topics include biomaterials and cell interactions, magnetic resonance spectroscopy and imaging, and image processing and machine learning. Enrollment limited.  SC 0 Course cr

* **BENG 403b / ECON 463b, The Economics and Science of Medicine**  Gregory Raskin and Yashodhara Dash
This multidisciplinary class is an exploration of the background of today's bestselling medicines, their huge commercial impact, and the companies that created them. It focuses on the most compelling aspects of drug development and company formation in the context of topical issues like cancer treatment, gene editing, stem cell therapy, the opioid epidemic, and drug pricing controversies. Prerequisite: Introductory or intermediate microeconomics, introductory or intermediate Biology, Molecular Biology, Chemistry or Biomedical Engineering.  SO
BENG 404b / MENG 404b, Medical Device Design and Innovation  Staff
The engineering design, project planning, prototype creation, and fabrication processes for medical devices that improve patient conditions, experiences, and outcomes. Students develop viable solutions and professional-level working prototypes to address clinical needs identified by practicing physicians. Some attention to topics such as intellectual property, the history of medical devices, documentation and reporting, and regulatory affairs.  o Course cr

* BENG 405b / 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 406b, Medical Software Design  Xenophon Papademetris
Software design and implementation for medical applications, with emphasis on how new ideas can be developed within today’s healthcare regulatory environment. This project-based course focuses on the interaction of medical imaging and 3D printing. Topics include the methods and design principles to take 3D medical images, and how to image analysis algorithms to create 3D models to guide diagnosis and interventional procedures or build patient-specific medical devices. Permission of the instructor. Strong programming background in at least one programming language.  sc

* BENG 410a, Physical and Chemical Basis of Bioimaging and Biosensing  Fahmeed Hyder, Ansel Hillmer, and Douglas Rothman
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 411a, BioMEMS and Biomedical Microdevices  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 161, 165, or 167 (or CHEM 112, 114, or 118), and ENAS 194.  SC

* BENG 422a, Engineering and Biophysical Approaches to Cancer  Michael Mak
This course focuses on engineering and biophysical approaches to cancer. The course examines the current state of the art understanding of cancer as a complex disease and the advanced engineering and biophysical methods developed to study and treat this disease. All treatment methods are covered. Basic quantitative and computational backgrounds are required. Prerequisites: BENG 249 or equivalent, MATH 120 or equivalent.  QR, SC
* BENG 435b, 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 161, 165, or 167 (or CHEM 112, 114, or 118); MCDB 120, or BIOL 101 and 102; or equivalents.  sc

BENG 444a, Modern Medical Imaging: Lecture and Demonstrations  Chi Liu, Dana Peters, and Gigi Galiana
Survey of engineering and physics foundations of modern medical imaging modalities with an emphasis on immersive and interactive experiences. Traditional lectures are balanced with guest lectures on state-of-the-art techniques and opportunities to observe procedures, acquire imaging data and reconstruct images. Modalities include MRI, X-ray, CT, SPECT, PET, optical and ultrasound methods. Prerequisite: BENG 352 or similar background.  QR, sc

BENG 445a / EENG 445a, Biomedical Image Processing and Analysis  James Duncan and Lawrence Staib
This course is an introduction to biomedical image processing and analysis, covering image processing basics and techniques for image enhancement, feature extraction, compression, segmentation, registration and motion analysis including traditional and machine learning techniques. Students learn the fundamentals behind image processing and analysis methods and algorithms with an emphasis on biomedical applications.
Prerequisite: BENG 352 or EENG 310 or permission of instructors. Recommended preparation: familiarity with probability theory.

BENG 449b, Biomedical Data Analysis  Staff
Study of biological and medical data analysis associated with applications of biomedical engineering. Provides basics of probability and statistics, as well as analytical approaches for determination of quantitative biological parameters from experimental data. Includes substantial programming in MATLAB. Prerequisite: MATH 120 or ENAS 151. After or concurrently with ENAS 194.  QR 0 Course cr

BENG 455b, Vascular Mechanics  Jay Humphrey
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 456b, Molecular and Cellular Biomechanics  Michael Murrell
The basic mechanical principles at the molecular and cellular level that underlie the major physical behaviors of the cell, from cell division to cell migration. Basic cellular physiology, methodology for studying cell mechanical behaviors, models for understanding the cellular response under mechanical stimulation, and the mechanical impact on cell differentiation and proliferation. Prerequisites: MENG 211 and 280 or equivalents, and experience with MATLAB. Recommended preparation: BENG 353 and MCDB 205.  QR, sc
BENG 458b, Multiscale Models of Biomechanical Systems  
Stuart Campbell

Current methods for simulating biomechanical function across biological scales, from molecules to organ systems of the human body. Theory and numerical methods; case studies exploring recent advances in multiscale biomechanical modeling. Includes computer laboratory sessions that introduce relevant software packages. Prerequisites: BENG 249, 351, and 353, or permission of instructor.  

BENG 459b / MENG 459b, Neuromuscular Biomechanics  
Staff

Mechanics and control of animal movement, including skeletal muscle mechanics, systems-level neural and sensory physiology, elements of feedback control, and optimal control. Deriving equations of motion for multibody mechanical systems that are actuated by muscles or muscle-like motors; incorporating sensory feedback; analyzing system properties such as stability and energetics. Prerequisites: MENG 383 and MATH 222 or equivalents, and familiarity with MATLAB or a similar scientific computing environment.  

BENG 463a, Immunoengineering  
Tarek Fahmy

Immu-no-engineering uses engineering and applied sciences to better understand how the immune system works. It also uses immunity to build better models and biomaterials that help fight diseases such as cancer, diabetes, lupus, MS, etc. This is an integrative class. It integrates what we know in ENAS with what we know in Immunity to address critical and urgent concerns in health and disease. Students learn that analytical tools and reagents built by engineers address some extremely significant problems in immunity, such as optimal vaccine design. Students also have the opportunity to apply new understandings towards gaping holes in immunotherapy and immunodiagnostics. Prerequisite: A basic understanding of biochemistry, biophysics, cell biology; calculus and differential equations.  

BENG 465b / MB&B 361b / MCDB 361b / NSCI 325b, Modeling Biological Systems II  
Jonathan Howard, Thierry Emonet, and Damon Clark

Advanced topics related to dynamical processes in biological systems. Processes by which cells compute, count, tell time, oscillate, and generate spatial patterns. Time-dependent dynamics in regulatory, signal-transduction, and neuronal networks; fluctuations, growth, and form. Comparisons between models and experimental data. Dynamical models applied to neurons, neural systems, and cellular biophysical processes. Use of MATLAB to create models. Prerequisite: MCDB 330 or equivalent, or a 200-level biology course, or with permission of instructor.  

BENG 467b, Systems Biology of Cell Signaling  
Andre Levchenko

Approaches from systems biology to the fundamental processes underlying both the sensory capability of individual cells and cell-to-cell communication in health and disease. Prerequisites: BENG 249 and ENAS 194, or equivalents.  

BENG 468b, Topics in ImmunoEngineering  
Tarek Fahmy

This course addresses the intersection of Immunobiology with Engineering and Biophysics. It invokes engineering tools, such as biomaterials, solid-state devices, nanotechnology, biophysical chemistry, and chemical engineering towards developing newer and effective solutions to cancer immunotherapy, autoimmune therapy, vaccine design, transplantation, allergy, asthma, and infections. The central theme is that dysfunctional immunity is responsible for a wide range of disease states and that engineering tools and methods can forge a link between the basic science and clinically
translatable solutions that will potentially be "modern cures" to disease. This course is a follow-up to BENG 463, Immunoengineering and focuses more on the clinical translation aspect as well as new understandings in immunology and how they can be translated to the clinic and eventually to the market. Prerequisites: BENG 463, Differential Equations, Advanced Calculus.

**BENG 469b, Single-Cell Biology, Technologies, and Analysis**  Rong Fan
This course is to teach the principles of single-cell heterogeneity in human health and disease as well as computational techniques for single-cell analysis, with a particular focus on the omics-level data. Topics to be covered include single-cell level morphometric analysis, genomic alteration analysis, epigenomic analysis, mRNA transcriptome sequencing, small RNA profiling, surface epitope, intracellular signaling protein, and secreted protein analysis, metabolomics, multi-omics, and spatially resolved single-cell omics mapping. The students are expected to perform computational analysis of single-cell high-dimensional datasets to identify population heterogeneity, identify cell types, states, and differentiation trajectories. Finally, case studies are provided to show the power of single-cell analysis in therapeutic target discovery, biomarker research, clinical diagnostics, and personalized medicine. Lab tours may be provided to show how single-cell omics data are generated and how high-throughput sequencing is conducted.

* **BENG 471a and BENG 472b, Special Projects**  Lawrence Staib
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, offered Pass/Fail, can be taken at any time during a student’s career, and may be taken more than once. For the Senior Project, see BENG 473, 474. Permission of both the instructor and the director of undergraduate studies is required.

* **BENG 473a and BENG 474b, Senior Project**  Lawrence Staib
Faculty-supervised biomedical engineering projects focused on research (laboratory or theory) or engineering design. Students should consult with the director of undergraduate studies and appropriate faculty mentors for suitable projects. BENG 473 is taken during the fall term of the senior year and BENG 474 is taken during the spring term of the senior year. Permission of both the faculty mentor and the director of undergraduate studies is required.

**BENG 475a / CPSC 475a / EENG 475a, 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. Prerequisite: CPSC 112 and MATH 120, or with permission of instructor. QR, SC RP

* **BENG 480a, Seminar in Biomedical Engineering**  Andre Levchenko
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. (For Class of 2020 and beyond this course is worth .5 credit.) ½ Course cr
* BENG 485b, Fundamentals of Neuroimaging  
Fahmeed Hyder and Douglas Rothman

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.  

Bosnian-Serbian-Croatian (SBCR)

SBCR 110a, Elementary Bosnian-Croatian-Serbian I  
Staff
The first half of a two-term introduction to Bosnian-Croatian-Serbian designed to develop skills in comprehension, reading, speaking, and writing. The grammatical structure and the writing systems of the languages; communication on topics drawn from daily life. Study of Serbian, Bosnian, and Croatian culture, and of south Slavic culture more generally. Course taught through distance learning using videoconferencing technology from Columbia University. Enrollment limited; interested students should e-mail minjin.hashbat@yale.edu for more information.  

L1  
RP 1½ Course cr

* SBCR 120b, Elementary Bosnian-Croatian-Serbian II  
Staff
The second half of a two-term introduction to Bosnian-Croatian-Serbian designed to develop skills in comprehension, reading, speaking, and writing. The grammatical structure and the writing systems of the languages; communication on topics drawn from daily life. Study of Serbian, Bosnian, and Croatian culture, and of south Slavic culture more generally. Prerequisite: SBCR 110 or equivalent. Course taught through distance learning using videoconferencing technology from Columbia University. Enrollment limited; interested students should e-mail minjin.hashbat@yale.edu for more information.  

L2  
RP 1½ Course cr

SBCR 130a, Intermediate Bosnian Croatian Serbian I  
Staff
This intermediate course is a continuation of the elementary course and is intended to enhance overall communicative competence in the language. This course moves forward from the study of the fundamental systems and vocabulary of the Bosnian/Croatian/Serbian to rich exposure to the spoken and written language with the wide range of speakers and situations. SBCR 120, or equivalent. Course taught through distance learning using videoconferencing technology from Columbia University. Enrollment limited; interested students should e-mail minjin.hashbat@yale.edu for more information.  

L3  
RP 1½ Course cr

* SBCR 140b, Intermediate Bosnian Croatian Serbian II  
Staff
The intermediate course in BCS is a continuation of the elementary course and is intended to enhance overall communicative competence in the language. This course moves forward from the study of the fundamental systems and vocabulary of the Bosnian/Croatian/Serbian to rich exposure to the spoken and written language with the wide range of speakers and situations. Prerequisite: SBCR 130 or equivalent. Course taught through distance learning using videoconferencing technology from Columbia University. Enrollment limited; interested students should e-mail minjin.hashbat@yale.edu for more information.  

L4  
RP 1½ Course cr

British Studies (BRST)
Burmese (BURM)

BURM 110a, Elementary Burmese I  Staff
This course aims to train students to achieve basic skills in Burmese. The students develop competency in reading and writing Burmese script and also learn basic spoken Burmese. This course is taught through distance learning from Cornell University using videoconferencing technology. Interested students may e-mail minjin.hashbat@yale.edu for information. L1 RP 1½ Course cr

BURM 120b, Elementary Burmese II  Staff
This course aims to give the students a confident and enjoyable start in speaking Burmese, focusing on what they are most likely to need when visiting the country. It covers the basics of pronunciation and grammar. Prerequisite: BURM 110 or equivalent. This course is taught through distance learning from Cornell University using videoconferencing technology. Interested students may e-mail minjin.hashbat@yale.edu for information. L2 RP 1½ Course cr

BURM 130a, Intermediate Burmese I  Staff
This course is a continuation of BURM 120 and relies on student knowledge of Burmese script. Students continue learning all major aspects of the language at the intermediate level, including the reading and understanding of formal-style texts. In spoken Burmese, students practice communicating at the increasingly complicated and practically useful level. Course work includes the reading and understanding of formal-style texts. Prerequisite: BURM 120 or equivalent. Course taught through distance learning using videoconferencing technology from Cornell University. Enrollment limited; interested students should e-mail minjin.hashbat@yale.edu for more information. L3 RP 1½ Course cr

BURM 140b, Intermediate Burmese II  Staff
This course is a continuation of BURM 130 and relies on student knowledge of Burmese script. The course aims to provide students with intermediate skills in all major aspects of the Burmese language. Students develop competency in reading and writing Burmese script, including formal style. Students also practice spoken Burmese using compound sentences, communicating at an increasingly complicated and practically useful level. Prerequisite: BURM 130 or equivalent. Course taught through distance learning using videoconferencing technology from Cornell University. Enrollment limited; interested students should e-mail minjin.hashbat@yale.edu for more information. L4 RP 1½ Course cr

Chemical Engineering (CENG)

CENG S150Ea / CENG 150a, Engineering Improv: An Introduction to Engineering Analysis  Michael Loewenberg
Online Course. Mathematical modeling is not a scripted procedure. Models are constrained by physical principles, including conservation laws and experimental observations but this does not provide a closed description. There is a lot more art in mathematical modeling than is commonly acknowledged and improvisation plays a significant role. The artistic aspects are important and intellectually engaging because they often lead to a deeper understanding. This course provides a general introduction to engineering analysis and to chemical engineering principles. Material
includes the derivation of governing equations from first principles and the analysis of these equations, including underlying assumptions, degrees of freedom, dimensional analysis, scaling arguments, and approximation techniques. The goal of this course is to obtain the necessary skills for improvising mathematical models for a broad range of problems that arise in engineering, science and everyday life. Students from all majors are encouraged to take this course. 1 Credit. Technology fee: $85. Tuition: $4,650.

Session A: May 30 - July 1. QR, SC

CENG S300b / CENG 300b, Chemical Engineering Thermodynamics  Peijun Guo

Online Course. This is a rigorous introductory course in thermodynamics. Material will include the first and second laws of thermodynamics, cyclic processes, chemical reaction and phase equilibria, and an introduction to statistical thermodynamics. The goal of this course is for students to obtain the necessary qualitative knowledge and quantitative skills for solving engineering science problems in thermodynamics. Prerequisite: Multivariable calculus. 1 Credit. Technology Fee: $85. Tuition: $4,500.

Session B: July 12 - August 13. QR, SC

* CENG 120b / ENAS 120b / ENVE 120b, Introduction to Environmental Engineering  John Fortner

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 161, 165 or CHEM 163, 167 (may be taken concurrently) or permission of instructor. QR, SC

CENG 150a / CENG S150Ea, Engineering Improv: An Introduction to Engineering Analysis  Michael Loewenberg

Mathematical modeling is not a scripted procedure. Models are constrained by physical principles, including conservation laws and experimental observations but this does not provide a closed description. There is a lot more art in mathematical modeling than is commonly acknowledged and improvisation plays a significant role. The artistic aspects are important and intellectually engaging because they often lead to a deeper understanding. This course provides a general introduction to engineering analysis and to chemical engineering principles. Material includes the derivation of governing equations from first principles and the analysis of these equations, including underlying assumptions, degrees of freedom, dimensional analysis, scaling arguments, and approximation techniques. The goal of this course is to obtain the necessary skills for improvising mathematical models for a broad range of problems that arise in engineering, science and everyday life. Students from all majors are encouraged to take this course. Prerequisite: MATH 112. QR, SC

CENG 300b / CENG S300b, Chemical Engineering Thermodynamics  Peijun Guo

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  Mingjiang Zhong
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 314a / ENVE 314a, Transport Phenomena I  Kyle Vanderlick
First of a two-semester sequence. 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 the instructor. QR, SC RP

CENG 315b / ENVE 315b, Transport Phenomena II  Michael Loewenber
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

CENG 345b / ENAS 345b, Principles and Applications of Interfacial Phenomena  Kyle Vanderlick
This course covers the nature and consequences of both flexible and rigid interfaces, such as those associated with liquids and solids respectively. We examine the properties of interfaces as they exist alone, as a collective (e.g., colloids), and also as they interact demonstrably with one another. Examples of the latter include thin films, confined fluids and biological membranes. An integral part of this course is the introduction and application of engineering analysis (e.g., finite element analysis) to calculate and predict behaviors central to technological applications. SC

CENG 351b / BENG 351b, Biotransport and Kinetics  Staff
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: MATH 115, ENAS 194; BIOL 101 and 102; CHEM 161, 163, or 167; BENG 249. QR 0 Course cr

CENG 373a / ENVE 373a, Air Pollution Control  Drew Gentner
An overview of air quality problems worldwide with a focus on emissions, chemistry, transport, and other processes that govern dynamic behavior in the atmosphere. Quantitative assessment of the determining factors of air pollution (e.g., transportation and other combustion–related sources, chemical transformations), climate change, photochemical “smog,” pollutant measurement techniques, and air quality management strategies. Prerequisite: ENVE 120. QR, SC RP
* CENG 377a / ENVE 377a, Water-Energy Nexus  Staff  
This course explores processes and technologies at the water-energy nexus. We utilize chemical and environmental engineering fundamentals to explore the links between maintaining clean water supply and energy security globally, as well as implications for environmental contamination and climate change. We develop a quantitative understanding of water chemistry and energy considerations for topics including traditional water and wastewater treatment, energy recovery from wastewater, membrane processes, water electrolysis for energy storage and electrochemical contaminant conversion, industrial water consumption and wastewater production, underground water sources and water for oil and gas, opportunities for reuse of nontraditional source waters and contaminant valorization, and considerations for decentralization, resilience, and electrification. Quantitative understanding of these processes will be attained based on mass and energy balances, systems engineering, thermodynamics, and kinetics. Prerequisite: ENVE 120 or permission of instructor. The course is primarily designed for juniors and seniors majoring in environmental engineering, but students in other engineering majors are welcome. Students in non-engineering majors are also welcome but are encouraged to communicate with the instructor to make sure they have sufficient background knowledge in required mathematics.  QR, SC

CENG 411a, Separation and Purification Processes  Paul Van Tassel  
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 412Lb, Chemical Engineering Laboratory and Design  Lisa Pfefferle  
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  Yehia Khalil  
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. Enrollment limited to seniors majoring in Chemical Engineering or Environmental Engineering.  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  Eric Altman
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  Paul Van Tassel
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.

Chemistry (CHEM)

CHEM 101a, Chemistry in the Modern World  N. Ganapathi
Basic concepts necessary to understand how chemistry affects life in the modern world.
Laws, events, and other ways that chemistry shapes human lives. Intended for non–
science majors; no prerequisites. 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

CHEM 106b, Chemistry and Forensics  N. Ganapathi
Chemistry principles, including but not limited to, atoms, molecules, molecular
structure and properties, solutions, fire, explosions, radioactivity, drugs and poisons,
and DNA analysis, as applied to forensic analysis. No prerequisites; intended for non–
science majors. 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

CHEM 134La or b, General Chemistry Laboratory I  Staff
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 161 or 163. May not be taken after a higher-numbered
laboratory course.  SC  RP  o Course cr

CHEM 136La or b, General Chemistry Laboratory II  Paul Cooper
Introduction to rate and equilibrium measurements, acid-base chemistry, synthesis of
inorganic compounds, and qualitative/quantitative analysis. After CHEM 134L or the
equivalent in advanced placement. To accompany or follow CHEM 165 or 167. May not
be taken after a higher-numbered laboratory course.  SC  RP  o Course cr

* CHEM 161a or b, General Chemistry I  Staff
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. Appropriate either as a first chemistry
course or for students with one year of high school chemistry. Attendance at a weekly
discussion section required. Normally accompanied by CHEM 134L.  QR, SC  RP
 o Course cr

* CHEM 163a, Advanced General Chemistry I  James Mayer
An in-depth examination of the principles of atomic, molecular, and stolid state
chemistry, including structures, periodicity, and chemical reactivity. Topics include the
quantum mechanics of atoms and chemical bonding, and inorganic, organic, and solid
state molecules and materials. For students with strong secondary school exposure to general chemistry. Attendance at a weekly discussion section required. Normally accompanied by CHEM 134L. Enrollment by placement only. QR, SC, RP o Course cr

* CHEM 165a or b, General Chemistry II  
Staff  
Topics include kinetics, chemical equilibrium, acid-base chemistry, free energy and entropy, electrochemistry, and nuclear chemistry. Attendance at a weekly discussion section required. Prerequisite: CHEM 161. Normally accompanied by CHEM 136L. Enrollment by placement only. QR, SC, RP o Course cr

* CHEM 167b, Advanced General Chemistry II  
Mark Johnson  
Topics include kinetics, chemical equilibrium, acid-base chemistry, free energy and entropy, electrochemistry, and nuclear chemistry. Attendance at a weekly discussion section required. Prerequisite: CHEM 163, or with equivalent placement. Normally accompanied by CHEM 136L. Enrollment by placement only. QR, SC, RP o Course cr

* CHEM 174a, Organic Chemistry for First Year Students I  
Seth Herzon  
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 o Course cr

* CHEM 175b, Organic Chemistry for First Year Students II  
Scott Miller  
Continuation of CHEM 174. Survey of simple and complex reaction mechanisms, spectroscopy, organic synthesis, and the molecules of nature. Attendance at a weekly discussion section required. After CHEM 174. Normally accompanied by CHEM 223L. Enrollment by placement only. SC, RP o Course cr

CHEM 220a or b, Organic Chemistry  
Staff  
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 221 or 230. SC, RP o Course cr

CHEM 221b, The Organic Chemistry of Life Processes  
Jason Crawford  
The principles of organic reactivity and how they form the basis for biological processes. The laboratory for this course is CHEM 223L. After CHEM 220. Students who have earned a grade lower than C in CHEM 220 are cautioned that they may not be sufficiently prepared for this course. SC, RP o Course cr

CHEM 222La or b, 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 136L or equivalent. After or concurrently with CHEM 174 or 220. SC o Course cr

CHEM 223Lb, Laboratory for Organic Chemistry II  
Staff  
Second term of an introductory laboratory sequence covering basic synthetic and analytic techniques in organic chemistry. Prerequisite: CHEM 222L. After or concurrently with CHEM 175, 221, or 230. SC o Course cr
CHEM 226La, Intensive Advanced Chemistry Laboratory  Christine DiMeglio
An intensive course in advanced 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 223L. Enrollment is limited; e-mail course instructor for enrollment procedure. WR, SC RP

CHEM 251Lb, Inorganic Chemistry Laboratory  Jonathan Parr
Introductory laboratory course covering synthetic and physical characterization techniques in inorganic chemistry. Prerequisite: 222L; concurrently with or after CHEM 252. SC o Course cr

CHEM 252b, Introductory Inorganic Chemistry  Hailiang Wang
Principles and applications of modern inorganic chemistry. Introduction to some of the fundamental concepts of solid-state chemistry, coordination chemistry, bioinorganic 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 o Course cr

CHEM 330La, Laboratory for Physical Chemistry I  Paul Cooper
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. SC RP o Course cr

CHEM 331Lb, Laboratory for Physical Chemistry II  Paul Cooper
Application of physical methods to chemical analysis by spectroscopic and spectrometric techniques. Please see the course syllabus for details regarding course registration. After CHEM 330L. After or concurrently with CHEM 333. SC RP

* CHEM 332a, Physical Chemistry with Applications in the Physical Sciences I  Tianyu Zhu
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 o Course cr

* CHEM 333b, 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 o Course cr

CHEM 355Lb, Chemical Biology and Bioanalytical Chemistry Laboratory  Stacy Malaker
The goal of the Chemical Biology and Bioanalytical Chemistry Laboratory is to involve students in the challenge and excitement of instrumentation analysis, before such research opportunities might normally be available. Students work in teams and are assigned an unknown protein. They express, purify, and characterize their assigned protein via affinity chromatography, NMR, X-ray scattering, and mass spectrometry.
This course is heavily reliant on the Chemical and Biophysical Instrumentation Center (CBIC), where students get hands-on experience with instruments. The semester culminates with students writing a manuscript in JACS format, followed by a conference-style poster session. Prerequisite: General chemistry lab, organic chemistry lab, one semester of biochemistry or chemical biology, or permission of instructor. SC

* CHEM 400a, Current Chemistry Seminar  Nilay Hazari
Designed to engage students in the Chemistry research-seminar program by providing requisite scientific guidance and a forum for directed discussion. Participants explore current avenues of chemical research as presented orally by the prime movers in the field, thereby exploring the frontiers of current knowledge while still retaining the structured environment of a classroom. May fulfill all or part of the senior requirement for the Chemistry major, as detailed in the program description in the YCPS.

CHEM 402a, Fundamentals of Transition Metal Chemistry  Patrick Holland
This half-term course covers the structures and properties of coordination compounds, and strategies for the design and analysis of new compounds. Elements of chelating ligands, spectroscopic methods, and magnetism are addressed. Prerequisites: Two terms of organic chemistry, and Chem 252 or equivalent. SC ½ Course cr

CHEM 403a, Fundamentals of Organometallic Chemistry  Patrick Holland
A half-term survey of the main principles of organometallic chemistry that enable students to understand basic concepts in the field. It prepares students for CHEM 404, Applications of Organometallic Chemistry, the second half of this course. Prerequisites: Two terms of organic chemistry and Chem 252 or equivalent experience. SC ½ Course cr

CHEM 404b, Applications of Organometallic Chemistry  Nilay Hazari
A half-term survey of the applications of organometallic chemistry that demonstrates to students the range of areas where organometallic reactions are important. It builds on the knowledge learned in CHEM 403, Fundamentals of Organometallic Chemistry. Prerequisites: Two terms of organic chemistry, one of CHEM 252, and CHEM 403 or equivalent experience. SC ½ Course cr

CHEM 405b, Inorganic Reaction Mechanisms  James Mayer
This half-term course covers the fundamentals of kinetics and mechanisms used by coordination compounds and transition-metal catalysts, and features analysis of papers from the recent literature. Prerequisites: Two terms of organic chemistry, Chem 252 or equivalent, and CHEM 402 or equivalent. SC ½ Course cr

CHEM 406b, Bioinorganic Spectroscopy  Gary Brudvig
This course is an advanced introduction to biological inorganic chemistry with an emphasis on the methods used to characterize the active sites of metalloproteins. The major physical methods used in the determination of molecular structure, bonding and physical properties of metal ions in proteins are introduced. Prerequisite: A general knowledge of biochemistry and familiarity with both inorganic coordination chemistry and physical chemistry. SC ½ Course cr

CHEM 407b, Bioinorganic Mechanisms  Gary Brudvig
This course is an advanced introduction to biological inorganic chemistry. An overview of the relevant geometric and electronic structures of metalloprotein active sites are presented and related to each protein’s function. The objective is to define and understand the function of metals in biology in terms of structure. Prerequisite:
CHEM 406 or permission of instructor. It will be assumed that students have a general knowledge of biochemistry and are familiar with both inorganic coordination chemistry and physical chemistry.  sc ½ Course cr

**CHEM 416a, Organic Structure and Energetics**  William Jorgensen

The course covers concepts in physical organic chemistry including molecular structure & bonding, conformational energetics, electronic effects, thermochemistry, ring strain, non-covalent interactions, molecular recognition, and host-guest chemistry. Prerequisites: Two terms of organic chemistry and two terms of physical chemistry or related courses or permission of the instructor.  sc ½ Course cr

**CHEM 417a, Kinetics and Thermodynamics in Organic Systems**  Scott Miller

The course generally follows Organic Structure and Energetics. This module covers concepts in physical organic chemistry including acid-base chemistry, advanced issues in stereochemistry, kinetics and thermodynamics, as well as experiments and techniques employed in mechanistic analysis. Issues in catalysis are addressed throughout. Prerequisites: CHEM 416 and two terms of introductory organic chemistry, and two terms of physical chemistry. Permission of the instructor may be sought for potential exceptions.  sc ½ Course cr

**CHEM 419a, Foundations of Chemical Biology**  Stacy Malaker

Chemical biology is a rapidly developing field at the interface of chemical and biological sciences. This subject deals with how chemistry can be applied to manipulate and study biological problems using a combination of experimental techniques ranging from organic chemistry, analytical chemistry, biochemistry, molecular biology, biophysical chemistry and cell biology. The purpose of this course is to teach students the core skills that are used by scientists at the interface of chemistry and biology. The course transitions into Chemical Biology II, where students learn more about therapeutic applications of chemical biology. Prerequisites: Two terms of both general chemistry and organic chemistry.  sc ½ Course cr

**CHEM 424a, Foundations of Chemical Biology II: Applications of Chemical Biology to Therapeutics**  David Spiegel

This course explores the design and enablement of medicines derived from a convergence of concepts and techniques from chemistry and biology. Topics include: small molecule drug discovery concepts and tools, drug metabolism, protein therapeutics, hybrid chemical/biologic drugs, and bifunctional molecules. Modern approaches for target discovery and validation are also discussed. Prerequisites: CHEM 419, two semesters of undergraduate organic chemistry, or permission of instructor. A basic understanding of biochemistry and molecular biology is assumed.  sc ½ Course cr

**CHEM 432a, Synthetic Methods in Organic Chemistry I**  Jon Ellman

Compound synthesis is essential to the discovery and development of new chemical entities with a desired property whether that be for fundamental study or for a more applied goal such as a new pharmaceutical, agrochemical, or material. In this course we emphasize key transformations and principles to provide a framework for the efficient design and synthesis of organic compounds. Prerequisites: Two terms of organic chemistry and one term of introductory inorganic chemistry, or related course, or permission of the instructor.  sc ½ Course cr
CHEM 433a, Synthetic Methods in Organic Chemistry II  Jon Ellman
Compound synthesis is essential to the discovery and development of new chemical entities with a desired property whether that be for fundamental study or for a more applied goal such as a new pharmaceutical, agrochemical, or material. In this course we emphasize key transformations and principles to provide a framework for the efficient design and synthesis of organic compounds. This course builds on the knowledge learned in CHEM 432. Prerequisite: CHEM 432 or permission of instructor.  sc ½ Course cr

CHEM 466a, Introduction to Quantum Mechanics 1  Sharon Hammes-Schiffer
A half-term introduction to quantum mechanics, starting with the Schrödinger equation and covering model systems such as particle-in-a-box and harmonic oscillator. The fundamental postulates and theorems of quantum mechanics are also covered. Prerequisite: Physical chemistry, multivariable calculus or equivalent experience, or permission of instructor.  sc ½ Course cr

CHEM 467a, Introduction to Quantum Mechanics 2  Sharon Hammes-Schiffer
Continuation of an introduction to quantum mechanics, starting with angular momentum and the hydrogen atom, and then covering approximate methods such as the variation method and perturbation theory. The concepts of electron spin as well as Hartree-Fock theory and other electronic structure methods for describing molecules are covered. Half-term course. Prerequisite: CHEM 467, or multivariable calculus or equivalent experience.  sc ½ Course cr

* CHEM 472a, Introduction to Statistical Mechanics 1  Victor Batista
A half-term introduction to modern statistical mechanics, starting with fundamental concepts on quantum statistical mechanics to establish a microscopic derivation of statistical thermodynamics. Topics include ensembles, Fermi, Bose and Boltzmann statistics, density matrices, mean field theories, phase transitions, chemical reaction dynamics, time-correlation functions, Monte Carlo simulations and Molecular Dynamics simulations. Prerequisites: Physical chemistry, multivariable calculus or equivalent experience.  sc ½ Course cr

* CHEM 473a, Introduction to Statistical Mechanics 2  Victor Batista
A half-term continuation of the introduction to modern statistical mechanics, with focus on quantum statistical mechanics of liquids, Monte Carlo methods and linear response theory (Chapters 6-8 of the textbook). Classical results are obtained according to the classical limit of the quantum mechanical description. Topics include the Monte Carlo simulations and Molecular Dynamics simulations for the description of the Ising model, fluids, solvation of solutes, alchemist free energy calculations, kinetics and transport properties. Prerequisites: Physical chemistry, multivariable calculus or equivalent experience.  sc ½ Course cr

* CHEM 480a or b, Introduction to Independent Research in Chemistry  Nilay Hazari
After consultation with the DUS, students engage individual experimental and/or theoretical research problems in the laboratories of a selected faculty member within the Chemistry department. At the end of the term, students submit a brief report summarizing goals, methods, and accomplishments. For each term of enrollment, students must complete the CHEM 480 registration form, available in the DUS office, and have it signed by their faculty research mentor. It must be submitted to
the Chemistry DUS for final approval no later than the last week of classes in the immediately preceding academic term. Individuals wishing to perform independent research must have demonstrated proficiency in the aspects of chemistry required for the planned project, as ascertained by the supervising faculty member, and must meet basic safety requirements prior to undertaking any activities, including certified completion of the online courses entitled Laboratory Chemical Training and Hazardous Chemical Waste Training administered by the Office of Environmental Health and Safety (EHS) at http://ehs.yale.edu/training. At least ten hours per week of research are required (including time spent on requisite safety training), with the faculty mentor affirming this level of student commitment by midterm. This course may be taken multiple times for Pass/Fail credit, subject to restrictions imposed by Yale College. RP

* CHEN 490a or b, Independent Research in Chemistry Nilay Hazari and Jonathan Parr

Senior Chemistry majors engage individual experimental and/or theoretical research problems in the laboratories of a selected faculty member in the Chemistry department or in a closely related field of molecular science. CHEN 490 registration forms, found in the DUS office, must be signed by the student’s faculty research mentor and submitted it to the Chemistry DUS for final approval no later than the last week of classes in the immediately preceding academic term. Mandatory class meetings address issues of essential laboratory safety and ethics in science, with other class sessions focusing on core topics of broad interest to Chemistry students, including online literary research, oral presentation skills, and effective scientific writing. At least ten hours of research are required per week. Students are assigned letter grades, subject to restrictions imposed by Yale College. In special cases and with DUS approval, juniors may take this course. RP

CHEM 492b, Biochemical Rates and Mechanisms I J Patrick Loria

An advanced treatment of enzymology. Topics include transition state theory and derivation of steady-state and pre-steady-state rate equations. The role of entropy and enthalpy in accelerating chemical reactions is considered, along with modern methods for the study of enzyme chemistry. These topics are supplemented with in-depth analysis of the primary literature Prerequisites: CHEM 332 or equivalent, two semesters of organic chemistry, Math 115. SC ½ Course cr

CHEM 496b, Computational Chemistry Sharon Hammes-Schiffer

An introduction to modern computational quantum chemistry methods. The lectures cover Hartree-Fock theory, density functional theory, geometry optimizations, thermochemistry, transition states, minimum energy paths, continuum solvation models, electron correlation methods, and modeling excited states. Special emphasis on the hands-on use of computational packages for current applications spanning organic, inorganic, and biochemical reactions. After physical chemistry or with permission of instructor. QR, SC ½ Course cr

Child Study (CHLD)

* CHLD 125a / EDST 125a / PSYC 125a, Child Development Ann Close and Carla Horwitz

This course is first in a sequence including Theory and Practice of Early Childhood Education (CHLD127/PSYCH 127/EDST 127) and Language Literacy and Play (CHLD
This course provides students a theoretical base in child development and behavior and tools to sensitively and carefully observer infants and young children. The seminar will consider aspects of cognitive, social, and emotional development. An assumption of this course is that it is not possible to understand children – their behavior and development – without understanding their families and culture and the relationships between children and parents. The course will give an overview of the major theories in the field, focusing on the complex interaction between the developing self and the environment, exploring current research and theory as well as practice. Students will have the opportunity to see how programs for young children use psychodynamic and interactional theories to inform the development of their philosophy and curriculum. In the past students have done weekly in-person classroom observations at a Yale affiliated childcare program. If this is not possible, students will be expected to arrange on their own to do a weekly observation in-person or virtually of a child under the age of 6. For a portion of class meetings, the class will divide into small supervisory discussion groups. Priority given to juniors, seniors, Ed Study students. WR, SO

* CHLD 334a / PSYC 334a, Developmental Psychopathology  Fred Volkmar, Eli Lebowitz, and Denis Sukhodolsky
Study of developmental psychopathology during childhood and adolescence, team taught by a child psychiatrist and three psychologists. Topics include: aspects of normal development, assessment methods, clinical disorders, treatment, and legal and social policy issues. Review of normative development, followed by discussion of theoretical approaches to understanding developmental aspects of common mental health conditions in childhood. Attention to treatment models as well as relevant issues of culture and ethnicity in the expression of psychopathology. Prerequisites: PSYC 130, 140, 180, or equivalent, or with permission of instructor.

Chinese (CHNS)

* CHNS 110a, Elementary Modern Chinese I  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.  
L1 RP  1½ Course cr

CHNS 112a, Elementary Modern Chinese for Heritage Speakers  Staff
First level of the advanced learner sequence. Intended for students with some aural proficiency but very 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.  
L1  1½ Course cr

* CHNS 120b, Elementary Modern Chinese II  Staff
Continuation of CHNS 110. After CHNS 110 or equivalent.  
L2 RP  1½ Course cr

CHNS 122b, Elementary Modern Chinese for Heritage Speakers  Staff
Continuation of CHNS 112.  
L2  1½ Course cr

* CHNS 130a, Intermediate Modern Chinese I  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. L3  RP  1½ Course cr

* CHNS 132a, Intermediate Modern Chinese for Heritage Speakers  Staff  
The second level of the advanced learner sequence. Intended for students with intermediate oral proficiency and 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. Prerequisite: CHNS 122b or equivalent. L3  RP  1½ Course cr

* CHNS 140b, Intermediate Modern Chinese II  Staff  
Continuation of CHNS 130. To be followed by CHNS 150. After CHNS 130 or equivalent. L4  RP  1½ Course cr

* CHNS 142b, Intermediate Modern Chinese for Heritage Speakers  Staff  
Continuation of CHNS 132. After CHNS 132 or equivalent. L4  1½ Course cr

* CHNS 150a, Advanced Modern Chinese I  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. L5

* CHNS 151b, Advanced Modern Chinese II  Staff  
Continuation of CHNS 150. After CHNS 150 or equivalent. L5

* CHNS 152a and CHNS 153b, Advanced Modern Chinese for Heritage Speakers  Staff  
This course is intended for heritage speakers with intermediate high to advanced low speaking and listening skills and with intermediate reading and writing skills. The class follows CHNS 142 in the heritage track. The goal of the course is to help students effectively expand their skills in reading and writing while concurrently addressing the need to improve their listening and oral skills in formal environments. The materials cover a variety of topics relating to Chinese culture, society, and cultural differences, supplemented with authentic video materials. Prerequisite: CHNS 142 or equivalent. L5

* CHNS 156a and CHNS 157b, Advanced Modern Chinese through Film for Heritage Speakers  Ninghui Liang  
This course is designed to consolidate students’ grasp of the language through the use of films, TV programs, videos on social media, and authentic written materials. Activities include presentations, group discussions, written assignments, and projects. Open to heritage learners with intermediate to advanced oral proficiency and intermediate-low reading and writing proficiency. After CHNS 142, or equivalent. L5

* CHNS 158a and CHNS 159b, Advanced Modern Chinese III  Staff  
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. (Previously CHNS 154.) After CHNS 151 or equivalent.  L5

* CHNS 162a, Advanced Modern Chinese V  Rongzhen Li
This course is intended for both heritage and non-heritage learners with advanced proficiency. Students develop sophisticated language skills through working with authentic written materials, images, and videos concerning historical events, historical figures, artists, writers, and philosophers. Activities include working with translation tools, discussions, debates, presentations, oral and written exercises on platforms such as Playposit and Perusall, and collaborative projects. After CHNS 153, or 157, or 159, or equivalent.  L5

* CHNS 163b, Advanced Modern Chinese VI  Rongzhen Li
This course is intended for both heritage and non-heritage learners with advanced proficiency. Students develop sophisticated language skills through working with authentic written materials, images, and videos concerning historical events, historical figures, artists, writers, and philosophers. Activities include working with translation tools, discussions, debates, presentations, oral and written exercises on platforms such as Playposit and Perusall, and collaborative projects. After CHNS 153, 157, 159 or equivalent.  L5

* CHNS 164a, Chinese for Reading Contemporary Fiction  Wei Su
Selected readings in Chinese fiction of the 1980s and 1990s for the purpose of developing advanced language skills in reading, speaking, and writing. After CHNS 153, or 157, or 159, or equivalent.  L5

* CHNS 165b, Readings in Modern Chinese Fiction  Wei Su
We read and discuss modern short stories, most written prior to 1949, for the purpose of developing advanced language skills in reading, speaking, and writing. After CHNS 153, or 157, or 159, or equivalent.  L5

* CHNS 166a and CHNS 167b, Chinese for Current Affairs  Staff
Advanced language course with a focus on speaking and writing in formal styles. Current affairs are used as a vehicle to help students learn advanced vocabulary, idiomatic expressions, complex sentence structures, news writing styles and formal stylistic register. Materials include texts and videos selected from news media worldwide to improve students’ language proficiency for sophisticated communications on a wide range of topics. After CHNS 153, 157, or 159.  L5

* CHNS 168a and CHNS 169b, Chinese for Global Enterprises  Min Chen
Advanced language course that familiarizes students with Chinese business terminology and discourse through 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. Prerequisite: After CHNS 153, or CHNS 157, or CHNS 159, or equivalent.  L5

CHNS 170a, Introduction to Literary Chinese I  Pauline Lin
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
CHNS 171b, Introduction to Literary Chinese II  Pauline Lin
Continuation of CHNS 170. After CHNS 170. L5

* CHNS 172a, Chinese for Scholarly Conversation  Jianhua Shen
This course aims to prepare students for the language requirements of advanced research or employment in a variety of China-related fields. Materials include readings on contemporary social, cultural, and political issues, which are written by prominent scholars in related fields. This level is suitable for students who have had four years of college Chinese or who have taken three years of an accelerated program for heritage speakers. After CHNS 153, 159, 157, or equivalent, or permission of the instructor. L5

CHNS 200a / EALL 200a / EAST 240a / HUMS 270a, The Chinese Tradition  Staff
An introduction to the literature, culture, and thought of premodern China, from the beginnings of the written record to the turn of the twentieth century. Close study of textual and visual primary sources, with attention to their historical and cultural backdrops. Students enrolled in CHNS 200 join a weekly Mandarin-language discussion section. No knowledge of Chinese required for students enrolled in EALL 200. Students enrolled in CHNS 200 must have L5 proficiency in Mandarin or permission of the course instructor. HU TR 0 Course cr

Classical Civilization (CLCV)

CLCV 125a / PHIL 125a, Introduction to Ancient Philosophy  Brad Inwood
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. WR, HU 0 Course cr

CLCV 161a / ARCG 161a / HSAR 247a, Art and Myth in Greek Antiquity  Staff
Visual exploration of Greek mythology through the study of ancient Greek art and architecture. Greek gods, heroes, and mythological scenes foundational to Western culture; the complex nature of Greek mythology; how art and architecture rendered myths ever present in ancient Greek daily experience; ways in which visual representations can articulate stories. Use of collections in the Yale University Art Gallery. HU 0 Course cr

CLCV 200b / HIST 204b, Global Leadership, 600 BCE–600 CE  Noel Lenski
This course provides students with an accessible and engaging introduction to both the classical world and the problems of political organization and leadership through time and across societies. Students learn to think comparatively between individuals, societies, and systems and to analyze different ideals of leadership. This means considering not only traditional masculine and military conceptions of rule but also the leadership roles and styles of women, slaves, and rebels. We hope to bring into view, in other words, the intersectional challenges to power faced by non-traditional leaders in a world dominated by gender, class, and cultural prejudices, and to show how non-traditional leaders confronted and overcame these. Students draw upon this experience to access the premodern world as an alternative but related historical reality which can productively inform their engagement with the present. HU

* CLCV 216b / LITR 239b / MGRK 216b / WGSS 209b, Dionysus in Modernity  George Syrimis
Modernity’s fascination with the myth of Dionysus. Questions of agency, identity and community, and psychological integrity and the modern constitution of the self.
Manifestations of Dionysus in literature, anthropology, and music; the Apollonian-Dionysiac dichotomy; twentieth-century variations of these themes in psychoanalysis, surrealism, and magical realism. HU TR

CLCV 223a / HIST 212a, The Ancient Economy  Joseph Manning
A survey of the economies of the ancient Mediterranean world, with emphasis on economic institutions, the development of the economies over time, ancient economic thought, and the interrelationships between institutions and economic growth. Material evidence for studying the economies of the ancient world, including coinage, documentary material, and archaeology. HU

* CLCV 260a / NELC 168a, Origins of Writing  Klaus Wagensonner
Exploration of writing in the ancient Near East and the profound effects this new method of communication had on human society. Focus on Egypt and Mesopotamia, where advanced writing systems first developed and were used for millennia, with consideration of Chinese, Mayan, and Indus Valley writing systems as well. HU

* CLCV 319b / HIST 242Jb / MGRK 300b / WGSS 293b, The Olympic Games, Ancient and Modern  George Syrimis
Introduction to the history of the Olympic Games from antiquity to the present. The mythology of athletic events in ancient Greece and the ritual, political, and social ramifications of the actual competitions. The revival of the modern Olympic movement in 1896, the political investment of the Greek state at the time, and specific games as they illustrate the convergence of athletic cultures and sociopolitical transformations in the twentieth century. HU

* CLCV 346a, The Greek Historians  Joseph Solodow
Close reading of the Greek historians, Herodotus, Thucydides, Polybius, also Eastern and pre-Herodotean Greek writings, Hellenistic histories, including Acts of the Apostles and II Maccabees: their aims, historical methods, literary techniques, influence on historiography. HU

* CLCV 353a / HUMS 375 / LITR 353a / WGSS 351, Greek Tragedy and Psychoanalysis  Nebojsa Todorovic
What do ancient fifth-century Athens and turn-of-the-(twentieth-)century Vienna have in common? In fact, psychoanalysis’ development was intertwined with Freud’s interpretations of classical Greek tragedy, and Greek tragedies in turn can shed light on psychoanalytic concepts in excess of Freud’s readings. The juxtaposition of these two worlds allows us to understand each with a fresh perspective. And this is what we study in this class: we read and interpret the best-known tragic plays by ancient playwrights Aeschylus, Sophocles, and Euripides in dialogue with key concepts of psychoanalytic criticism. Well-established questions that Greek tragedy raises about gender politics, the evolution of democracy, the progressive disintegration of the Athenian polis, the construction of citizenship and foreignness, the influence of rhetoric and sophistry is reframed in dialogue with Freud’s (and his followers’) redefinitions of language, the unconscious, the self, trauma, violence, and gender. The goal of this course is to provide students with a clear understanding of the historical evolutions of these two forms of cultural production while also engaging in more theoretical and comparative work of literary interpretation and critical theorization. Considering the pivotal role that both psychoanalysis and Greek tragedy held in the development of later currents of thoughts (including postcolonial studies, Black Studies, feminist theory, queer theory, and Black
studies), particular attention is paid to the afterlives of the Freudian method and classical tragedy. WR, HU

* CLCV 450a, Two-Term Senior Project for the Major in Classical Civilization  
Andrew Johnston
Qualified students may write a two-term senior essay under the guidance of a faculty adviser. 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, students select a topic for research from any area of the literature, history, culture, or philosophy of ancient Greece, Rome, or Hellenistic Egypt, or a topic from the classical tradition.

* CLCV 452a, One-Term Senior Project for the Major in Classical Civilization  
Andrew Johnston
A one-term senior project. Students select a topic for research from any area of the literature, history, culture, or philosophy of ancient Greece, Rome, or Hellenistic Egypt, or a topic from the classical tradition. An appropriate instructor is assigned to each student by the director of undergraduate studies in consultation with the student.

Classics (CLSS)

* CLSS 490a, Two-Term Senior Essay for the Intensive Major in Classics  
Andrew Johnston
Qualified students may write a two-term 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.

CLSS 492a, One-Term Senior Essay for the Intensive Major in Classics  
Andrew Johnston
Qualified students may write a one-term 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.

Cognitive Science (CGSC)

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 175a, The Mystery of Sleep  
Meir Kryger and Suman Baddam
The role in which sleep and circadian rhythms affect attention, cognition, and memory through multidisciplinary consideration of neurobiology, epidemiology, and humanities. Psychological aspects of sleep; sleep disorders; sleep deprivation; and the history of sleep in philosophy, literature, and art. This course is not open to students previously enrolled in CSPC 350, CSMC 370, or CSYC 390. SC

CGSC 216b / LING 116b / PSYC 116b, Cognitive Science of Language  
Staff
The study of language from the perspective of cognitive science. Exploration of mental structures that underlie the human 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 to which language shapes perceptions of color, number, space, and gender.  

**CGSC 277a / AFAM 198a / EDST 177a / EP&E 494a / PHIL 177a, Propaganda, Ideology, and Democracy**  
Jason Stanley  
Historical, philosophical, psychological, and linguistic introduction to the issues and challenges that propaganda raises for liberal democracy. How propaganda can work to undermine democracy; ways in which schools and the press are implicated; the use of propaganda by social movements to address democracy’s deficiencies; the legitimacy of propaganda in cases of political crisis.  

HU 0 Course cr

* **CGSC 313b / PHIL 305b / PSYC 313b, Philosophy for Psychologists**  
Joshua Knobe  
Introduction to frameworks developed within philosophy that have applications in psychological research. Principal topics include the self, causation, free will, and morality. Recommended preparation: a course in philosophy or psychology.  

HU, SO

**CGSC 315a / PSYC 315a, The Modern Unconscious**  
John Bargh  
The notion of the unconscious mind traced from the early 1800s through Freud to present-day cognitive science, with a focus on the past thirty years. The power and function of the unconscious as a pervasive part of normal everyday human functioning. Readings from philosophy of mind and evolutionary biology.  

SO

* **CGSC 375b / LING 375b, Linguistic Meaning and Conceptual Structure**  
Staff  
The meaning of a word or sentence is something in the human mind that has specific properties: it can be expressed (written/signed/spoken forms); it can be combined with other meanings; its expression is not language dependent; it connects with the world; it serves as a vehicle for inference; and it is hidden from awareness. The course explores these properties in some detail and, in the process, provides the students with technical vocabulary and analytical tools to further investigate them. The course is thus intended for those students interested in undertaking a research project on the structure of meaning. the nature of lexico-conceptual structure, that is, the structure of concepts which we refer to as “word meanings”, and how they may be combined through linguistic and non-linguistic means. Its ultimate objective is to bridge models of conceptual structure and models of linguistic semantic composition, identify their respective strengths and weaknesses and explore some of the fundamental questions that any theory of linguistic meaning composition must answer. Evidence discussed will emerge from naturalistic, introspectional, and experimental methodologies. Prerequisites: LING 110, CGSC 110, LING 217, or LING 263.  

SO

* **CGSC 395a / PHIL 395a, Junior Colloquium in Cognitive Science**  
Guilherme Almeida  
Survey of contemporary issues and current research in cognitive science. By the end of the term, students select a research topic for the senior essay. Enrollment limited to Cognitive Science majors.  

½ Course cr
* CGSC 420a or b / NSCI 440a or b / PSYC 420a or b, Topics in Clinical Neuroscience

Avram Holmes

An overview and examination of the neuroscience of psychiatric illness. We focus on cutting-edge research in humans and animals aimed at understanding the biological mechanisms that underlie psychiatric illness. Although these questions date back to early philosophical texts, only recently have experimental psychologists and neuroscientists begun to explore this vast and exciting domain of study. We discuss the evolutionary and developmental origins of individual differences in human personality, measurement issues, fundamental dimensions of psychopathology, stability/plasticity, heritability, and implications therapeutic interventions as well as the associated broader implications for public policy. A major focus is on the neurobiology of fear and anxiety, including brain circuits, molecular genetic pathways, and epigenetics. A secondary focus is on differences in behavior and biology that confer risk for the development of depression and addiction, including the biological systems involved in hedonic pleasure, motivated goal pursuit, and the regulation of impulses in the face of everyday temptation. Students should have some background in psychology; PSYC 110 and PSYC 160 preferred. so

* CGSC 425b / PSYC 425b, Social Perception

Brian Scholl

Connections between visual perception, among the earliest and most basic of human 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


Joshua Knobe

Introduction to the emerging field of moral cognition. Focus on questions about the philosophical significance of psychological findings. Topics include the role of emotion in moral judgment; the significance of character traits in virtue ethics and personality psychology; the reliability of intuitions and the psychological processes that underlie them. HU

* CGSC 435a / PSYC 435a, The Kinds We Keep: Sorting and Distorting Reality

Frank Keil

Sorting the world into kinds is crucial human cognition. It grounds concepts, the currency of thought. But this cognitive asset can corrode our humanity and become a curse if we fail to understand the attendant biases. We first consider some metaphysical assumptions about causal patterns in the world that sustain relatively stable kinds and how these provide grounds for building early categories. We then examine why humans, and most AI systems, must sort individuals into kinds to learn and think about the world. But while categorization greatly amplifies the power of thought, it also distorts what is sorted and how the resulting kinds are construed. We explore why learning is impossible without such distortions of and consider different sets of distortions and when they occur. We focus on thought about fundamental, or ontological kinds, many of which are first apprehended in infancy or early childhood. These include non-living natural kinds, goal-directed entities, thinking things, living things, and artifacts. We ask how human and artificial agents might take more care with the kinds they use. How can we embrace the kinds that inspire exploration
and discovery without having our mis-construals turn them towards darker ends?
Prerequisites: PSYC 110 or CGSC 110 and two additional courses relevant to cognition.

* CGSC 437b / PSYC 437b, Minds, Brains, and Machines  Julian Jara-Ettinger
Exploration of the implications that the brain is a kind of computer that gives rise to the mind. Readings combine classical and cutting-edge research in psychology, philosophy, and artificial intelligence.  SO  RP

* CGSC 439a / PSYC 439a, The Psychology of Social Construction  Yarrow Dunham
We live in a world replete with “forgeries that become genuine”: pieces of paper that become money, words that become promises, lines in the sand that become borders. Nearly every aspect of our lives is shaped and constrained by these kinds of socially constructed entities, things as real as mountains but far more mysterious. How do such entities come to be, and how do (and how should) we understand them? How are they made and how can they be contested when they go astray? Answering these questions requires ranging across diverse literatures beginning with psychology but including philosophy, anthropology, economics, and game theory. Prerequisite: PSYC 110 or CGSC 110.  SO

* CGSC 471a, Directed Research in Cognitive Science  Joshua Knobe
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. Only one term may be offered toward the major, with permission of the director of undergraduate studies; two terms may be offered toward the bachelor's degree.

* CGSC 473a, Directed Reading in Cognitive Science  Joshua Knobe
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. Only one term may be offered toward the major, with permission of the director of undergraduate studies; two terms may be offered toward the bachelor's degree.

Comparative Literature (LITR)

* LITR 025b / AFST 028b / ENGL 028b, African Literature in the World  Cajetan Iheka
This seminar introduces students to a subset of African literature that has entered the canon of world literature. Bookended by the writings of Chinua Achebe and Chimamanda Adichie, we explore the marks of regional specificity in these works and how they transcend local geographical markers to become worldly artifacts. Our considerations include why certain texts cross the boundaries of nation and region while others remain confined within territorial bounds. We also examine advantages
of the global circulation of African literary works and the pitfalls of a global readership. The class moves from an introductory unit that orients students to African and world literature to focus on close reading of primary texts informed by historical and theoretical nuances. From analyzing works responding to the colonial condition and the articulation of anticolonial sensibilities, to those narrating the African nation at independence and the postcolonial disillusionment that followed, the seminar attends to the formal and thematic implications of globalization for African literary writing. Authors include Chinua Achebe, Mariama Ba, Ngugi wa Thiong’o, Mbolo Mbue, NoViolet Bulawayo, Taiye Selasie, and Chimamanda Adichie. Enrollment limited to first-year students. Preregistration required; see under First-Year Seminar Program.

* LITR 027a / HUMS 027a / WGSS 027a, Six Pretty Good Selves  
Marta Figlerowicz and Ayesha Ramachandran
Through the prism of thinking about the self, this course provides first-year students with an intensive introduction to studying the humanities at Yale. The course is anchored around six trans-historical models of thinking about selfhood: the ideal self, the lover, the revolutionary, the convert, the solipsist, and the social climber. We range widely across genres, media, periods, and geographies: from Plato’s *Symposium* to Machado de Assis’s *Epitaph for a Small Winner*, from the ghazals of Hafez to the *Kamasutra*. We also make extensive use of Yale’s rich manuscript archives, historical object collections, and art galleries and devote sustained attention to improving students’ academic writing skills. Friday sessions will alternate between writing workshops and field trips to Yale collections. Enrollment limited to first-year students. Preregistration required; see under First-Year Seminar Program.

1½ Course cr

* LITR 101a / HUMS 115a, Purposes of College Education  
Staff
College is a crucial institution in which our society works through its expectations for young people. The first half of this course explores some of the purposes that have been ascribed to college, including development of personal character, participation in a community, preparation for citizenship, and conversation with others on intellectual matters. The second half touches on the social and economic contexts of college education, including the history of the curriculum, the role of social class, the cost of higher education, and career preparation. We read Plato’s Republic, a key text for the philosophy of education, in its entirety. Other readings from Aristotle, Confucius, Bhagavad-Gita, Virginia Woolf, Martin Luther King, Max Weber. Lectures are designed for interactive conversation. Preference for first-year and sophomore students, but all students are welcome.

HU 0 Course cr

* LITR 130b / HUMS 130b, How to Read  
Rudiger Campe and Hannan Hever
Introduction to techniques, strategies, and practices of reading through study of lyric poems, narrative texts, plays and performances, films, new and old, from a range of times and places. Emphasis on practical strategies of discerning and making meaning, as well as theories of literature, and contextualizing particular readings. Topics include form and genre, literary voice and the book as a material object, evaluating translations, and how literary strategies can be extended to read film, mass media, and popular culture. Junior seminar; preference given to juniors and majors.

HU
* LITR 140a, How To Compare  Samuel Hodgkin
This course is an exploration of literary comparison from methodological as well as historical perspectives. We compare texts within genres, across genres and media, across periods, and between cultures and languages. We consider questions such as whether all comparisons must assume a common ground, and whether there is always an implicit politics to any comparison. Topics range from theories of translation and ekphrasis to exoticism and untranslatability. Readings include classics by critics such as Aristotle, Ibn Sina, and Kristeva, and writers such as Marie de France, Nezami, and Calvino. It also engages with the literature of our own moment: we will read a newly-translated novel by the Chilean writer Nona Fernández, and the Iranian poet Kayvan Tahmasebian will visit the class for a conversation. We will also discuss films (Parajanov and Barta) and a new Russian computer game. This course fulfills an introductory requirement for students considering one of the majors in the Comparative Literature department, but all are welcome, and the methodologies and questions discussed in the class are useful for any kind of humanistic inquiry.  

HU

LITR 143b / ENGL 192b / FILM 240b, World Cinema  Marta Figlerowicz
Development of ways to engage films from around the globe productively. Close analysis of a dozen complex films, with historical contextualization of their production and cultural functions. Attention to the development of critical skills. Includes weekly screenings, each followed immediately by discussion.  

HU

* LITR 154b / ENGL 395b / HUMS 380b, The Bible as a 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.  

WR, HU RP

* LITR 168a or b / ENGL 129a or b / HUMS 127a or b / THST 129a or b, Tragedy in the European Literary Tradition  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 might include Aristotle’s Poetics or Homer’s Iliad and plays by Aeschylus, Sophocles, Euripides, Seneca, Hrotsvitha, Shakespeare, Lope de Vega, Calderon, Racine, Büchner, Ibsen, Strindberg, Chekhov, Wedekind, Synge, Lorca, Brecht, Beckett, Soyinka, Tarell Alvin McCraney, and Lynn Nottage. Focus on textual analysis and on developing the craft of persuasive argument through writing.  

WR, HU

* LITR 169a or b / ENGL 130a or b, Epic in the European Literary Tradition  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 on developing the craft of persuasive argument through writing.  

WR, HU

* LITR 178a / HUMS 233a / MMES 201a / NELC 156a, Classics of the Arabic-Islamic World  Shawkat Toorawa
Survey of the literary tradition of the Arabic-Islamic world (West Asia, North Africa, and Muslim Spain), a textual conversation among diverse authors from late antiquity to
the Mamluk period. Prose and poetry from the Qur’an to the Arabian Nights; attention to the interdependence of the works and their cultural setting, the agendas authors pursued, and the characters they portrayed.  

**LITR 183a / HUMS 180a / ITAL 310a, Dante in Translation**  
Staff  
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. No knowledge of Italian required. Course conducted in English.  

* LITR 195b / ENGL 205b / HUMS 200b / MUSI 462b, Medieval Songlines  
Ardis Butterfield  
Introduction to medieval song in England via modern poetic theory, material culture, affect theory, and sound studies. Song is studied through foregrounding music as well as words, words as well as music.  

* LITR 239b / CLCV 216b / MGRK 216b / WGSS 209b, Dionysus in Modernity  
George Syrimis  
Modernity’s fascination with the myth of Dionysus. Questions of agency, identity and community, and psychological integrity and the modern constitution of the self. Manifestations of Dionysus in literature, anthropology, and music; the Apollonian-Dionysiac dichotomy; twentieth-century variations of these themes in psychoanalysis, surrealism, and magical realism.  

**LITR 253a / HIST 260a / HUMS 255a / RSEE 312a / RUSS 312a, Tolstoy’s *War and Peace***  
Staff  
The course is a semester-long study of the quintessential big Russian novel, Leo Tolstoy’s *War and Peace*, about Napoleon’s failed 1812 war against Russia. *War and Peace* (1865–1869) is a sweeping panorama of nineteenth-century Russian society, a novel of profound philosophical questions, and an unforgettable gallery of artfully drawn characters. Reading the novel closely, we pose the following questions. In what ways is this patriotic war epic also an imperial novel? What myths does it destroy and construct? How does it combine fiction and history? What forces drive history, as it unfolds in the present? What are the limits of individual agency, and how much do emperors and generals control the fates of nations and armies? Finally, a question that is never too broad for Tolstoy: what is a meaningful, well-lived life? We explore these questions while refining our tools of literary analysis and situating the novel in its historical context and in our contemporary world. Secondary materials include Tolstoy’s letters, contemporary reviews, maps, and historical sources, as well as readings in political theory, philosophy, international relations, and literary criticism. All readings and class discussions in English. No prerequisites required. Both WR and non-WR sections are offered.  

* LITR 256a / CPLT 657a / PORT 352a / PORT 652a, Clarice Lispector: The Short Stories  
Kenneth David Jackson  
This course is a seminar on the complete short stories of Clarice Lispector (1920–1977), a master of the genre and one of the major authors of twentieth-century Brazil known for existentialism, mysticism and feminism.
* LITR 259a / LAST 252a / PORT 356a, Concrete Poetry in Brazil & Portugal: Verbivocovisual Poetics in Theory and Practice  
Kenneth David Jackson  
Brazilian concrete poetry in international perspective; production and theory of concrete poetry, translation, and criticism during the second half of the twentieth century. Brazilian concrete poets in the context of visual and concrete poetics. Representative works include 'Pilot Plan' and Theory of Concrete Poetry, graphic and spatial poems, and public expositions of works. Brazilian concrete poets were among the leaders of an international neo-vanguard movement in mid-twentieth century related to geometrical abstraction in painting. In the journals Noigandres and Invenção, and the Theory of Concrete Poetry the Brazilians link their poetics to Pound, Mallarmé, cummings and other inventive figures in world poetry, while relating poetry to graphic arts through reference to painting and to semiotics, including Fenollosa's essay on use of the Chinese character. The exhibit in S. Paulo's Museum of Modern Art in December 1956 was the beginning of the public exhibition of concrete poetry, now the topic of anthologies, websites, criticism, and museum retrospectives. Concrete poetics dominated the production of poetry in Brazil for half a century with a major effect on cultural and intellectual life. Prerequisite: PORT 140 or equivalent.  
HU

LITR 265b / EALL 256b / EAST 358b / GLBL 251b / HUMS 272b, China in the World  
Jing Tsu  
Recent headlines about China in the world, deciphered in both modern and historical contexts. Interpretation of new events and diverse texts through transnational connections. Topics include China and Africa, Mandarinization, Chinese America, science and technology, science fiction, and entrepreneurship culture. Readings and discussion in English.  
HU

LITR 279b / ER&M 209b / VIET 220b, Introduction to Vietnamese Culture, Values, and Literature  
Quang Van  
Introduction to Vietnamese culture and values. Topics include cultural and national identity, aesthetics, the meaning of life, war, and death. Selected readings from Zen poems, folklore, autobiographies, and religious and philosophical writings. Course is taught in English and is an alternative to Western perspectives. Readings in translation. No previous knowledge of Vietnamese required.  
HU

LITR 284a / FREN 270a / GMAN 214a, Mad Poets  
Staff  
A lecture course introducing undergraduates to the rich tradition of poetry written in French (and German) during the nineteenth and twentieth centuries. Each week is devoted to exploring the life and work of a poet whose ways of behaving, creating, and perceiving the world might be described as insane. There is, perhaps, no shortage of mad poets, but those whose life and work provide topics for discussion here include Hölderlin, Nerval, Baudelaire, Rimbaud, Verlaine, Mallarmé, Lautréamont, Apollinaire, Breton, Artaud, and Celan. Students become familiar with the tools required to read, interpret, understand, and enjoy poetry, and develop an understanding of the poems' broader literary historical, philosophical, and political significance. Regular references are made to other modes of expression, including painting, photography, film, music, dance, philosophy, theater, and architecture. Lectures in English. Sections in English or French. Readings available both in original language and in English translation.  
WR, HU  
Course cr
* LITR 301b / FILM 360b / RSEE 380b / RUSS 380b, Putin’s Russia and Protest Culture  Marijeta Bozovic
Survey of Russian literature and culture since the fall of communism. The chaos of the 1990s; the solidification of power in Putin’s Russia; the recent rise of protest culture. Sources include literature, film, and performances by art collectives. Readings and discussion in English; texts available in Russian.  WR, HU

* LITR 305b / ENGL 483b / HUMS 428b / JDST 343b, Advanced Literary Translation  Robyn Creswell
A sequel to LITR 348, The Practice of Literary Translation. Students apply to this workshop with a project in mind that they have been developing, either on their own or for a senior thesis, and they present this work during the class on a regular basis. Practical translation is supplemented by readings in the history of translation practice and theory, and by the reflections of practitioners on their art. These readings are selected jointly by the instructor and members of the class. Topics include the history of literary translation—Western and Eastern; comparative approaches to translating a single work; the political dimension of translation; and translation in the context of religion and theology. Class time is divided into student presentations of short passages of their own work, including related key readings; background readings in the history of the field; and close examination of relevant translations by accomplished translators. Students receive intensive scrutiny by the group and instructor. Prerequisite: LITR 348.

* LITR 308b / ER&M 306b / JDST 353b / MMES 308b, Literature at the Limit from Palestine and Israel  Hannan Hever
Readings and films from post-1948 Palestine and Israel, with special attention given to historical and political contexts. Consideration of the limit, in the geographical sense of borders and checkpoints, as well as in the existential sense of extremity and trauma.  HU

* LITR 317a / JDST 326a, Marxist Theory of Literature  Hannan Hever
The role of Marxist thought in understanding literary institutions and texts in the twentieth century. Marx’s theory of ideology; Lukacs’s theory of literature as the basis for development of Marxist literary theory; the Frankfurt and materialistic schools. Readings include works by Raymond Williams, Catherine Belsey, Walter Benjamin, Pierre Macherey, and Frederic Jameson.  HU

* LITR 328b / MGRK 212b, Folktales and Fairy Tales  Maria Kaliambou
History of the folktale from the late seventeenth through the late twentieth centuries. Basic concepts, terminology, and interpretations of folktales, with some attention to twentieth-century theoretical approaches. Performance and audience, storytellers, and gender-related distinctions. Interconnections between oral and written traditions in narratives from western Europe and Greece.  WR, HU TR

* LITR 330b / GMAN 227b / HUMS 330b / PHIL 402b, Heidegger’s Being and Time  Martin Hagglund
Systematic, chapter by chapter study of Heidegger’s *Being and Time*, arguably the most important work of philosophy in the twentieth-century. All major themes addressed in detail, with particular emphasis on care, time, death, and the meaning of being.  HU
* LITR 348b / ENGL 456b / HUMS 427b / JDST 316b, The Practice of Literary Translation  Robyn Creswell
This course combines a seminar on the history and theory of translation (Tuesdays) with a hands-on workshop (Thursdays). The readings lead us through a series of case studies comparing, on the one hand, multiple translations of given literary works and, on the other, classic statements about translation – by translators themselves and prominent theorists. We consider both poetry and prose from the Bible, selections from Chinese, Greek, and Latin verse, classical Arabic and Persian literature, prose by Cervantes, Borges, and others, and modern European poetry (including Pushkin, Baudelaire, and Rilke). Students are expected to prepare short class presentations, participate in a weekly workshop, try their hand at a series of translation exercises, and undertake an intensive, semester-long translation project. Proficiency in a foreign language is required.  HU

* LITR 349a / ENGL 224a / THST 317a, Tragedy and Drama of Reconciliation  Jan Hagens
Close reading of dramas of reconciliation from the Western canon that have traditionally been categorized as tragedies. Ways in which the recategorization of such plays lends additional complexity and meaning to their endings and allows for new interpretations of the texts, their authors, and the history of drama.  HU

* LITR 353a / CLCV 353a / HUMS 375 / WGSS 351, Greek Tragedy and Psychoanalysis  Nebojsa Todorovic
What do ancient fifth-century Athens and turn-of-the-(twentieth-)century Vienna have in common? In fact, psychoanalysis' development was intertwined with Freud's interpretations of classical Greek tragedy, and Greek tragedies in turn can shed light on psychoanalytic concepts in excess of Freud's readings. The juxtaposition of these two worlds allows us to understand each with a fresh perspective. And this is what we study in this class: we read and interpret the best-known tragic plays by ancient playwrights Aeschylus, Sophocles, and Euripides in dialogue with key concepts of psychoanalytic criticism. Well-established questions that Greek tragedy raises about gender politics, the evolution of democracy, the progressive disintegration of the Athenian polis, the construction of citizenship and foreignness, the influence of rhetoric and sophistry is reframed in dialogue with Freud's (and his followers') redefinitions of language, the unconscious, the self, trauma, violence, and gender. The goal of this course is to provide students with a clear understanding of the historical evolutions of these two forms of cultural production while also engaging in more theoretical and comparative work of literary interpretation and critical theorization. Considering the pivotal role that both psychoanalysis and Greek tragedy held in the development of later currents of thoughts (including postcolonial studies, Black Studies, feminist theory, queer theory, and Black studies), particular attention is paid the afterlives of the Freudian method and classical tragedy.  WR, HU

* LITR 374a / FILM 325a / GMAN 379a, German Cinema 1918–1933  Jan Hagens
The years between 1918 and 1933 are the Golden Age of German film. In its development from Expressionism to Social Realism, this German cinema produced works of great variety, many of them in the international avantgarde. This introductory seminar gives an overview of the silent movies and sound films made during the Weimar Republic and situate them in their artistic, cultural, social, and political context between WWI and WWII, between the Kaiser's German Empire and the Nazis' Third
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Reich. Further objectives include: familiarizing students with basic categories of film studies and film analysis; showing how these films have shaped the history and the language of film; discussing topic-oriented and methodological issues such as: film genres (horror film, film noir, science fiction, street film, documentary film); set design, camera work, acting styles; narration in film; avantgarde cinema; the advent and use of sound in film; Realism versus Expressionism; film and popular mythology; melodrama; representation of women; modern urban life as spectacle; film and politics. Directors studied include: Grune, Lang, Lubitsch, Murnau, Pabst, Richter, Ruttmann, Sagan, von Sternberg, Wiene, et al.

WR, HU

LITR 383a / FREN 244a / THST 225a, The French Stage: History and Performance of French Theater from Molière to Césaire  Staff

From Molière to Marie Ndiaye, via Augustin de Beaumarchais, Olympe de Gouges, George Sand and Wouadjı Mouhawad, theater is at the center of French artistic and political culture. This course covers four centuries of theater history, from the age of Versailles to the beginning of the twenty-first century. We discover the plays, their relationship to current events, their political and aesthetic dimensions, the history of their staging, and the material aspects of their productions. HU 0 Course cr

* LITR 384b / EALL 252b / EAST 251b / FILM 446b, Japanese Cinema before 1960  Aaron Gerow

The history of Japanese cinema to 1960, including the social, cultural, and industrial backgrounds to its development. Periods covered include the silent era, the coming of sound and the wartime period, the occupation era, the golden age of the 1950s, and the new modernism of the late 1950s. No knowledge of Japanese required. Formerly JAPN 270. HU TR

* LITR 386a / HUMS 211a / RLST 265a, Fate and Chance in Art and Experience  Noreen Khawaja

This seminar is co-taught with Sheila Heti. It discusses shifts in how the unchosen is conceived and how it is valued, across a range of contemporary fields and historical models—from Greek tragedy to contemporary performance art, from Protestant aesthetics of fate and grace to the I Jing and its interpreters, from mathematical and physical approaches to chance to the rise of astrology. Students consider when and where we ourselves operate with a belief in something like fate. The goal to explore whether and how a contemporary concept of fate may come into focus. HU

* LITR 388a / HUMS 274a / NELC 325a, The Education of Princes: Medieval Advice Literature of Rulership and Counsel  Shawkat Toorawa

In this course we read “mirrors for princes,” a type of political writing by courtiers and advisors. The genre flourished in the courts of medieval Europe and the Islamic world. We learn about the ethical and moral considerations that guided (or were meant to guide) rulers in their conduct, in the formulation of their policies, and about theories of rule and rulership. The works we read are from several cultural, religious, and political traditions, and include: Christine de Pizan, A Medieval Woman’s Mirror of Honor; Einhard, Life of Charlemagne; Erasmus, Education of a Christian Prince; Ibn al-Muqaffā’, Kalilah and Dimnah; John of Salisbury, Policraticus: Book of the Statesman; Machiavelli, The Prince; Nizam al-Mulk, The Book of Government. All texts are in English translation. Instructor permission is required. HU
* LITR 418a / JDST 339a / MMES 418a / RLST 203a, The Classics of Modern Hebrew Literature  Hannan Hever
Overview of the Poetics, Culture, History, and Political dynamics of Modern Hebrew Literature as national literature over the last 300 years. The course traces the literary development of its diasporic condition in Europe through the Hebrew Literature that is created in the Israeli Jewish sovereignty. The course is taught in Hebrew and the readings of literary texts are also in Hebrew. No background in Jewish literature, Hebrew literature, or Jewish culture is required.  HU

* LITR 431a / HUMS 229a / LAST 431a / SPAN 431a, Latin American Languages of Liberation: The Long Sixties  Staff
This is a multi-media seminar that studies the Latin American cultural and political discourses of liberation throughout the sixties, with an eye at assessing their legacy today. While the language that characterized the foundation of the nation-states in the 19th century was emancipation, in the second part of the twentieth century, and particularly around 1968, Latin America embraced the world discourse of liberation. This seminar examines languages of liberation in an array of disciplines and artistic practices from South and Central America as well as the Caribbean. We explore regional debates that were also inserted in the larger discourse of the anti-colonial struggles of the global South. Topics include Philosophy of liberation (Dussel), Theology of liberation (the 1968 Council of Bishops in Medellin, Colombia), Theater of the oppressed (Boal), Pedagogy of the oppressed (Freire), Cinema of liberation (manifestos of Third Cinema), the New Song protest movements across the region (both Spanish and Portuguese American music), anti-colonialism in the Caribbean (Césaire, Fanon), anti-neocolonialism (dependency theory, internal colonialism), Indigenous liberation (from the Barbados declarations to the Lacandon jungle declarations), experimental “boom” literature (Cortázar) etc.  HU  0 Course cr

* LITR 446b / FREN 247b, Experimental Literature, Theory, and Manifestoes  Morgane Cadieu
A survey of the French experimental prose of the 20th and 21st centuries. Corpus includes novels and plays, literary and political manifestoes, and landmark articles on literary theory, structuralism, and poststructuralism. Topics include: inspiration and creativity; the aesthetics of manifestoes and the politics of literature; automatic writing and constrained prose; feminist and queer writings; urban spaces in avant-garde literary movements. Works by: Bataille, Beauvoir, Beckett, Breton, Perec, Sarraute, Wittig. Theoretical excerpts by: Barthes, Deleuze, Derrida, Foucault, Glissant, Malabou.  L5, HU  TR

Dialogue constitutes an integral part of human experience and culture ever since antiquity. Whether as a rhetorical or a dramatic device, written or oral, fictional or not – dialogue substantiates the core of any intersubjective communication, building bridges between the self and the Other while maintaining them as two separate entities. This seminar explores the form and function of dialogue through a wide range of theoretical and literary texts, focusing on a set of social, hermeneutical, poetical, and political questions. Specific attention is given to literary cases of failed dialogues and miscomprehension, aiming at the unique ability of the literary text to draw our attention beyond the limits of human communication and language. Readings include
texts by Plato, Schlegel, Novalis, Bachtin, Levinas, Buber, Gadamer, Parsons, Kleist, Beckett, Melville, Schnitzler, Celan, Bachmann, and others.  

* LITR 463a / ENGL 268a / HUMS 254a / PHIL 227a, Literature and Philosophy, Revolution to Romanticism  
  Jonathan Kramnick  
  This is a course on the interrelations between philosophical and literary writing beginning with the English Revolution and ending with the beginnings of Romanticism. We read major works in empiricism, political philosophy, and ethics alongside poetry and fiction in several genres. Topics include the mind/body problem, political ideology, subjectivity and gender, and aesthetic experience as they take philosophical and literary form during a long moment of historical change.  

* LITR 473b / MMES 164b, Politics and Literature in the Middle East  
  Samuel Hodgkin  
  This course considers the relationship between literature and politics in Turkey, Iran, and the Arab world since the late 19th century. We read novels, short stories, poetry, essays, play scripts, and comics, and watch movies, while situating them in their artistic and political contexts. This course considers the ways that an artwork can intervene in the political debates of its time, while taking seriously the distinctive modes of political thought that are possible only through art. Topics include gender relations, the legacies of European colonialism, modernization and modernism, revolutionary movements, the role of religion in society, experiences of violence and trauma, and the drastic changes to Middle Eastern societies wrought by the oil boom. All readings are in English translation, but if sufficient students with relevant language skills enroll, an additional biweekly session may be arranged for selected course readings in the original languages.  

* LITR 482a / GMAN 288a / HUMS 480a / PHIL 469a, The Mortality of the Soul: From Aristotle to Heidegger  
  Martin Hagglund  
  This course explores fundamental philosophical questions of the relation between matter and form, life and spirit, necessity and freedom, by proceeding from Aristotle’s analysis of the soul in De Anima and his notion of practical agency in the Nicomachean Ethics. We study Aristotle in conjunction with seminal works by contemporary neo-Aristotelian philosophers (Korsgaard, Nussbaum, Brague, and McDowell). We in turn pursue the implications of Aristotle’s notion of life by engaging with contemporary philosophical discussions of death that take their point of departure in Epicurus (Nagel, Williams, Scheffler). We conclude by analyzing Heidegger’s notion of constitutive mortality, in order to make explicit what is implicit in the form of the soul in Aristotle.  

* LITR 483a / ENGL 248a / HSHM 476a / HUMS 430a / PHIL 361a, Thought Experiments: Connecting Literature, Philosophy and the Natural Sciences  
  Paul Grimstad  
  The course looks closely at the intersection of literature, philosophy and natural science through the lens of the thought experiment. Do thought experiments yield new knowledge about the world? What role does narrative or scene setting play in thought experiments? Can works of literary fiction or films function as thought experiments? Readings take up topics such as personal identity, artificial intelligence, meaning and intentionality, free will, time travel, the riddle of induction, “trolley problems” in ethics and the hard problem of consciousness. Authors
may include Mary Shelley, Plato, Albert Einstein, Franz Kafka, H.G. Wells, Rene Descartes, Kazuo Ishiguro, Rivka Galchen, Alan Turing, Hilary Putnam, as well as films (*The Imitation Game*) and television shows (*Black Mirror*). Students should have taken at least one course involving close analysis of works of literature or philosophy. WR, HU

* LITR 484b / AFST 443b / FREN 442b / MMES 402b, Decolonizing Memory : Africa & the Politics of Testimony  Jill Jarvis
This seminar explores the politics and poetics of memory in a time of unfinished decolonization. It also provides students with a working introduction to anticolonial, postcolonial, and decolonial critique. Together we bring key works on the topics of state violence, trauma, and testimony into contact with literary works and films by artists of the former French and British empires in Africa. Reading literary and theoretical works together permits us to investigate archival silences and begin to chart a future for the critical study of colonial violence and its enduring effects. Literary readings may include works by Djebar, Rahmani, Ouologuem, Sebbar, Diop, Head, Krog. Films by Djebar, Leuvecy, Sembène, and Sissako. Theoretical readings may include works by Arendt, Azoulay, Césaire, Derrida, Fanon, Mbembe, Ngugi, Spivak, and Trouillot. WR, HU

**Computer Science (CPSC)**

**CPSC S100a / CPSC 100a, Introduction to Computing and Programming**  Cody Murphrey and Jay Lim
In-person Course. Introduction to the intellectual enterprises of computer science and to the art of programming. Students learn how to think algorithmically and solve problems efficiently. Topics include abstraction, algorithms, data structures, encapsulation, resource management, security, software engineering, and web development. Languages include C, Python, SQL, and JavaScript, plus CSS and HTML. Problem sets inspired by real-world domains of biology, cryptography, finance, forensics, and gaming. 1 Credit. Tuition: $4,650. Session A: May 30 - July 1. QR

* **CPSC 035b / MUSI 035b, Twenty-First Century Electronic and Computer Music Techniques**  Scott Petersen
Exploration of twenty-first century electronic and computer music through the diverse subjects and issues at the intersection of technology and new music. How computers have changed and challenged the analysis, composition, production, and appreciation of music over the last fifty years. Knowledge of basic music theory and the ability to read Western musical notation is assumed. Enrollment limited to first-year students. Preregistration required; see under First-Year Seminar Program. QR

**CPSC 100a / CPSC S100a, Introduction to Computing and Programming**  Cody Murphrey and Jay Lim
Introduction to the intellectual enterprises of computer science and to the art of programming. Students learn how to think algorithmically and solve problems efficiently. Topics include abstraction, algorithms, data structures, encapsulation, resource management, security, software engineering, and web development. Languages include C, Python, SQL, and JavaScript, plus CSS and HTML. Problem sets inspired by real-world domains of biology, cryptography, finance, forensics, and gaming. See CS50’s website, https://cs50.yale.edu, for additional information. No
previous programming experience required. Open to students of all levels and majors.

QR oo Course cr

**CPSC 112b, Introduction to Programming**  Timothy Barron
Development on the computer of programming skills, problem-solving methods, and selected applications. No previous experience with computers necessary.  QR oo Course cr

* **CPSC 150a, 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 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 200a, Introduction to Information Systems**  Stephen Slade
The real-world artifacts and implementations that comprise the vital computational organisms that populate our world. Hardware and software and the related issues of security, privacy, regulation, and software engineering. Examples stress practical applications of technology, as well as limitations and societal issues. After CPSC 100 or 112 or equivalent.  QR

**CPSC 201a or b, Introduction to Computer Science**  Stephen Slade
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 or b, Mathematical Tools for Computer Science**  Staff
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 223a or b, Data Structures and Programming Techniques**  Staff
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

**CPSC 262b / AMTH 262b / S&DS 262b, Computational Tools for Data Science**  Roy Lederman

Introduction to the core ideas and principles that arise in modern data analysis, bridging statistics and computer science and providing students the tools to grow and adapt as methods and techniques change. Topics include principal component analysis, independent component analysis, dictionary learning, neural networks and optimization, as well as scalable computing for large datasets. Assignments include implementation, data analysis and theory. Students require background in linear algebra, multivariable calculus, probability and programming. Prerequisites: after or concurrently with MATH 222, 225, or 231; after or concurrently with MATH 120, 230, or ENAS 151; after or concurrently with CPSC 100, 112, or ENAS 130; after S&DS 100-108 or S&DS 230 or S&DS 241 or S&DS 242. Enrollment is limited; requires permission of the instructor.  QR

**CPSC 276b, Introduction to Applications of Computer and Data Science for the Digital Humanities**  Holly Rushmeier

Introduction to applications of computer and data science in the humanities, including web technologies, visualization, and database design. Students work in teams to develop a variety of applications proposed by faculty and staff from Yale humanities departments, the Digital Humanities Lab, the Institute for the Preservation of Cultural Heritage, and/or the Computer Science department. Meets with CPSC 376/HSAR 567/CLSS 840. Students may earn credit for CPSC 276 or 376; not both. Prerequisite: CPSC 110, CPSC 112, equivalent programming experience, or permission of the instructor.  QR, HU

**CPSC 310b, Technology, Power, and Security: Political Challenges of the Computer Age**  Joan Feigenbaum

Twenty-first century societies are faced with both threats and opportunities that combine sophisticated computation with politics and international relations in critical ways. Examples include cyber warfare; cyber espionage; cyber crime; the role of social media in democratic self-governance, authoritarian control, and election "hacking"; cryptocurrencies; and mass surveillance. This course examines the political challenges wrought by massive increases in the power of computational and communication technologies and the potential for citizens and governments to harness those technologies to solve problems. It is co-taught by one faculty member in computer science and one in political science. Programming experience and some knowledge of basic computer science is required. Meets with CPSC 210/PLSC 369. Students may earn credit for CPSC 210/PLSC 369 or for CPSC 310; not for both. Prerequisite: CPSC 223 or the equivalent.  QR, SO 0 Course cr

**CPSC 323a or b, Introduction to Systems Programming and Computer Organization**  Staff

Machine architecture and computer organization, systems programming in a high-level language, issues in operating systems, software engineering, prototyping in scripting languages. After CPSC 223.  QR RP
**CPSC 327a or b, Object-Oriented Programming**  Timothy Barron
Object-oriented programming as a means to designing and writing efficient, reliable, modular, and reusable code. Covers core concepts and features of object-oriented languages (classes, inheritance, composition, encapsulation, polymorphism, and exceptions) as well as the use of object-oriented design patterns (iterator, decorator, strategy, adapter, observer, etc.). This course was previously number CPSC 427. After CPSC 223.  QR

**CPSC 334a, Creative Embedded Systems**  Scott Petersen
Ubiquitous computing is creating new canvases and opportunities for creative ideas. This class explores the use of microprocessors, distributed sensor networks, IoT, and intermedia systems for the purposes of creative expression. The course is delivered in a mixed lecture and lab format that introduces the fundamental concepts and theory behind embedded systems as well as issues particular to their creative employment. The key objective of the course is for students to conceive of and implement creative uses of computation. To this end, skills to be obtained during the course are as follows: (1) appreciate the current efforts and motivation to push the limitations of computation for creative expression, both in new application and new foundational research; (2) weigh factors such as cost, power, processing, memory, I/O capabilities, and networking capabilities when choosing a set of embedded devices and sensors; (3) contextualize unfamiliar hardware and languages through examples, documentation, and familiar design pattern; and (4) manage communication between multiple languages, devices, and protocols. Additionally, at the end of the course students will have a portfolio of their work in the form of writing, code, video, audio, and physical artifacts. Prerequisite: CPSC 223 or equivalent or by permission of instructor.  QR  RP

**CPSC 338b / EENG 348b, Digital Systems**  Rajit Manohar
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

**CPSC 365b / ECON 365b, Algorithms**  Staff
Paradigms for algorithmic problem solving: greedy algorithms, divide and conquer, dynamic programming, and network flow. NP completeness and approximation algorithms for NP-complete problems. Algorithms for problems from economics, scheduling, network design and navigation, geometry, biology, and optimization. Provides algorithmic background essential to further study of computer science. Either CPSC 365 or CPSC 366 may be taken for credit. Prerequisites: CPSC 202 and 223.  QR

**CPSC 376b, Advanced Computer and Data Science Applications for the Digital Humanities**  Holly Rushmeier
Advanced applications of computer and data science in the humanities, including web technologies, visualization, and database design. Students work in teams to develop a variety of applications proposed by faculty and staff from Yale humanities faculty, the Digital Humanities Lab, the Institute for the Preservation of Cultural Heritage, and the Computer Science department. Meets with CPSC 376/CPSC 276/HSAR 567/CLSS 840. Students may earn credit for CPSC 276 or 376; not both. Prerequisite: CPSC 223 or equivalent, or permission of the instructor.  QR, HU
CPSC 413a, Computer System Security  Timothy Barron
Overview of the principles and practice behind analyzing, designing, and implementing secure computer systems. Covers problems that have continued to plague computer systems for years as well as recent events and research in this rapidly evolving field of computer science. Learn to think from the perspective of an adversary; to understand systems well enough to see how their flaws could be exploited, and to consequently defend against such exploitation. Offers opportunities for hands-on exploration of attacks and defenses in the contexts of web applications, networks, and system level software. Also discusses ethical considerations and responsibilities associated with security research and practice. After CPSC 323.

* CPSC 414a, Computing Then and Now: How Digital Technology Evolves  Michael Fischer
The goal of this course is to provide the historical perspective needed to think critically about today’s emerging computing technologies such as AI, self-driving cars, autonomous drones, quantum computers, and blockchains. This course traces the evolution of selected examples of digital technology from their intellectual bases through ubiquitous deployment. Examples are drawn from computer hardware and software systems, networking, algorithms, and applications. Prerequisite: CPSC 223 and junior or senior level standing in the major.

* CPSC 421b, Compilers and Interpreters  Jay Lim
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 422a, Design and Implementation of Operating Systems  Zhong Shao
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 424a, Parallel Programming Techniques  Andrew Sherman
Practical introduction to parallel programming, emphasizing techniques and algorithms suitable for scientific and engineering computations. Aspects of processor and machine architecture. Techniques such as multithreading, message passing, and data parallel computing using graphics processing units. Performance measurement, tuning, and debugging of parallel programs. Parallel file systems and I/O. Prerequisite: CPSC 323, or CPSC 223 and significant experience with C/C++ programming in another science, social science or engineering discipline, or permission of instructor. QR RP

CPSC 429a, Principles of Computer System Design  Lin Zhong
Humans are stupid; computers are limited. Yet a collaboration of humans and computers has led to ever more powerful and complex computer systems. This course examines the limitations of humans and computers in this endeavor and how they shape the design, implementation, and evaluation of computer systems. It surveys the empirical knowledge reported by scholars and practitioners that overcome such limitations. The lectures, reading assignments, and classroom discussions travel through psychology and philosophy and revisit important results from theoretical computer science, with a goal of elucidating the rationales behind the best practices in computer systems research and development. Prerequisite: CPSC 323 or equivalent.
Students should have the ability to write significant system programs in at least one systems programming language (e.g., C, C++ and Rust).

**CPSC 431a / MUSI 428a, Computer Music: Algorithmic and Heuristic Composition**  
Scott Petersen  
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 / MUSI 427b, Computer Music: Sound Representation and Synthesis**  
Scott Petersen  
Study of the theoretical and practical fundamentals of computer-generated music, with a focus on low-level sound representation, acoustics and sound synthesis, scales and tuning systems, 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 435a, Building an Internet Router**  
Robert Soule  
Over the course of the semester, students build a fully functioning Internet router. Students design the control plane in Python on a Linux host and design the data plane in the new P4 language on the bm2 software switch. To provide context and background for the design of their router, students read a selection of papers to get both a historical perspective and exposure to current research in networking. Prerequisite: CPSC 433.

**CPSC 437a, Introduction to Database Systems**  
Avi Silberschatz  

**CPSC 439a or b, Software Engineering**  
Timos Antonopoulos  
Introduction to fundamental concepts in software engineering and to the development and maintenance of large, robust software systems. The process of collecting requirements and writing specifications; project planning and system design; methods for increasing software reliability, including delta debugging and automatic test-case generation; type systems, static analysis, and model checking. Students build software in teams. After CPSC 323. QR RP

**CPSC 446a, Data and Information Visualization**  
Holly Rushmeier  
Visualization is a powerful tool for understanding data and concepts. This course provides an introduction to the concepts needed to build new visualization systems, rather than to use existing visualization software. Major topics are abstracting visualization tasks, using visual channels, spatial arrangements of data, navigation in visualization systems, using multiple views, and filtering and aggregating data. Case studies to be considered include a wide range of visualization types and applications in humanities, engineering, science, and social science. Prerequisite: CPSC 223.

**CPSC 447a, Introduction to Quantum Computing**  
Yongshan Ding  
This course introduces the fundamental concepts in the theory and practice of quantum computation. Topics include information processing, quantum programming, quantum
compilation, quantum algorithms, and error correction. The objective of the course is to engage students in applying fresh thinking to what computers can do – we establish an understanding of how quantum computers store and process data, and discover how they differ from conventional digital computers. We anticipate this course will be of interest to students working in computer science, electrical engineering, physics, or mathematics. Prerequisites: CPSC 201 and CPSC 202. Basic familiarity with discrete probability and linear algebra is recommended. Prior experience in quantum computing is useful but not required.

**CPSC 448a / EENG 426a / ENAS 876a, Silicon Compilation**  Rajit Manohar
An upper-level course on compiling computations into digital circuits using asynchronous design techniques. Emphasis is placed on the synthesis of circuits that are robust to uncertainties in gate and wire delays by the process of program transformations. Topics include circuits as concurrent programs, delay-insensitive design techniques, synthesis of circuits from programs, timing analysis and performance optimization, pipelining, and case studies of complex asynchronous designs. Prerequisite: EENG 201 and introductory programming, or permission of instructor.

* **CPSC 451b, The User Interface**  David Gelernter
The user interface (UI) in the context of modern design, where tech has been a strong and consistent influence from the Bauhaus and U.S. industrial design of the 1920s and 1930s through the IBM-Eames design project of the 1950s to 1970s. The UI in the context of the windows-menus-mouse desktop, as developed by Alan Kay and Xerox in the 1970s and refined by Apple in the early 1980s. Students develop a detailed design and simple implementation for a UI. Prerequisite: CPSC 223 or equivalent.

**CPSC 452b, Deep Learning Theory and Applications**  Smita Krishnaswamy
Deep neural networks have gained immense popularity within the last decade due to their success in many important machine learning tasks such as image recognition, speech recognition, and natural language processing. This course provides a principled and hands-on approach to deep learning with neural networks. Students master the principles and practices underlying neural networks including modern methods of deep learning, and apply deep learning methods to real-world problems including image recognition, natural language processing, and biomedical applications. The course is based on homework, a final exam, and a final project (either group or individual, depending on the total number enrolled). The project includes both a written and oral (i.e. presentation) component. Prerequisites: CPSC 202 and knowledge of Python Programming.

**CPSC 454b, Software Analysis and Verification**  Ruzica Piskac
Introduction to concepts, tools, and techniques used in the formal verification of software. State-of-the-art tools used for program verification; detailed insights into algorithms and paradigms on which those tools are based, including model checking, abstract interpretation, decision procedures, and SMT solvers. After CPSC 202 and 323 or equivalents.

**CPSC 455a / ECON 425a, Economics and Computation**  Yang Cai
A mathematically rigorous investigation of the interplay of economic theory and computer science, with an emphasis on the relationship of incentive-compatibility
and algorithmic efficiency. Our main focus is on algorithmic tools in mechanism
design, algorithms and complexity theory for learning and computing Nash and
market equilibria, and the price of anarchy. Case studies in Web search auctions,
wireless spectrum auctions, matching markets, and network routing, and social
networks. Prerequisite: CPSC 365 or permission of the instructor. Familiarity with basic
microeconomic theory is helpful but not required.  

CPSC 458b, Automated Decision Systems  Stephen Slade
The spectrum of automated decision models and tools, with a focus on their costs and
effectiveness. Examples from a variety of fields, including finance, risk management,
robotics, medicine, and politics. After CPSC 223 or equivalents.  

* CPSC 459a, Building Interactive Machines  Marynel Vazquez
This advanced course brings together methods from machine learning, computer
vision, robotics, and human-computer interaction to enable interactive machines to
perceive and act in a variety of environments. Part of the course examines approaches
for perception with different sensing devices and algorithms; the other part focuses on
methods for decision making and applied machine learning for control. Understanding
of probability, differential calculus, linear algebra, and planning (in Artificial
Intelligence) is expected for this course. Programming assignments require proficiency
in Python and high-level familiarity with C++. Prerequisites: CPSC 201, CPSC 202, and
CPSC 470 (or 570), or permission of the instructor.  

* CPSC 464a, Topics in Foundations of Machine Learning  Nisheeth Vishnoi
This course focuses on current and important topics in machine learning where a
foundational understanding is lacking or under development. This includes modern
algorithmic methods, novel learning and generative models, and the societal impact of
machine learning. Representative topics include optimization and sampling methods
for non-convex functions in Euclidean spaces or manifolds, algorithms beyond worst
case, fairness, and robustness. This course is for students who would like to address
the limitations of current machine learning systems deployed in the real world through
a combination of foundational work such as coming up with the right definitions,
modeling, methods, along with empirical evaluation. Prerequisites: CPSC 365 or
366 is required and S&DS 251 is recommended. Solid background in calculus, linear
algebra, stochastic processes, and advanced algorithms along with a good background
in programming is necessary.  

CPSC 465a, Theory of Distributed Systems  James Aspnes
Models of asynchronous distributed computing systems. Fundamental concepts of
concurrency and synchronization, communication, reliability, topological and geometric
constraints, time and space complexity, and distributed algorithms. After CPSC 365 or
366.  

CPSC 467b, Cryptography and Computer Security  Charalampos Papamanthou
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 or MATH 244, and 223.
CPSC 468a, Computational Complexity  Staff
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 366, or with permission of instructor.  QR

CPSC 469b, 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 or 366; a solid background in probability is desirable.  QR

CPSC 470b, Artificial Intelligence  Staff
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 472a, 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 201 and 202 or equivalents. May not be taken after CPSC 473.  QR

* CPSC 473b, Intelligent Robotics Laboratory  Brian Scassellati
Students work in small teams to construct novel research projects using one of a variety of robot architectures. Project topics may include human-robot interaction, adaptive intelligent behavior, active perception, humanoid robotics, and socially assistive robotics. Enrollment limited to 20. After CPSC 472.  QR

CPSC 474a, Computational Intelligence for Games  James Glenn
Introduction to techniques used for creating computer players for games, particularly board games. Topics include combinatorial and classical game theory, stochastic search methods, applications of neural networks, and procedural content generation. Prerequisites: CPSC 202 and CPSC 223.  QR

CPSC 475a / BENG 475a / EENG 475a, 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. Prerequisite: CPSC 112 and MATH 120, or with permission of instructor.  QR, SC, RP

CPSC 477b, Natural Language Processing  Dragomir Radev
Linguistic, mathematical, and computational fundamentals of natural language processing (NLP). Topics include part of speech tagging, Hidden Markov models, syntax and parsing, lexical semantics, compositional semantics, machine translation, text classification, discourse, and dialogue processing. Additional topics such as
sentiment analysis, text generation, and deep learning for NLP. Prerequisites: CPSC 202 and CPSC 223, or permission of instructor. QR

**CPSC 478b, 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 482b, Current Topics in Applied Machine Learning**  David van Dijk
We cover recent advances in machine learning that focus on real-world data. We discuss a wide range of methods and their applications to diverse domains, such as finance, health care, genomics, protein folding, drug discovery, neuroscience, and natural language processing. The seminar is based on a series of lectures by the instructor, guest lecturers, and student presentations. Student presentations are expected to be on recent publications from leading journals and conferences in the field, and are followed by discussions. A final project involves the application of a machine learning method to real-world data. Prerequisites: Basic programming knowledge (e.g., CPSC 112 or equivalent, in Python); mathematical background in Linear algebra (e.g., MATH 222/225 or equivalent); and Calculus (e.g., MATH 120 or equivalent); or instructor permission.

**CPSC 484b, Introduction to Human-Computer Interaction**  Marynél Vazquez
This course introduces students to the interdisciplinary field of Human-Computer Interaction (HCI), with particular focus on Human-Robot Interaction (HRI). The first part of the course covers principles and techniques in the design, development, and evaluation of interactive systems. It provides students with an introduction to UX Design and User-Centered Research. The second part focuses on the emergent field of HRI and several other non-traditional interfaces, e.g., AR/VR, tangibles, crowdsourcing. The course is organized as a series of lectures, presentations, a midterm exam, and a semester-long group project on designing a new interactive system. After CPSC 201 and 202 or equivalents. Students who do not fit this profile may be allowed to enroll with the permission of the instructor. SO

* **CPSC 490a, Senior Project**  Ruzica Piskac
Individual research intended to fulfill the senior requirement. 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.

**Computer Science and Economics (CSEC)**

**CSEC 491a, Senior Project**  Philipp Strack
This one-term independent-project course explicitly combines both techniques and subject matter from computer science and economics. A project proposal must be approved by the DUS and project adviser by the end of the third week of the term in which the student is enrolled.
Computing and the Arts (CPAR)

*CPAR 491a, Senior Project in Computing and the Arts*  Julie Dorsey
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 (CZEC)

**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. Online articles, annotated excerpts from Capek's *R. U. R.*, Hasek's *Svejk*, Kundera's *Joke* and *Unbearable Lightness of Being*, and Havel's *Private View*. Audio- and videotapes. 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 246b / FILM 364b / RSEE 240b, Milos Forman and His Films*  Karen von Kunes
An in-depth examination of selected films by Milos Forman and representatives of the New Wave, *cinéma vérité* in Czech filmmaking. Special attention to Forman's artistic and aesthetic development as a Hollywood director in such films as *Hair, One Flew over the Cuckoo's Nest, Ragtime,* and *Amadeus.* Screenings and discussion in English. HU

The DeVane Lecture Course (DEVN)

The next Devane Lecture Course will be offered during the spring 2023 term. Information is pending.

Directed Studies (DRST)

Dutch (DUTC)
Earth and Planetary Sciences (EPS)

**EPS 100a, Natural Disasters**  David Bercovici and Maureen Long
Natural events and their impact on humanity and the built environment. Earthquakes, volcanoes, tsunamis, landslides, coastal flooding, tornadoes, hurricanes, and meteoritic impacts. Hazard mitigation strategies. Consequences of global warming.  sc

**EPS 101a, Climate Change**  Mary-Louise Timmermans and Noah Planavsky
An introductory course that explores the science of global climate change. We analyze processes that regulate the climate on Earth, assess the scientific evidence for global warming, and discuss consequences of climate change. We explore Earth's climate history as it relates to the present climate as well as future climate projections. Uncertainty in the interpretation of climate observations and future projections are examined.  sc

* EPS 105b / APHY 100b / ENAS 100b / EVST 100b / PHYS 100b, Energy, Environment, and Public Policy  Daniel Prober
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.  qr, sc

**EPS 110a, Dynamic Earth**  David Evans
An introduction to the Earth as a planetary system, from its atmosphere to its core; and how the constantly changing surface environment controls both the foundation and fate of industrial society. Topics include planetary structure; plate tectonics, earthquakes and volcanoes; minerals, rocks and soils; evolution of landscapes; hydrology and floods; coasts and oceans; climate and weather; Earth history and biological evolution; humanity’s economic dependence on natural resources; and human influences on the natural environment.  sc

**EPS 111La, Dynamic Earth Laboratory and Field Methods**  David Evans
Practical exercises in the laboratory and in the field to complement EPS 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 EPS 110, or after EPS 115.  sc ½ Course cr

**EPS 274a, Fossil Fuels and World Energy**  Michael Oristaglio
The origins, geologic settings, exploration, distribution, and extraction of coal, oil, and natural gas as finite Earth resources. The role of fossil fuels in the world's energy systems; environmental impacts of fossil fuels, including climate change; the transition to low-carbon energy sources. Prerequisites: high school chemistry, mathematics, and Earth science. Recommended preparation: G&G 110 or 205.  sc

* EPS 275b, Renewable Energy  Michael Oristaglio
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
EPS 312a, Structural Geology  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

EPS 325a, Vertebrate Paleontology  Jacques Gauthier
Phylogeny and evolution of the major clades of vertebrates from Cambrian to Recent, as inferred mainly from the fossilized remains of the musculoskeletal system (cranial, axial, and appendicular skeletons). Special attention given to the evolution of vertebrate feeding, locomotor, and sensory systems. Prerequisite: E&EB 225, or with permission of instructor. SC 1½ Course cr

EPS 326a, Introduction to Earth and Planetary Physics  Shun-ichiro Karato
An introduction to the structure and dynamics of Earth and other planets in the context of cosmic evolution. Review of basic physical principles and their applications to geophysics and planetary physics. Star formation and nucleosynthesis; planetary accretion and the birth of the solar system; heat flow, plate tectonics, and mantle dynamics; seismology and geodesy; core dynamics, geomagnetism, and planetary magnetism. Prerequisites: PHYS 181b and MATH 120a or b, or equivalents. QR, SC

EPS 335a, 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

EPS 350a, Rock Formation in 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: EPS 220 or permission of instructor. SC 0 Course cr

EPS 355a, Extraordinary Glimpses of Past Life  Derek Briggs
Study of exceptionally well-preserved fossil deposits (lagerstätten) that contain nonmineralized 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. SC

EPS 428a / AMTH 428a / E&EB 428a / PHYS 428a, Science of Complex Systems  Jun Korenaga
Introduction to the quantitative analysis of systems with many degrees of freedom. Fundamental components in the science of complex systems, including how to simulate complex systems, how to analyze model behaviors, and how to validate models using observations. Topics include cellular automata, bifurcation theory, deterministic chaos, self-organized criticality, renormalization, and inverse theory. Prerequisite: PHYS 301, MATH 247, or equivalent. QR, SC
* EPS 487a, Individual Study in Earth and Planetary Sciences  Pincelli Hull
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

* EPS 488a, Research in Earth and Planetary Sciences  Pincelli Hull
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.

* EPS 490a and EPS 491a, Research and Senior Thesis  Pincelli Hull
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 start of the senior year. The plan requires approval of the full EPS faculty.

* EPS 492a, The Senior Essay  Pincelli Hull
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.

East Asian Languages and Literatures (EALL)

EALL 200a / CHNS 200a / EAST 240a / HUMS 270a, The Chinese Tradition  Staff
An introduction to the literature, culture, and thought of premodern China, from the beginnings of the written record to the turn of the twentieth century. Close study of textual and visual primary sources, with attention to their historical and cultural backdrops. Students enrolled in CHNS 200 join a weekly Mandarin-language discussion section. No knowledge of Chinese required for students enrolled in EALL 200. Students enrolled in CHNS 200 must have L5 proficiency in Mandarin or permission of the course instructor.  HU  TR  0 Course cr

EALL 212b / PHIL 203b, Ancient Chinese Thought  Mick 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

* EALL 252b / EAST 251b / FILM 446b / LITR 384b, Japanese Cinema before 1960  Aaron Gerow
The history of Japanese cinema to 1960, including the social, cultural, and industrial backgrounds to its development. Periods covered include the silent era, the coming of sound and the wartime period, the occupation era, the golden age of the 1950s, and the new modernism of the late 1950s. No knowledge of Japanese required. Formerly JAPN 270.  HU  TR

EALL 256b / EAST 358b / GLBL 251b / HUMS 272b / LITR 265b, China in the World  Jing Tsu
Recent headlines about China in the world, deciphered in both modern and historical contexts. Interpretation of new events and diverse texts through transnational
connections. Topics include China and Africa, Mandarinization, Chinese America, science and technology, science fiction, and entrepreneurship culture. Readings and discussion in English. HU

* EALL 280a / EAST 260a / FILM 307a, East Asian Martial Arts Film  Staff
The martial arts film has not only been a central genre for many East Asian cinemas, it has been the cinematic form that has most defined those cinemas for others. Domestically, martial arts films have served to promote the nation, while on the international arena, they have been one of the primary conduits of transnational cinematic interaction, as kung-fu or samurai films have influenced films inside and outside East Asia, from The Matrix to Kill Bill. Martial arts cinema has become a crucial means for thinking through such issues as nation, ethnicity, history, East vs. West, the body, gender, sexuality, stardom, industry, spirituality, philosophy, and mediality, from modernity to postmodernity. It is thus not surprising that martial arts films have also attracted some of the world’s best filmmakers, ranging from Kurosawa Akira to Wong Kar Wai. This course focuses on films from Japan, China, Hong Kong, Taiwan, and South Korea—as well as on works from other countries influenced by them—covering such martial arts genres such as the samurai film, kung-fu, karate, wuxia, and related historical epics. It provides a historical survey of each nation and genre, while connecting them to other genres, countries, and media. HU TR 0 Course cr

* EALL 296b / EAST 391b / RLST 121b, Religion and Culture in Korea  Hwansoo Kim
Introduction to Shamanism, Buddhism, Confucianism, Daoism, Christianity, and new religions in Korea from ancient times to the present. Examination of religious traditions in close relationships with social, economic, political, and cultural environments in Korean society. Examination of religious tensions, philosophical arguments, and ethical issues that indigenous and foreign religions in Korea have engaged throughout history to maximize their influence in Korean society. HU

* EALL 300b / EAST 340b, Sinological Methods  Pauline Lin
A research course in Chinese studies, designed for students with background in modern and literary Chinese. Explore and evaluate the wealth of primary sources and research tools available in China and in the West. For native speakers of Chinese, introduction to the secondary literature in English and instruction in writing professionally in English on topics about China. Topics include Chinese bibliographies; bibliophiles’ notes; specialized dictionaries; maps and geographical gazetteers; textual editions, variations and reliability of texts; genealogies and biographical sources; archaeological and visual materials; and major Chinese encyclopedias, compendia, and databases. Prerequisite: CHNS 171 or equivalent. Formerly CHNS 202. HU

* EALL 470a or b and EALL 471a or b, Independent Tutorial  Lucas Bender
For students with advanced Chinese, Japanese, or Korean 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.
* EALL 491a or b, Senior Essay  Lucas Bender
Preparation of a one-term senior essay under faculty supervision.

* EALL 492a or b and EALL 493a or b, Yearlong Senior Essay  Staff
Preparation of a two-term senior essay under faculty supervision. Credit for EALL 492 only on completion of EALL 493.

East Asian Studies (EAST)

EAST 119a / HSAR 119a, Introduction to the History of Art: Asian Art and Culture  Quincy Ngan
This introductory course explores the art of India, China, Japan, and Korea from prehistory to the present. We consider major works and monuments from all four regions. Themes include the representation of nature and the body, the intersection of art with spirituality and politics, and everything from elite to consumer culture. All students welcome, including those who have no previous experience with either art history or the study of Asian art. This class makes frequent visits to Yale University Art Gallery.  HU 0 Course cr

EAST 220a / HIST 321a, China from Present to Past  Staff
Underlying causes of current issues facing China traced back to their origins in the premodern period. Topics include economic development, corruption, environmental crises, gender, and Pacific island disputes. Selected primary-source readings in English, images, videos, and Web resources.  WR, HU 0 Course cr

EAST 240a / CHNS 200a / EALL 200a / HUMS 270a, The Chinese Tradition  Staff
An introduction to the literature, culture, and thought of premodern China, from the beginnings of the written record to the turn of the twentieth century. Close study of textual and visual primary sources, with attention to their historical and cultural backdrops. Students enrolled in CHNS 200 join a weekly Mandarin-language discussion section. No knowledge of Chinese required for students enrolled in EALL 200. Students enrolled in CHNS 200 must have L5 proficiency in Mandarin or permission of the course instructor.  HU 0 Course cr

* EAST 251b / EALL 252b / FILM 446b / LITR 384b, Japanese Cinema before 1960  Aaron Gerow
The history of Japanese cinema to 1960, including the social, cultural, and industrial backgrounds to its development. Periods covered include the silent era, the coming of sound and the wartime period, the occupation era, the golden age of the 1950s, and the new modernism of the late 1950s. No knowledge of Japanese required. Formerly JAPN 270.  HU

* EAST 260a / EALL 280a / FILM 307a, East Asian Martial Arts Film  Staff
The martial arts film has not only been a central genre for many East Asian cinemas, it has been the cinematic form that has most defined those cinemas for others. Domestically, martial arts films have served to promote the nation, while on the international arena, they have been one of the primary conduits of transnational cinematic interaction, as kung-fu or samurai films have influenced films inside and outside East Asia, from The Matrix to Kill Bill. Martial arts cinema has become a crucial means for thinking through such issues as nation, ethnicity, history, East vs. West, the body, gender, sexuality, stardom, industry, spirituality, philosophy, and mediality, from modernity to postmodernity. It is thus not surprising that martial arts films have
also attracted some of the world's best filmmakers, ranging from Kurosawa Akira to Wong Kar Wai. This course focuses on films from Japan, China, Hong Kong, Taiwan, and South Korea—as well as on works from other countries influenced by them—covering such martial arts genres such as the samurai film, kung-fu, karate, wuxia, and related historical epics. It provides a historical survey of each nation and genre, while connecting them to other genres, countries, and media.  

**EAST 301b / 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.  

**EAST 310a / GLBL 309a / PLSC 357a, The Rise of China**  
Staff  
Analysis of Chinese domestic and foreign politics, with a focus on the country's rise as a major political and economic power. Topics include China's recent history, government, ruling party, technology, trade, military, diplomacy, and foreign policy.  

**EAST 313a / ANTH 213a, Contemporary Japan and the Ghosts of Modernity**  
Yukiko Koga  
This course introduces students to contemporary Japan, examining how its defeat in the Second World War and loss of empire in 1945 continue to shape Japanese culture and society. Looking especially at the sphere of cultural production, it focuses on the question of what it means to be modern as expressed through the tension between resurgent neonationalism and the aspiration to internationalize. The course charts how the legacy of Japan's imperial failure plays a significant role in its search for renewal and identity since 1945. How, it asks, does the experience of catastrophic failure—and failure to account for that failure—play into continued aspirations for modernity today? How does Japanese society wrestle with modernity's two faces: its promise for progress and its history of catastrophic violence? The course follows the trajectory of Japan's postwar nation-state development after the dissolution of empire, from its resurrection out of the ashes after defeat, to its identity as a US ally and economic superpower during the Cold War, to decades of recession since the 1990s and the search for new relations with its neighbors and new reckonings with its own imperial violence and postwar inactions against the background of rising neonationalism.  

* **EAST 335b / RLST 135b, Zen Buddhism**  
Eric Greene  
Survey of the history and teachings of Zen Buddhism in China and Japan. Emphasis on reading and interpretation of primary Zen texts in their historical and religious context, along with investigation of modern interpretations and appropriations of Zen in the West.  

* **EAST 340b / EALL 300b, Sinological Methods**  
Pauline Lin  
A research course in Chinese studies, designed for students with background in modern and literary Chinese. Explore and evaluate the wealth of primary sources and research tools available in China and in the West. For native speakers of Chinese, introduction to the secondary literature in English and instruction in writing professionally in English on topics about China. Topics include Chinese bibliographies; bibliophiles' notes;
specialized dictionaries; maps and geographical gazetteers; textual editions, variations and reliability of texts; genealogies and biographical sources; archaeological and visual materials; and major Chinese encyclopedias, compendia, and databases. Prerequisite: CHNS 171 or equivalent. Formerly CHNS 202. HU

**EAST 358b / EALL 256b / GLBL 251b / HUMS 272b / LITR 265b, China in the World** Jing Tsu

Recent headlines about China in the world, deciphered in both modern and historical contexts. Interpretation of new events and diverse texts through transnational connections. Topics include China and Africa, Mandarinization, Chinese America, science and technology, science fiction, and entrepreneurship culture. Readings and discussion in English. HU

* **EAST 390b / RLST 102b, Atheism and Buddhism** Hwansoo Kim

A critical examination of atheism and religions (Buddhism), with a focus on intellectual, religious, philosophical, and scientific debates about God, the origin of the universe, morality, evolution, neuroscience, happiness, enlightenment, the afterlife, and karma. Readings selected from philosophical, scientific, and religious writings. Authors include some of the following: Charles Darwin, Bertrand Russell, Christopher Hitchins, Richard Dawkins, Deepak Chopra, Sam Harris, Owen Flanagan, Stephen Batchelor, and the Dalai Lama. HU

* **EAST 391b / EALL 296b / RLST 121b, Religion and Culture in Korea** Hwansoo Kim

Introduction to Shamanism, Buddhism, Confucianism, Daoism, Christianity, and new religions in Korea from ancient times to the present. Examination of religious traditions in close relationships with social, economic, political, and cultural environments in Korean society. Examination of religious tensions, philosophical arguments, and ethical issues that indigenous and foreign religions in Korea have engaged throughout history to maximize their influence in Korean society. HU

* **EAST 417b / ANTH 414b, Hubs, Mobilities, and World Cities** 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 0 Course cr

* **EAST 427a / HSAR 427a, Chinese Skin Problems** Quincy Ngan

This seminar uses artwork as a means of understanding the various skin problems faced by contemporary Chinese people. Divided into four modules, this seminar first traces how the “ideal skin” as a complex trope of desire, superficiality, and deception has evolved over time through the ghost story, *Painted Skin* (*Huapi*), and its countless spin-offs. Second, the course explores how artists have overcome a variety of social distances and barriers through touch; we look at artworks that highlight the healing power and erotic associations of cleansing, massaging, and moisturizing the skin. Third, we explore the relationship between feminism and gender stereotypes through artworks and performances that involve skincare, makeup and plastic surgery. Fourth, the course investigates the dynamics between “Chineseness,” colorism, and racial tensions through the artworks produced by Chinese-American and diasporic artists. Each module is comprised of one meeting focusing on theoretical frameworks and two meetings focusing on individual artists and close analysis of artworks. Readings include Cathy
Park Hong’s *Minor Feelings*, Nikki Khanna’s *Whiter*, and Leta Hong Fincher’s *Leftover Women*.  

* EAST 470a or b, Independent Study  
Staff
For students with advanced Chinese, Japanese, or Korean language skills who wish to pursue a close study of the East Asia region, not otherwise covered by departmental offerings. May be used for research, a special project, or a substantial research paper under faculty supervision. A term paper or its equivalent and regular meetings with an adviser are required. 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, signed by the adviser, by the end of the first week of classes and its approval by the director of undergraduate studies.

* EAST 480a or b, One-Term Senior Essay  
Staff
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 EAST 492b, Senior Research Project  
Staff
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. Credit for EAST 491 only on completion of EAST 492. ½ Course cr per term

**Ecology & Evolutionary Biology (E&EB)**

* E&EB 106a / HLTH 155a / MCDB 106a, 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, dengue, and Lyme disease. Biology of the pathogens including modes of transmission, establishment of infection, and immune responses; the challenges associated with vector control, prevention, development of vaccines, and treatments. Intended for non–science majors; preference to freshmen and sophomores. Prerequisite: high school biology.  SC

E&EB 210a / S&DS 101a, Introduction to Statistics: Life Sciences  
Jonathan Reuning-Scherer
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

E&EB 220a / EVST 223a, General Ecology  
David Vasseur
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 0 Course cr
E&EB 223Lb, Laboratory for Principles of Ecology, Evolutionary Biology, and the Tree of Life  Marta Wells
Study of evolutionary novelties, their functional morphology, and their role in the diversity of life. Introduction to techniques used for studying the diversity of animal body plans. Evolutionary innovations that have allowed groups of organisms to increase their diversity.  sc  o Course cr

E&EB 225b, Evolutionary Biology  Paul Turner
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  o Course cr

E&EB 242b, Behavioral Ecology  Vanessa Ezenwa
An introduction to the study of animal behavior from an evolutionary and ecological perspective. Topics include decision-making, group living and cooperation, sexual selection and mating behavior, signaling and communication. In addition to lectures, in-class discussions and activities, students engage in the material by design and implement their own research projects. Prerequisite: BIOL 104, or permission of instructor.  sc

E&EB 250a, Biology of Terrestrial Arthropods  Marta 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). To be taken concurrently with E&EB 251L.  sc

E&EB 251La, Laboratory for Biology of Terrestrial Arthropods  Marta Wells
Comparative anatomy, dissections, identification, and classification of terrestrial arthropods; specimen collection; field trips. Concurrently with or after E&EB 250.  sc  o Course cr

E&EB 262a, The Biology of Sharks and Their Relatives  Joshua Moyer
An integrative course that examines the biology of sharks and other cartilaginous fishes (Class Chondrichthyes) from a variety of perspectives. Students learn about the taxonomy and systematics, paleontology, functional anatomy, behavior, physiology, ecology, and cultural significance of sharks. Coursework includes answers to discussion prompts, guided review of scientific literature, and in-class exams that allow students to demonstrate their understanding of chondrichthyan biology and sharks’ unique place in the vertebrate tree of life. To be taken with E&EB 263L.  sc

E&EB 263La, The Biology of Sharks and Their Relatives Laboratory  Joshua Moyer
This is a hands-on, specimen-based overview of the fossil record, comparative anatomy, functional morphology, and biodiversity of sharks and their relatives, the skates, rays, and ratfish. Students examine and dissect fresh and preserved specimens and use the fossil remains of extinct sharks to investigate the evolution of cartilaginous fishes. This course should be taken concurrently with E&EB 262, The Biology of Sharks and Their
Relatives. Prerequisites: BIOL 104 Principles of Ecology and Evolutionary Biology  SC
½ Course cr
* E&EB 272b, 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 273b, Laboratory for Ornithology  Richard Prum
Laboratory and field studies of avian morphology, diversity, phylogeny, classification, identification, and behavior. Concurrently with E&EB 272b.  SC ½ Course cr
* E&EB 275b / EVST 400b, 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

E&EB 290b, Comparative Developmental Anatomy of Vertebrates  Joshua Moyer
A survey of the development, structure, and evolution of major vertebrate groups. Topics include the micro-anatomy of major organ systems, the developmental underpinnings of the vertebrate body plan, and the development, 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 291Lb, Comparative Anatomy of Vertebrates Laboratory  Joshua Moyer
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 295a, Life in Motion: Ecological and Evolutionary Physiology  Martha Munoz
Physiology is the study of the functions that organisms perform and how they use those functions to interact with the environment. To survive, grow, and reproduce, all organisms must acquire energy and avoid conditions that exceed their physiological limits. These interactions all involve motion—ions traveling across membranes, muscle fibers twitching, respiration, and locomotion, to name a few. In this course, we tackle physiological processes from both “bottom up” and “top down” approaches, with integration among these dimensions, to extract general physiological rules of life. Then, we link our discoveries to the broader context of ongoing global change, and consider whether and how organisms can physiologically respond to contemporary selective pressures. While the course focuses heavily on animal physiology, plants, fungi, and microbes are also featured. Prerequisites: BIOL 101, 102, 103, 104, and CHEM 161, or permission of the instructor.  SC

E&EB 322a, Evolutionary Genetics  Staff
Genetic variation is the currency by which natural selection is translated into evolutionary change. In this course we dissect patterns of genetic variation using an evolutionary mindset to ultimately understand what shapes genetic variation in nature and the potential for species to adapt to new and changing environments. This class unites two foundational fields of evolutionary genetics; quantitative genetics (the study of the genetic basis of complex traits) and population genetics (the study of gene
variant frequencies across time and space), with an ultimate goal of understanding evolutionary change in nature. Although this course is lecture based, there is much opportunity for hands-on learning. Students use real-life and simulated genetic data to map the genetic basis of traits and investigate the evolutionary forces responsible for shaping genetic variation in nature. We also discuss how quantitative and population genetics theory are applied to the modern genomic era, particularly in the context of detecting genomic signatures of adaptation. Lastly, we discuss the application of evolutionary genetics to human populations, including the usefulness and missteps of these applications for science and society. Prerequisite: E&EB 225, Evolutionary Biology.

* E&EB 336a / HSHM 453a / HUMS 336a, Culture and Human Evolution  Gary Tomlinson

Examination of the origins of human modernity in the light of evolutionary and archaeological evidence. Understanding, through a merger of evolutionary reasoning with humanistic theory, the impact of human culture on natural selection across the last 250,000 years.  HU, SC

E&EB 354a, Phylogenetic Biology  Casey Dunn

Phylogenetic Biology is the study of the evolutionary relationships between organisms, and the use of evolutionary relationships to understand other aspects of organism biology. This course surveys phylogenetic methods, providing a detailed picture of the statistical, mathematical, and computational tools for building phylogenies and using them to study evolution. We also examine the application of these tools to particular problems in the literature and emerging areas of study. Prerequisites: E&EB 225 and an organismal course.  SC

E&EB 428a / AMTH 428a / EPS 428a / PHYS 428a, Science of Complex Systems  Jun Korenaga

Introduction to the quantitative analysis of systems with many degrees of freedom. Fundamental components in the science of complex systems, including how to simulate complex systems, how to analyze model behaviors, and how to validate models using observations. Topics include cellular automata, bifurcation theory, deterministic chaos, self-organized criticality, renormalization, and inverse theory. Prerequisite: PHYS 301, MATH 247, or equivalent.  QR, SC

E&EB 464b / 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.  SC, SO 0 Course cr

* E&EB 469a or b, Tutorial  Marta 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. Proposals must be submitted no later than the
first day of the second week of the term in which the student enrolls in the tutorial. The final paper is due in the hands of the director of undergraduate studies by the last day of reading period in the term of enrollment. 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 may be counted as an elective toward the requirements of the major. Normally, faculty sponsors must be members of the EEB department.

* E&EB 470a or b, Senior Tutorial  Marta Wells
Tutorial for seniors in the B.A. degree program who elect a term of independent study to complete the senior requirement. A thesis, fifteen to twenty pages in length, is required. A student must be sponsored by a faculty member who sets requirements and meets weekly with the student. 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. Proposals must be submitted no later than the first day of the second week of the term in which the student enrolls in the tutorial. The final paper is due in the hands of the director of undergraduate studies by the last day of reading period in the term of enrollment. Normally, faculty sponsors must be members of the EEB department. Enrollment limited to seniors. Fulfills the senior requirement for the B.A. degree.

* E&EB 474a or b, Research  Marta 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 Canvas, 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 no later than the first day of the second week of the term in which the student enrolls in the course. The final research paper is due in the hands of the director of undergraduate studies by the last day of reading period in the term of enrollment.

* E&EB 475a and E&EB 476b, Senior Research  Marta 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 Canvas, 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 no later than the first day of the second week of the term in which the student enrolls in the course. The final research paper is due in the hands of the director of undergraduate studies by the last day of classes in the term of enrollment. Fulfills the senior requirement for the B.S. degree. Enrollment limited to seniors.
**E&EB 495a and E&EB 496b, Intensive Senior Research**  Marta 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 director of undergraduate studies; forms are available from the office of undergraduate studies. For research in the fall term, approval is encouraged during the spring term of the junior year. Proposals are due no later than the first day of the second week of the term in which the student enrolls in the course. The final research paper is due in the hands of the director of undergraduate studies by the last day of reading period in the term of enrollment. One term of intensive research fulfills a portion of the senior requirement for the B.S. degree.  

2 Course cr per term

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**Economics (ECON)**

* **ECON 001b, Economic Ideas Worth a Nobel Prize**  Jose-Antonio Espin-Sanchez
This course introduces students to a selection of ideas that in the past fifty years have merited a Nobel Prize in economics. The goal of the course is twofold. First, it serves as an introduction to a wide range of economic topics. Second, by studying the most influential economic ideas, students learn firsthand how economic science has evolved. The course is not structured chronologically, but according to economic areas, such as microeconomics, macroeconomics, finance, poverty, and the environment. No prior knowledge of economics or statistics is assumed. Enrollment limited to first-year students. Preregistration required; see under First-Year Seminar Program.

* **ECON 002b, Social Issues in America**  Rebecca Toseland
This seminar investigates how data and economics can be used to understand and solve some of the most pressing contemporary social issues in the United States. Topics include equality of opportunity, education, health, climate change, criminal justice, and discrimination. In the context of these topics, the course provides an introduction to some basic economic concepts and data analysis techniques. No prior knowledge of economics or statistics is assumed. Enrollment limited to first-year students. Preregistration required; see under First-Year Seminar Program.

* **ECON 108a or b, Quantitative Foundations of Microeconomics**  Tolga Koker
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; visit economics.yale.edu/undergraduate-program for more information. May not be taken after ECON 110 or 115. QR, SO

* **ECON 110a or b, An Introduction to Microeconomic Analysis**  Staff
Similar to ECON 115, but taught as a lecture discussion with limited enrollment. Enrollment limited to first-years and sophomores. Online preregistration is required; visit economics.yale.edu/undergraduate-program for more information. May not be taken after ECON 108 or 115. QR, SO

* **ECON 111a or b, An Introduction to Macroeconomic Analysis**  Staff
Similar to ECON 116, but taught as a lecture discussion with limited enrollment. Enrollment limited to first-years and sophomores. Online preregistration is required;
visit economics.yale.edu/undergraduate-program for more information. May not be taken after ECON 116. Prerequisite: ECON 108, 110, or 115. SO

**ECON 115a or b, Introductory Microeconomics** Staff
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 o Course cr

**ECON 116a or b, Introductory Macroeconomics** Staff
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 o Course cr

**ECON 117a or b, Introduction to Data Analysis and Econometrics** Staff
Introduction to data analysis from the beginning of the econometrics sequence; exposure to modern empirical economics; and development of credible economic analysis. This course emphasizes working directly and early with data, through such economic examples as studies of environmental/natural resource economics, intergenerational mobility, discrimination, and finance. Topics include: probability, statistics, and sampling; selection, causation and causal inference; regression and model specification; and machine learning and big data. Prerequisites: ECON 108, 110, 115, or equivalent and familiarity with single variable calculus. Students who have taken ECON 131 may not receive major credit for this course. QR, SO o Course cr

**ECON 121a or b, Intermediate Microeconomics** Staff
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 o Course cr

**ECON 122a or b, Intermediate Macroeconomics** 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. 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 o Course cr

**ECON 123a or b, Intermediate Data Analysis and Econometrics** Staff
Comprehensive and theoretical examination of econometrics, with further exploration of topics covered in ECON 117. A term research project addresses a research question chosen by the student, and involves the application of learned methods to a relevant data set. Prerequisites: ECON 108, 110, 115, or equivalent; ECON 117; and familiarity with single variable calculus. QR, SO o Course cr

**ECON 125a, Microeconomic Theory** Staff
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  o Course cr

* ECON 126b, Macroeconomic Theory  Zhen Huo
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  o Course cr

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. Prerequisites: Introductory microeconomics and MATH 118 or MATH 120 and MATH 222; or MATH 120 and MATH 225. QR, SO  o Course cr

ECON 136b, Econometrics  Staff
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. Prerequisites: After ECON 135 or STAT 241 and 242. May not be taken concurrently with STAT 242. QR, SO  o Course cr

ECON 159a / GLBL 159a, Game Theory  Staff
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  o Course cr

ECON 160b, Applications of Game Theory  Benjamin Polak and Joyee Deb
This is a second half of the semester class on applications of game theory. We build on the learnings from introductory game theory courses like ECON/GLBL 159 or MGT 822. The course aims to introduce important ideas and tools from game theory, and use them to answer questions in social sciences, law, and business. For instance, how can we use game theory to design sound environmental policies and formulate environmental treaties? How large should juries be, and should we require unanimous verdicts? Why do bargaining parties sometimes engage in lengthy and costly legal battles? How do sellers decide the best format for an auction to sell a good? When do we see price wars? The topics include basics of mechanism design, bargaining with incomplete information, dynamic pricing, and applications of repeated games. Prerequisite: Any introductory game theory course, e.g., ECON/GLBL 159, MGT 822 or Game Theory in the SOM Core. SO ½ Course cr

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 171b / AFAM 146b / EDST 271b, Urban Inequalities and Educational Inequality  Gerald Jaynes
Analysis of contemporary policy problems related to academic underperformance in lower income urban schools and the concomitant achievement gaps among various racial and ethnic groups in United States K-12 education. Historical review of opportunity inequalities and policy solutions proposed to ameliorate differences in achievement and job readiness. Students benefit from practical experience and interdisciplinary methods, including a lab component with time spent in a New Haven high school. Prerequisites: Any course offered by Education Studies, or one course in history or any social science, either: Anthropology, Economics, Political Science, Psychology, Sociology. EDST 110 is preferred, although not required.  

* ECON 185a / GLBL 237a, Global Economy  Aleh Tsyvinski
A global view of the world economy and the salient issues in the short and the long run. Economics of crises, fiscal policy, debt, inequality, global imbalances, climate change. The course is based on reading, debating, and applying cutting edge macroeconomic research.  

ECON 186a, European Economic History, 1700–1815  Staff
European economic growth and development from the late seventeenth century through the first stages of the British industrial revolution. The role of institutional development, trade and imperialism, agricultural improvements, and industrialization. Particular attention to comparisons between Britain and other parts of Europe. After ECON 115 or 121, and ECON 116 or 122.  

* ECON 209a / EP&E 313a, Economic Analysis of Law  Robin Landis
This course is intended to provide an introduction to the economic analysis of law. We examine the economic rationale(s) underlying various legal doctrines of both common law and statutory law, as well as the economic consequences of different legal doctrines. Previous coursework in economics, while helpful, is not a prerequisite for the course.  

* ECON 212a / PLSC 442a, Introduction to Political Economy  John Roemer
The course is an introduction to important economic ideas: preferences and rationality, Pareto efficiency, economic equilibrium in a capitalist economy, externalities, the role of the state, uncertainty and von Neumann-Morgenstern utility, the principle of insurance, elementary game theory (Nash equilibrium), the median voter theorem, political equilibrium with party competition, distributive justice, equality of opportunity, and Arrow’s impossibility theorem. These topics are essential tools for political economists. Prerequisite: One year of calculus or intermediate microeconomics with calculus.  

ECON 251a, Financial Economics  Staff
Introduction to the economic analysis of investment decisions and financial markets. Topics include time discounting, portfolio choice, equilibrium pricing, arbitrage, market efficiency, equity valuation, fixed-income securities, derivative pricing, and financial intermediation. Prerequisite: Introductory microeconomics.  

ECON 265a, History of Economic Thought  Robert Dimand
The objective of this course is to give an overview of how economic analysis has developed, and an introduction to the varied ways in which some of the great
economists of the past have gone about studying how the economy functions. We discuss the relevance of their theories to public policy and the role of the state, and consider the roles of pre-analytic vision, improvements in analytical technique, and external events (such as the Great Depression or Global Financial Crisis) in the development of economic analysis. Prerequisites: ECON 115 and ECON 116. So

* ECON 302b / EP&E 364b / PHIL 304b, Choice Theory and its Critics  
Daniel Greco and Larry Samuelson
The aim of the course is to build up a sufficiently strong foundation in the philosophy of science to allow students to critically assess the challenge posed to the rational choice framework in social science by evidence of human irrationality. Readings are drawn from philosophy, economics (including behavioral economics), and psychology. Prerequisites: Four courses in a combination of economics, philosophy, and psychology.

ECON 326b, Fundamentals of Economic Development  
Kaivan Munshi
The objective of this course is to examine some of the fundamental forces that shape the process of economic development. This course is divided into three sections: (i) Market Failure: with an analysis of credit, labor, and insurance markets in developing countries. (ii) Social Response: how community networks emerge in response to market failure. We study the positive and negative consequences of this community involvement for growth and development; in the short-run and the long-run. We also provide economic foundations for the emergence of social norms and identity, as well as the dynamic inefficiencies that they can generate with economic development. (iii) Biological Response: how biological adaptation to economic conditions in the pre-modern economy can have negative consequences for nutritional status and health in developing economies. Apart from providing a particular perspective on development, an additional objective of this course demonstrates the use of economic theory in informing empirical research. Prerequisites: Intermediate Microeconomics, Introductory Econometrics and Data Analysis. Students are expected to be familiar with calculus, basic microeconomics, and basic econometrics.

ECON 330a / EVST 340a, Economics of Natural Resources  
Staff
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.

* ECON 331a, The Economics of Energy and Climate Change  
Staff
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.

ECON 339b, Advance Competition Economics and Policy  
Fiona Scott Morton
Limits that antitrust laws, as applied and interpreted by agencies, courts, and competitors, place on firm behavior. Economic theories underlying antitrust enforcement. Whether legal rules restricting competitive behavior increase social welfare and how they affect managerial choices. The evidence and reasoning advanced
in key antitrust cases; how outcomes may affect social welfare and firm strategies. Goals and procedures of US and EU antitrust agencies. SO

**ECON 340b / PLSC 359b, Economics and Politics of Development** Gerard Padro
This course covers recent scholarship on the political economy of development. It starts with the study of macro-historical facts and moves on to micro issues, such as conflict and corruption. Prerequisite: Intermediate microeconomics and Econometrics (ECON 117 or equivalent).

**ECON 350a, Mathematical Economics: General Equilibrium Theory** Staff
An introduction to general equilibrium theory and its application to finance and the theory of money. Recommended for students considering graduate study in economics, or a career in quantitative finance. Prerequisites: After MATH 118 or 120, and intermediate microeconomics. QR, SO 0 Course cr

**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 0 Course cr

* **ECON 360b, Capital Markets** Gary Gorton
Topics related to capital markets, with emphasis on the financial crisis of 2007–2008. The design, pricing, and trading of corporate bonds, credit derivatives, and money market instruments; bond restructuring, bond ratings, and financial crises; basic tools used to address such issues, including fixed income mathematics, binomial option pricing, and swaps. Prerequisites: intermediate microeconomics and econometrics. Note: ECON 360a "Capital Markets" is cross-listed with SOM MGT 947a and has space for up to five undergraduates.

**ECON 361b, Corporate Finance** Christopher Clayton
Financial management from inside the corporation or operating entity. Topics include capital budgeting and valuation, optimal capital structure, initial public offerings, mergers, and corporate restructuring. Cases and problem sets provide applications. Prerequisites: intermediate microeconomics and econometrics. 0 Course cr

**ECON 363a, The Global Financial Crisis** Andrew Metrick
Comprehensive survey of the causes, events, policy responses, and aftermath of the recent global financial crisis. Study of the dynamics of financial crises in a modern economy. Prerequisite: Successful completion of a course in introductory economics. SO

**ECON 365b / CPSC 365b, Algorithms** Staff
Paradigms for algorithmic problem solving: greedy algorithms, divide and conquer, dynamic programming, and network flow. NP completeness and approximation algorithms for NP-complete problems. Algorithms for problems from economics, scheduling, network design and navigation, geometry, biology, and optimization. Provides algorithmic background essential to further study of computer science. Either CPSC 365 or CPSC 366 may be taken for credit. Prerequisites: CPSC 202 and 223. QR
ECON 375b / GLBL 219b, Monetary Policy  William English
Introduction to modern macroeconomic models and how to use the models to examine some of the key issues that have faced monetary policymakers during and after the global financial crisis of 2008–2009. Prerequisites: Intermediate level macroeconomics (ECON 122 or 126) and introductory econometrics.  WR, SO 0 Course cr

* ECON 407a / GLBL 310a, International Finance  Staff
A study of how consumers and firms are affected by the globalization of the world economy. Topics include trade costs, the current account, exchange rate pass-through, international macroeconomic co-movement, multinational production, and gains from globalization. Prerequisite: intermediate macroeconomics or equivalent.  SO 0 Course cr

ECON 409b, Firms, Markets, and Competition  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 410b, The Economics of Innovation  Mitsuru Igami
Study of forces that drive the process of innovation. Creativity and creative destruction; the innovator’s dilemma; incentives to innovate; competitive advantage; industry evolution; intellectual property. Use of both formal theoretical models and quantitative empirical studies, as well as descriptive studies from management strategy and economic history. Prerequisites: econometrics and intermediate microeconomics.

* ECON 411a, Economics of Uncertainty and Information  Staff
Individual and collective choice in the presence of uncertainty and asymmetric information. Implications of such decision making for economic phenomena. Basic analytical tools for studying decisions under uncertainty. Asset markets, adverse selection, screening, signaling, moral hazard, incomplete contracts, bilateral trade with asymmetric information, and mechanism design. Prerequisites: intermediate microeconomics and econometrics.  SO 0 Course cr

* ECON 412a, International Environmental Economics  Samuel Kortum
Introduction to international and environmental economics and to research that combines the two fields. Methods for designing and analyzing environmental policy when economic activity and pollution cross political borders. Effects of market openness on the environment and on environmental regulation; international economics and climate change. Prerequisites: intermediate microeconomics and econometrics.  SO

ECON 414a, Economic Models of New Technology  Staff
Analysis of firms’ incentives to innovate, focusing on the effects of market power on the intensity of innovative activity. Topics include strategic investment in innovation, patent races, the diffusion of knowledge, intellectual property (IP) protection systems, IP licensing, research joint ventures, litigation, venture capital, and conflicts between IP rights and antitrust regulation. Prerequisites: intermediate microeconomics and econometrics.  SO 0 Course cr
ECON 417b, Computational Methods in Economics  Tony Smith
Introduction to the basic tools of numerical analysis and how to apply them to the study of economic models in a variety of subdisciplines, including macroeconomics, labor economics, industrial organization, public finance, and environmental economics. Prerequisite: intermediate microeconomics, intermediate macroeconomics, and econometrics.

ECON 419a, Financial Time Series Econometrics  Xiaohong Chen
This is an advanced course covers basic univariate and multivariate models and methods used to analyze financial and economic time series data and panel time series data. Topics include: classic linear models; serial dependence, autocorrelation in error variances (ARCH, GARCH); methods that allow for nonlinearity, tail dependence, comovements, conditional value at risk, fat-tails, nonstationarity; vector autoregressive models; factor models; Markov switching, latent factors, measurement errors, stochastic volatility; empirical asset pricing models. The aim of the course is to help students write their senior essays and start their own research in economics and finance. Prerequisites: ECON 117 and 123, or ECON 135 and 136.

ECON 424a / GLBL 308a, Central Banking  Staff
Introduction to the different roles and responsibilities of modern central banks, including the operation of payments systems, monetary policy, supervision and regulation, and financial stability. Discussion of different ways to structure central banks to best manage their responsibilities. Prerequisites: Intermediate Microeconomics, Intermediate Macroeconomics, and Introductory Econometrics.

ECON 425a / CPSC 455a, Economics and Computation  Yang Cai
A mathematically rigorous investigation of the interplay of economic theory and computer science, with an emphasis on the relationship of incentive-compatibility and algorithmic efficiency. Our main focus is on algorithmic tools in mechanism design, algorithms and complexity theory for learning and computing Nash and market equilibria, and the price of anarchy. Case studies in Web search auctions, wireless spectrum auctions, matching markets, and network routing, and social networks. Prerequisite: CPSC 365 or permission of the instructor. Familiarity with basic microeconomic theory is helpful but not required.

ECON 429b, Data Analysis and Strategy  Mitsuru Igami
Study of systematic thinking about competition and strategy using key concepts of microeconomics. Analysis of data, with consideration of economic theory and statistical methods using tools in Excel and Stata. Topics include logical thinking, empirical analysis, modeling, and estimation. Prerequisite: Introductory Microeconomics; some familiarity with statistics and econometrics is helpful.

ECON 433a, The Economics of Space  Staff
The aim of this course is to analyze the ways that geography determines economic outcomes. We discuss and analyze data on regional economic activity and how economic shocks propagate in space. We pair those data with simple models where geography plays a crucial role in the determination of economic activity and discuss how changes in this geography lead some regions to grow and economic outcomes to diverge. Various policies that affect the spatial allocation of economic activity, such as
infrastructure investment, local taxes, and transfers, are analyzed. Prerequisites: MATH 118, 120, or permission of instructor.

**ECON 435b, Economic Topics in Algorithms**  Maximilian Schaefer
The goal of this seminar is to introduce students to algorithms commonly used in commercial applications and to the blockchain technology. Students are asked to program algorithm prototypes and to reflect on existing economic research based on the programming experience gained in the course. Prerequisites: ECON 121, ECON 117, and programming experience in R or Python.

**ECON 438a, Applied Econometrics: Politics, Sports, Microeconomics**  Ray Fair
This course has an applied econometrics focus. Topics include voting behavior, betting markets, and various issues in sports. The aim of the course is to help students prepare original empirical research using econometric tools and to read empirical papers in economics and other social sciences. Students write three empirical papers. The first can be an extension of an existing article, where some of the results are duplicated and then extended. The second is similar to the first with no example provided. The third is an original paper within the range of topics covered in the course, where data are collected and analyzed using relevant econometric techniques. Prerequisites: Two courses in econometrics or statistics, or one course with special permission from the instructor.

**ECON 439b, Applied Econometrics: Macroeconomic and Finance Forecasting**  Ray Fair
This course has an applied econometrics focus. The focus is on forecasting macroeconomic and financial variables. Macroeconomic forecasting concerns forecasting variables like GDP, components of GDP like consumption, investment, and imports, inflation, the unemployment rate, interest rates, the government deficit, and exchange rates. There are various forecasting methods, some purely statistical time series techniques and some using economic theory. We consider both. Financial forecasting is more problematic, since changes in asset prices may be roughly unpredictable. We also examine topics like momentum forecasting to see if some asset prices are predictable. Prerequisites: Two courses in econometrics or statistics, or one course with special permission from the instructor.

* **ECON 444a, Market Inefficiencies and the Limits of Arbitrage**  Staff
The role of hedge funds in the United States financial markets and hedge fund behavior; understanding what hedge funds do, why they exist, and how they are different from other investment vehicles. Study of investment strategies that provide opportunity and risk for investors and study of academic papers analyzing (risky) arbitrage strategies. Prerequisite: intermediate microeconomics and econometrics.

* **ECON 445b, The U.S. Banking System**  Michael J Pascutti
The special functions of banks in the U.S. economy. The benefits but fragile nature of the banking system. Prerequisites: intermediate macroeconomics, microeconomics, and econometrics.

* **ECON 449a / EP&E 244a / PLSC 374a, The Economic Analysis of Conflict**  Gerard Padro
In this course we apply microeconomic techniques, theoretical and empirical, to the analysis of internal violent conflict, including civil wars, terrorism and insurgencies,
its causes and consequences. Topics include forced migration, ethnic conflict, long-term consequences of war and individual choices to participate in violence. Readings comprise frontier research papers and students will learn to critically engage with cutting-edge research designs. Prerequisites: Intermediate econometrics

* ECON 450b, Investment Analysis  Alex Hetherington and Chivetta Amelia
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 451a, Economics of Blockchains  Dirk Bergemann
In recent years, cryptocurrencies and blockchains have seen broad experimentation and adoption across many areas in the modern economy. However, the foundations of blockchains can be traced back to many classical results in the study of incentives and distributed systems, such as in economics, cryptography, and computer science. This seminar aims to introduce students to the theoretical underpinning of blockchain technology and help develop skills in economic analysis. We cover the related literature and more recent developments and applications such as Bitcoin, decentralized exchanges, and smart contracts. We explore this novel field through the lens of mechanism design, i.e., aligning the incentives of strategic agents to induce desirable outcomes in an economic system. Prerequisites: ECON 121, ECON 159, or ECON 351. Exposure to computer science is not required, but highly recommended.

* 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. Prerequisite: ECON 251 or ECON 252 or ECON 255.

* ECON 458b, The Economics of Population  Timothy Guinnane
An overview of some basic demographic methods such as the life table and age-standardized rates, followed by consideration of the core topics in economic demography: fertility, mortality, and migration, along with their connections to the economy and economic development. The course is largely based on reading and discussion of journal articles. Prerequisites: Introductory Econometrics and Intermediate 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 463b / BENG 403b, The Economics and Science of Medicine  Gregory Raskin and Yashodhara Dash
This multidisciplinary class is an exploration of the background of today's bestselling medicines, their huge commercial impact, and the companies that created them. It focuses on the most compelling aspects of drug development and company formation in the context of topical issues like cancer treatment, gene editing, stem cell therapy, the opioid epidemic, and drug pricing controversies. Prerequisite: Introductory or intermediate microeconomics, introductory or intermediate Biology, Molecular Biology, Chemistry or Biomedical Engineering.  so
* ECON 465b / EP&E 224b / GLBL 330b, 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 467a / GLBL 307a, Economic Evolution of the Latin American and Caribbean Countries  Ernesto Zedillo
Economic evolution and prospects of the Latin American and Caribbean (LAC) countries. Topics include the period from independence to the 1930s; import substitution and industrialization to the early 1980s; the debt crisis and the "lost decade"; reform and disappointment in the late 1980s and the 1990s; exploration of selected episodes in particular countries; and speculations about the future. Prerequisites: intermediate microeconomics and macroeconomics. SO

* ECON 471b / EP&E 297b, 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 472a, Economics of Artificial Intelligence and Innovation  Evangelia Chalioti
This course studies the economics of innovation and the effects of artificial intelligence on different industries. Topics include economics of the intellectual property (IP) protection system; strategic choices in innovation and competition; patent races; measurement and big data; the sharing and digitalized economy; collective intelligence and decisions; online auctions; venture capital; legal and social infrastructure. Prerequisites: ECON 115 or equivalent; ECON 121. SO

* ECON 475a / EP&E 286a, 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 480a / GLBL 311a, Banking Crises and Financial Stability  Sigridur Benediktsdottir
Focus on systemic risk, banking crises, financial stability and macroprudential policies. Additional emphasis on systemic risk and prudential policies in peripheral European economies and emerging economies. Prerequisites: ECON 115 and 116, or equivalent. SO

* ECON 486b, Dynamic Games  Anna Sanktjohanser
This course explores topics on dynamic games: we consider situations where agents interact repeatedly. We cover applications related to a range of fields from industrial organization (price wars and oligopoly with imperfect monitoring) to macroeconomic policy (time consistency). Students should have a solid background in multivariate calculus, be comfortable with rigorous proofs and mathematical arguments, and be
willing to learn further mathematical tools as needed. Prerequisites: either ECON 121 or ECON 125, as well as completion of the mathematics requirement of the economics major. So

* ECON 488b, Agents & Fiduciaries: Economics and Law  Richard Brooks
The seminar introduces students to the basic models in the principal-agent literature, including moral hazard and adverse selection, as well as the legal structures that regulate agents and other fiduciaries. Prerequisite: Intermediate microeconomics. So

* ECON 491a and ECON 492b, The Senior Essay  Staff
Senior essays are an opportunity for students to engage in independent, original economic research. Essays are not reviews of the literature, rather each should be an examination of a hypothesis using the tools of economics. In particular, the essay must contain original research and/or analysis. They can be theoretical, empirical or computational. The senior essays that receive A's and are awarded prizes are typically those that use economics tools (and, where appropriate, data) to offer fresh insights on questions. Students enrolling in this one-term course need to find an advisor. There are no page requirements or formatting requirements. Generally, essays run about 30 pages. Advice regarding bibliographies, graphs, etc. should be given by your advisor. For further information, including relevant dates and deadlines, please see economics.yale.edu/undergraduate/senior-essay.

* ECON 498a and ECON 499b, Directed Reading  Staff
Junior and senior economics majors desiring a directed reading course in special topics in economics not covered in other graduate or undergraduate courses may elect this course, 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. Junior and senior majors may take this course for a letter grade, but it does not meet the requirement for a department seminar. The application form may be found here: https://economics.yale.edu/sites/default/files/files/Undergraduate/Forms/2022%20Spring%20Forms/Econ%20499%20DIRECTED_READING_FORM_spring_2022%20fillable.pdf

Education Studies (EDST)

* EDST 065a / HUMS 065a, Education and the Life Worth Living  Matthew Croasmun
Consideration of education and what it has to do with real life—not just any life, but a life worth living. Engagement with three visions of different traditions of imagining the good life and of imagining education: Confucianism, Christianity, and Modernism. Students will be asked to challenge the fundamental question of the good life and to put that question at the heart of their college education. Enrollment limited to freshmen. Preregistration required; see under Freshman Seminar Program. HU

EDST 110a / SOCY 112a, Foundations in Education Studies  Staff
Introduction to key issues and debates in the U.S. public education system. Focus on the nexus of education practice, policy, and research. Social, scientific, economic, and political forces that shape approaches to schooling and education reform. Theoretical and practical perspectives from practitioners, policymakers, and scholars. So

O Course cr
* **EDST 125a / CHLD 125a / PSYC 125a, Child Development**  Ann Close and Carla Horwitz
This course is first in a sequence including Theory and Practice of Early Childhood Education (CHLD 127/PSYCH 127/EDST 127) and Language Literacy and Play (CHLD 128/PSYCH 128/EDST 128). This course provides students a theoretical base in child development and behavior and tools to sensitively and carefully observer infants and young children. The seminar will consider aspects of cognitive, social, and emotional development. An assumption of this course is that it is not possible to understand children – their behavior and development – without understanding their families and culture and the relationships between children and parents. The course will give an overview of the major theories in the field, focusing on the complex interaction between the developing self and the environment, exploring current research and theory as well as practice. Students will have the opportunity to see how programs for young children use psychodynamic and interactional theories to inform the development of their philosophy and curriculum. In the past students have done weekly in-person classroom observations at a Yale affiliated childcare program. If this is not possible, students will be expected to arrange on their own to do a weekly observation in-person or virtually of a child under the age of 6. For a portion of class meetings, the class will divide into small supervisory discussion groups. Priority given to juniors, seniors, Ed Study students.  wr, so

**EDST 135b / PHIL 130b, Philosophy of Education**  Jason Stanley
An introduction to the philosophy of education. In this course, we read classical texts about the nature and purpose of education, focusing ultimately on the question of the normative shape and form of education in liberal democracy. What is the difference between education and indoctrination? What is the proper relation, in a liberal democracy, between civic education and vocational education? What shape or form should education take, if it is to achieve its goals? How, for example, is the liberal ideal of equality best realized in the form and structure of an educational system? Authors include Plato, Rousseau, Du Bois, Washington, Stanton, Dewey, Cooper, Woodson, and Freire.  hu

**EDST 140a / PSYC 140a, Developmental Psychology**  Julia Leonard
An introduction to research and theory on the development of perception, action, emotion, personality, language, and cognition from a cognitive science perspective. Focus on birth to adolescence in humans and other species. Prerequisite: PSYC 110.  so

**EDST 160b / PSYC 150b, Social Psychology**  Jennifer Hirsch
Theories, methodology, and applications of social psychology. Core topics include the self, social cognition/social perception, attitudes and persuasion, group processes, conformity, human conflict and aggression, prejudice, prosocial behavior, and emotion.  so

* **EDST 162a / SOCY 162a, Methods in Quantitative Sociology**  Staff
Introduction to methods in quantitative sociological research. Topics include: data description; graphical approaches; elementary probability theory; bivariate and multivariate linear regression; regression diagnostics. Students use Stata for hands-on data analysis.  qr, so  o Course cr
EDST 177a / AFAM 198a / CGSC 277a / EP&E 494a / PHIL 177a, Propaganda, Ideology, and Democracy  Jason Stanley

Historical, philosophical, psychological, and linguistic introduction to the issues and challenges that propaganda raises for liberal democracy. How propaganda can work to undermine democracy; ways in which schools and the press are implicated; the use of propaganda by social movements to address democracy’s deficiencies; the legitimacy of propaganda in cases of political crisis. HU o Course cr

* EDST 205b, Principles of Effective Teaching in the Secondary Classroom  Melissa Scheve

Children across America spend roughly 12,000 hours in school from kindergarten through grade 12. How those instructional hours are spent dramatically impacts students’ academic and personal well-being. Many studies have demonstrated that teacher quality matters to students’ long-term outcomes including graduation and job placement. In this course, we delve into the essential principles of being an effective teacher, focusing specifically on the U.S. secondary classroom. Building community, designing culturally sustaining curriculum, teaching inclusively, and assessing students authentically are a handful of the principles we explore together through articles about teacher practice, video examples of classroom practice, and students opportunity to enact some of these practices during class. Each student is paired with a current secondary public school teacher across America to engage in a case study of effective teaching throughout the seminar. By the end of this course, you learn some core principles of effective teaching, gain an understanding of the complexities of enacting effective teaching practices given educational inequities, conduct a case study about effective teaching, and practice some aspects of secondary teaching.

EDST 110 is recommended. Preference given to Education Studies Scholars and juniors and seniors interested in post-graduate careers in teaching. SO

* EDST 211a / ER&M 406a, Latinx Communities and Education in the United States  Staff

This course is an interdisciplinary and comparative study of Latinx communities and their experiences with K-12 education in the United States. The Latinx population in the United States continues to grow, with the Census Bureau projecting that the Latinx population will comprise 27.5 percent of the nation's population by 2060.[1] In fact, in 2018, more than a quarter of the nation's newborns were Latinx.[2] Yet, even as the Latinx population continues to grow, the education field has a relatively broad understanding of Latinx communities in the United States—frequently treating them as a monolith when designing everything from curriculum to education reform policies. To understand why such an approach to education studies may yield limited insight on Latinx communities, the course draws on research about the broader histories and experiences of Latinx communities in the United States before returning to the topic of K-12 education. EDST 110 Foundations in Education Studies recommended. SO

* EDST 223a / PLSC 223a, Learning Democracy: The Theory and Practice of Civic Education  Amir Fairdosi

This is a seminar on the theory and practice of civic education. We begin by investigating philosophies of civic education, asking such questions as: What is civic education and what is its purpose? What knowledge, skills, and values promote human flourishing and the cultivation of a democratic society? What role can and should schools play in this cultivation? In the next part of the course we focus on civic
education in practice, exploring various approaches to teaching civics and the empirical evidence in support of each method’s effectiveness. We also discuss variations in access to civic education opportunities across socioeconomic, demographic, and national contexts, and how societies might deal with these disparities.

* EDST 225b, Child Care, Society, and Public Policy  
Janna Wagner and Jessica Sager
Exploration of societal decisions about where children under the age of five spend their days. Topics include where young children belong; how to regulate, pay for, and support child care arrangements; consideration of gender, race, and family finances; and the profound impact of these decisions on the well-being of children, families, and the economy. Assignments draw heavily on student insights and reflections. Preference in enrollment will go to students who have taken EDST 110, with Education Studies Scholars receiving priority.

* EDST 230b, American Education and the Law  
William Garfinkel
Interactions between American elementary and secondary school education and the American legal system, with a focus on historical and contemporary case law. The relationship between schooling and the state; constitutional, statutory, and regulatory law governing the rights and responsibilities of educators, students, and parents; equal educational opportunity. Recommended preparation: EDST 110. Preference to Education Studies Scholars.

* EDST 233a / FILM 233a, Children and Schools in Global Cinema  
Dudley Andrew
Children have long been, and remain, the target of many films. They precipitated some of the earliest studies of the new medium and its regulation as well. But this seminar turns the tables on the premise that children have also been dangerous for the cinema. As subjects and actors in films, they have proven recalcitrant, unpredictable, combustible; in short, they have behaved as children often do. Insofar as cinema is an institution, children must be disciplined to ensure its smooth operation. And yet much of what is valuable in cinema involves the very unpredictability that is natural in children. This seminar operates as a dialogue between education and cinema across the living bodies of children. We give the cinema and children the first and last words in this dialogue, ‘education’ being asked to learn, not teach. We defamiliarize education by bringing into our classroom children and films foreign to the United States, including films from France, Africa, Iran, and East Asia Foundations in Education Studies recommended.

* EDST 235b, Education and the Culture Wars  
Talya Zemach-Bersin
Examination of the historical development and politics of the “culture wars” with a focus on how battles over the “soul of America” have focused on the American education system. Conflict over “American values” issues like abortion, gay marriage, and religion are compounded by legal battles over federal funding and school choice. Study of interdisciplinary readings from law, politics, history, and cultural studies. Preference for enrollment will be given to Education Studies Scholars.

EDST 237a / LING 217a / PSYC 317a, Language and Mind  
Maria Pinango
The structure of linguistic knowledge and how it is used during communication. The principles that guide the acquisition of this system by children learning their first language, by children learning language in unusual circumstances (heritage speakers, sign languages) and adults learning a second language, bilingual speakers.
The processing of language in real-time. Psychological traits that impact language learning and language use.  

* **EDST 238a / PLSC 238a, The Politics of Public Education**  
Staff  
Examination of the deep political divides, past and present, over public education in the United States. Fundamental questions, including who gets to determine where and how children are educated, who should pay for public education, and the role of education as a counter for poverty, remain politically contested. The course explores these conflicts from a variety of political perspectives. Students learn journalistic methods, including narrative, opinion and digital storytelling, developing the necessary skills to participate in the national conversation around education policy and politics.  

* **EDST 255a / AFAM 259a / AMST 309a, Education and Empire**  
Talya Zemach-Bersin  
This course offers an introduction to the transnational history of education in relation to the historical development of the U.S. empire both at home and abroad. By bringing together topics often approached separately—immigration, education, race, colonialism, and the history of U.S. empire—we interrogate the ways that education has been mobilized to deploy power: controlling knowledge, categorizing and policing differences, administering unequal paths to citizenship/belonging, forcing assimilation, promoting socio-economic divides, and asserting discipline and control. EDST 110 recommended.  

* **EDST 261b, Colloquium: Readings in Education Studies**  
Talya Zemach-Bersin  
This colloquium, required for all newly admitted YES Scholars, supplements the curriculum by introducing scholars to a range of topics, methods and approaches to education studies, acquainting them with the expertise and contributions of faculty teaching in the YES program and their fellow students, and providing them with opportunities for leadership, reflection, and collaboration. While building a cohort community, students will read key texts in the field of education studies and participate in research methods trainings. Assignments include weekly readings, an ongoing class blog, leading class convenings, research methods training, and collaborative final projects. Prerequisites: EDST 110 and acceptance into the Education Studies MAP.  

* **EDST 263a, Place, Race, and Memory in Schools**  
Errol Saunders  
In the wake of the Black Lives Matter movement and widespread, multiracial protests calling for racial justice across the United States, there is a renewed interest in the roles that schools play in perpetuating racial disparities in American society and the opportunities that education writ large might provide for remedying them. As places, schools both shape and are profoundly shaped by the built environment and the everyday experiences of the people that interact with them. Teachers, administrators, students, and parents are impacted by the racialized memories to explain the past, justify the present, and to move them to action for the future. These individual and collective memories of who and where they are, and the traumas, successes, failures, and accomplishments that they have with regard to school and education are essential to understanding how schools and school reforms work. Grounded in four different geographies, this course examines how the interrelationships of place, race, and memory are implicated in reforms of preK-12 schools in the United States. The course uses an interdisciplinary approach to study these phenomena, borrowing from commensurate frameworks in sociology, anthropology, political science, and memory...
EDST 271b / AFAM 146b / ECON 171b, Urban Inequalities and Educational Inequality
Gerald Jaynes
Analysis of contemporary policy problems related to academic underperformance in lower income urban schools and the concomitant achievement gaps among various racial and ethnic groups in United States K-12 education. Historical review of opportunity inequalities and policy solutions proposed to ameliorate differences in achievement and job readiness. Students benefit from practical experience and interdisciplinary methods, including a lab component with time spent in a New Haven high school. Prerequisites: Any course offered by Education Studies, or one course in history or any social science, either: Anthropology, Economics, Political Science, Psychology, Sociology. EDST 110 is preferred, although not required.

* EDST 282b / PLSC 417b, Comparative International Education Mira Debs
Around the world, education is one of the central institutions of society, developing the next generation of citizens, workers and individuals. How do countries balance these competing priorities? In which ways do countries converge on policies, or develop novel approaches to education? Through the course, students learn the a) impact of colonialism on contemporary education systems, b) the competing tensions of the demands of citizen and worker and c) how a variety of educational policies are impacted around the world and their impact on diverse populations of students. EDST 110 Foundations in Education Studies recommended. WR, SO

* EDST 290a, Leadership, Change, and Improvement in Education Richard Lemons
Analysis of the most significant challenges faced by the United States educational system, drawing upon research from a range of academic disciplines to understand how schools and districts operate and why certain educational challenges persist, sometimes over multiple generations of students. Students will study successful educational improvement efforts to better understand the political and organizational strategies necessary to improve student experiences and outcomes at scale, as well as the leadership practices necessary to successfully implement and sustain such strategies. Preference given to Education Studies Scholars or others who have taken EDST 110. SO

* EDST 340a / AFAM 455a / ER&M 438a, Anti-Racist Curriculum and Pedagogy Daniel HoSang
This seminar explores the pedagogical and conceptual tools, resources and frameworks used to teach about race and racism at the primary and secondary levels, across diverse disciplines and subject areas. Moving beyond the more limited paradigms of racial colorblindness and diversity, the seminar introduces curricular strategies for centering race and racism in ways that are accessible to students from a broad range of backgrounds, and that work to advance the overall goals of the curriculum. Prerequisite: ER&M 200 or an equivalent course addressing histories of race, ethnicity, and migration. SO

* EDST 400a, Senior Capstone (Fall) Talya Zemach-Bersin
The first course in the yearlong sequence, followed by EDST 410/EDST 490 preparing students for a thesis-equivalent capstone project and overview of education studies
methodologies and practical research design. Prerequisites: EDST 110 and two Education Studies electives. Enrollment limited to senior Education Studies Scholars.

* EDST 410b, Senior Capstone (Spring) Talya Zemach-Bersin
The second course in the yearlong Education Studies Scholars capstone sequence where students conduct a rigorous project on a topic of their choice in education research, policy, and/or practice. Enrollment limited to senior Education Studies Scholars.

* EDST 490b, Senior Essay Independent Study Talya Zemach-Bersin
Independent research under faculty direction, involving research, policy or practice resulting in a final capstone paper. This course is open to Education Studies Scholars who are completing their capstone, in lieu of taking EDST 400 or EDST 410. To register for this course, students must submit a written plan of study approved by a faculty mentor to the Director of Undergraduate Study no later than the end of registration period in the term in which the course is to be taken. The course meets biweekly (every two weeks), beginning in the first week of the term. Prerequisite: EDST 110.

Egyptian (EGYP)

EGYP 110a, Introduction to Classical Hieroglyphic Egyptian I Lingxin Zhang
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. L1

EGYP 120b, Introduction to Classical Hieroglyphic Egyptian II Lingxin Zhang
Continuation of EGYP 110. Prerequisite: EGYP 110. L2 RP

* EGYP 128b / AFST 128b / ARCG 128b / NELC 129b / RLST 251b, Magic and Ritual in Ancient Egypt and the Near East John Darnell
Introduction to ancient Egyptian magic and rituals with an overview on the use of magic and discussion of the different rituals and festivals attested in Ancient Egypt and the Near East. HU

* EGYP 131a, Intermediate Egyptian I: Literary Texts John Darnell
This course engages in close reading of Middle Egyptian literary texts in hieroglyphic transcription, along with an introduction to the hieratic (cursive) Egyptian script of the original sources. Primary sources include the Middle Kingdom stories, principally those known by the modern titles “The Story of Sinuhe” and “The Tale of the Eloquent Peasant.” Assigned secondary literature includes reviews of grammatical topics in Middle Egyptian and analyses of the cultural, religious, and historical context of the literary texts. We also read portions of texts from other genres — historical, administrative, etc. — that serve to illuminate concepts and practices appearing in the literary compositions. Prerequisite: EGYP 120 or permission of instructor. L3

* EGYP 137a / RLST 423a, Gnostic Texts in Coptic Ramona Teepe
Reading, translation, and analysis of Gnostic and Valentinian literature from Nag Hammadi, in several dialects of Coptic. Prerequisite: EGYP 127 or equivalent. Counts as L4 if taken after EGYP 147 or equivalent. L3

* EGYP 141b, Intermediate Egyptian: Historical Texts Lingxin Zhang
Close reading of Middle Egyptian historical texts in original hieroglyphic and hieratic script. Initial survey of ancient Egyptian historiography and grammatical forms peculiar
to this genre of text. Prerequisite: EGYP 120. Counts as L4 if taken after EGYP 131. 13

* EGYP 147b / RLST 422b, Egyptian Monastic Literature in Coptic  Stephen Davis
Readings in the early Egyptian classics of Christian asceticism in Sahidic Coptic, including the desert Fathers and Shenute. Prerequisite: EGYP 127 or equivalent. Counts as L4 if taken after EGYP 137 or equivalent. 13

* EGYP 158a, Ancient Egyptian Texts of the First and Second Intermediate Periods  John Darnell
Close readings of ancient Egyptian hieroglyphic and hieratic texts of the First and Second Intermediate Periods. The material includes autobiographical texts, letters, religious texts, documentary and historical texts. The material addresses questions of political and social change, causes and nature of internal and external warfare, the development of self-presentation for both royal and non-royal people, and changes in ancient Egyptian religion. This course requires completion of L1 and L2 Beginning Ancient Egyptian. Ideally, students will have taken at least one semester of L3 and L4 Intermediate Egyptian, although some may be admitted with instructor permission. 15

Electrical Engineering (EENG)

EENG 200a, Introduction to Electronics  Staff
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, WR, SC

EENG 201b, Introduction to Computer Engineering  Priya Panda
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  Amin Karbasi
Introduction to systems that sense, process, control, and communicate. Topics include information theory and coding (compression, channel coding); network systems (network architecture, routing, wireless networks); signals and systems (linear systems, Fourier techniques, bandlimited sampling); estimation and learning (hypothesis testing, regression, classification); and end-to-end application examples (security, communication systems). MATLAB programming assignments illustrate concepts. Students should have basic familiarity with counting (combinatorics), probability and statistics (independence between events, conditional probability, expectation of random variables, uniform distribution). Prerequisite: MATH 115. AP Stats preferred. QR
EENG 203b, Circuits and Systems Design  Hong Tang
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 QR, SC RP

EENG 310b, Signals and Systems  Dionysis Kalogerias
Signal and system theory, having its roots at a great extent on classical and modern harmonic analysis, has played an instrumental role in the development of several transformative technologies during the 20th and 21st centuries. Two such examples are communication systems (analog, digital, wired, wireless), and compressive sensing and sparse approximations. This core course provides a comprehensive first exposition to signal and system theory, and mainly covers the following content: definitions/classifications/modeling of signals and systems in continuous and discrete-time; linear system theory (impulse response, frequency response, linear difference/differential equations); convolutions (continuous and discrete); Fourier series; Fourier transform (continuous and discrete-time); Laplace transform and Z-transform. Prior knowledge of advanced calculus of one variable and some elementary real analysis will be very useful (something like MATH 115), although it is not required strictly. QR

EENG 320a / APHY 320a, Introduction to Semiconductor Devices  Hong Tang
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. Recommended preparation: EENG 200. PHYS 180 and 181 or permission of instructor QR, SC

EENG 325a, Electronic Circuits  Fengnian Xia
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 348b / CPSC 338b, Digital Systems  Rajit Manohar
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 400b, Electronic Materials  Staff
Survey and review of fundamental material issues pertinent to modern microelectronic and optoelectronic technology. Topics include band theory, electronic transport, surface kinetics, diffusion, defects in crystals, thin film elasticity, crystal growth, and heteroepitaxy. Formerly EENG 408. Prerequisite: EENG 320 or permission of instructor. QR, SC
EENG 406b, Photovoltaic Energy  Fengnian Xia
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.

EENG 426a / CPSC 448a / ENAS 876a, Silicon Compilation  Rajit Manohar
An upper-level course on compiling computations into digital circuits using asynchronous design techniques. Emphasis is placed on the synthesis of circuits that are robust to uncertainties in gate and wire delays by the process of program transformations. Topics include circuits as concurrent programs, delay-insensitive design techniques, synthesis of circuits from programs, timing analysis and performance optimization, pipelining, and case studies of complex asynchronous designs. Prerequisite: EENG 201 and introductory programming, or permission of instructor.

EENG 428a, Cloud FPGA  Jakub Szefer
This course is an intermediate to advanced level course focusing on digital design and use of Field Programmable Gate Arrays (FPGAs). In addition, it centers around the new computing paradigm of Cloud FPGAs, where the FPGAs are hosted remotely by cloud providers and accessed remotely by users. The theoretical aspects of the course focus on digital system modeling and design using the Verilog Hardware Description Language (Verilog HDL). In the course, students learn about logic synthesis, behavioral modeling, module hierarchies, combinatorial and sequential primitives, and implementing and testing the designs in simulation and real FPGAs. Students also learn about FPGA tools from two major vendors: for Xilinx FPGAs and Intel FPGAs (formerly Altera). The practical aspects focus on designing systems using commercial Cloud FPGA infrastructures: Amazon F1 service (Xilinx FPGAs) or through the Texas Advanced Computing Center (Intel FPGAs). Students learn about cloud computing, interfacing servers to FPGAs, PCIe and AXI protocols, and how to write software that runs on the cloud servers and leverages the FPGAs for acceleration of various computations. Prerequisites: EENG 201 and 348 or permission of the instructor. Students should be familiar with digital design basics and have some experience with Hardware Description Languages such as Verilog or VHDL. QR

* EENG 432a / 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 434b / MATH 251b / S&D S 351b, Stochastic Processes  Amin Karbasi
Introduction to the study of random processes including linear prediction and Kalman filtering, Poison counting process and renewal processes, Markov chains, branching processes, birth-death processes, Markov random fields, martingales, and random walks. Applications chosen from communications, networking, image reconstruction, Bayesian statistics, finance, probabilistic analysis of algorithms, and genetics and evolution. Prerequisite: S&D S 241 or equivalent. QR
EENG 439a, Neural Networks and Learning Systems  Priya Panda
Neural networks (NNs) have become all-pervasive giving us self-driving cars, Siri Voice assistants, Alexa, and much more. While deep NNs deliver state-of-the-art accuracy on many artificial intelligence tasks, it comes at the cost of high computational complexity. Accordingly, designing efficient hardware architectures for deep neural networks is an important step towards enabling the wide deployment of NNs, particularly in low-power computing platforms, such as, mobiles, embedded Internet of Things (IoT) and drones. This course aims to provide a thorough overview on deep learning techniques, while highlighting the key trends and advances toward efficient processing of deep learning in hardware systems, considering algorithm-hardware co-design techniques. Prerequisites: MATH 222 or CPSC 202, EENG 201, and knowledge of Python programming.

EENG 445a / BENG 445a, Biomedical Image Processing and Analysis  James Duncan and Lawrence Staib
This course is an introduction to biomedical image processing and analysis, covering image processing basics and techniques for image enhancement, feature extraction, compression, segmentation, registration and motion analysis including traditional and machine learning techniques. Student learn the fundamentals behind image processing and analysis methods and algorithms with an emphasis on biomedical applications. Prerequisite: BENG 352 or EENG 310 or permission of instructors. Recommended preparation: familiarity with probability theory.

EENG 450a, Applied Digital Signal Processing  Roman Kuc
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.

* EENG 452a, Internet Engineering  Leandros Tassiulas
Introduction to basic Internet protocols and architectures. Topics include packet-switch and multi-access networks, routing, flow control, congestion control, Internet protocols (IP, TCP, BGP), the client-server model, IP addressing and the domain name system, wireless access networks, and mobile communications. Prerequisite: a college-level course in mathematics, engineering, or computer science, or with permission of instructor. QR

* EENG 455b, Network Algorithms and Stochastic Optimization  Leandros Tassiulas
This course focuses on resource allocation models as well as associated algorithms and design and optimization methodologies that capture the intricacies of complex networking systems in communications computing as well as transportation, manufacturing, and energy systems. Max-weight scheduling, back-pressure routing, wireless opportunistic scheduling, time-varying topology network control, and energy-efficient management are sample topics to be considered, in addition to Lyapunov
stability and optimization, stochastic ordering, and notions of fairness in network resource consumption. QR

EENG 475a / BENG 475a / CPSC 475a, 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. Prerequisite: CPSC 112 and MATH 120, or with permission of instructor. QR, SC RP

* EENG 481b, 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

Energy Studies (ENRG)

* ENRG 300a, Multidisciplinary Topics in World Energy Michael Oristaglio
This course studies how the 21st century energy transition away from fossil fuels towards sustainable (sustainable, low-carbon) energy sources is proceeding in key countries and regions around the world such as U.S., Germany, China, India, and Sub-Saharan Africa. The approach is multidisciplinary, encompassing geographical, technological, economic, social and geopolitical incentives and barriers to progress. Enrollment in the Energy Studies MAP is required. SO

* ENRG 320a / ENVE 320a / MENG 320a, Energy, Engines, and Climate Alessandro Gomez
The course aims to cover the fundamentals of a field that is central to the future of the world. The field is rapidly evolving and, although an effort will be made to keep abreast of the latest developments, the course emphasis is on timeless fundamentals, especially from a physics perspective. Topics under consideration include: key concepts of climate change as a result of global warming, which is the primary motivator of a shift in energy supply and technologies to wean humanity off fossil fuels; carbon-free energy sources, with primary focus on solar, wind and associated needs for energy storage and grid upgrade; traditional fossil-fuel power plants and engines, that are currently involved in 85% of energy conversion worldwide and we can’t “turn on a dime”. Elements of thermodynamics are covered throughout the course as needed, including the definition of various forms of energy, work and heat as energy transfer, the principle of conservation of energy, first law and second law, and rudiments of heat engines. We conclude with some considerations on energy policy and with the "big picture" on how to tackle future energy needs. Designed for juniors and seniors in science and engineering. Prerequisite: MENG 211 or permission from the instructor. QR, SC

* ENRG 400b, Senior Capstone Seminar Michael Oristaglio
This course serves as the capstone seminar for the Energy Studies Multidisciplinary Academic Program (MAP). Capstone projects in Energy Studies are undertaken in
the senior year and can comprise an independent study project or an extension of a
summer internship, senior essay or senior project in the major. To register for this
course, students must submit a project proposal to the Director of Energy Studies
no later than the end of registration period in the term in which the course is to be
taken. In addition to individual study, the seminar meets regularly during the term.
Prerequisite: Enrollment in, and expected completion of, the course requirements for
Energy Studies.

Engineering & Applied Science (ENAS)

* ENAS 050a or b / APHY 050a or b / PHYS 050a or b, Science of Modern Technology and Public Policy  Daniel Prober
Examination of the science behind selected advances in modern technology and implications for public policy, with 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, renewable energy technologies, 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 first-year students. Preregistration required; see under First-Year Seminar Program.  SC

* ENAS 100b / APHY 100b / EPS 105b / EVST 100b / PHYS 100b, Energy, Environment, and Public Policy  Daniel Prober
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.  QR, SC

ENAS 110b / APHY 110b, The Technological World  Owen Miller
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.  QR, SC

* ENAS 118a, Introduction to Engineering, Innovation, and Design  Vincent Wilczynski and Lawrence Wilen
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  John Fortner
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 161, 165 or CHEM 163, 167 (may be taken concurrently) or permission of instructor. QR, SC

**ENAS 123a / EVST 123a, You, Your Planet, and A Sustainable Future**  Aaron Dollar
This course attempts to give a holistic view of the major inter-relationships between humans and our planet, along with an examination of options for paths to a future that is more sustainable. It seeks to be personal and practical where possible, with a strong focus on ways that individuals can make a difference in their daily lives to the pressing issues around the climate and biodiversity crises. We examine concepts primarily through simple, fundamental physical principles which help to “see the forest for the trees” without getting bogged down by complex details. SC

**ENAS 130a or b, Introduction to Computing for Engineers and Scientists**  Beth Anne Bennett
An introduction to the use of the C 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 graphical display of computational results. Prerequisite: MATH 115 or equivalent. Recommended preparation: previous programming experience. QR

**ENAS 151a or b / APHY 151a or b / PHYS 151a or b, Multivariable Calculus for Engineers**  Staff
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

**ENAS 194a or b / APHY 194a or b, Ordinary and Partial Differential Equations with Applications**  Staff
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 MATH 120 or equivalent, and knowledge of matrix-based operations. QR

**ENAS 221a, The Materials Science of Art**  Katherine Schilling
Exploration of some fundamental scientific principles underlying the engineering of material works of art. The origins of appearance and physical properties, the materials science involved in the fabrication of art works, and the technical analysis of these properties, are discussed in lectures, demonstrated in labs, and illustrated with objects in the Yale museums. This course may be of interest to Art and Architecture majors. SC

**ENAS 345b / CENG 345b, Principles and Applications of Interfacial Phenomena**  Kyle Vanderlick
This course covers the nature and consequences of both flexible and rigid interfaces, such as those associated with liquids and solids respectively. We examine the properties of interfaces as they exist alone, as a collective (e.g., colloids), and also as they interact demonstrably with one another. Examples of the latter include thin films, confined fluids and biological membranes. An integral part of this course is the introduction and application of engineering analysis (e.g., finite element analysis) to calculate and predict behaviors central to technological applications. SC
ENAS 360b / ENVE 360b, Green Engineering and Sustainable Design  Julie Zimmerman
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 161, 165 or 163, 167 (or CHEM 112, 113, or 114, 115), or permission of instructor.

* ENAS 400a, Making it  Joseph Zinter
Positioned at the intersection of design, technology, and entrepreneurship, students are introduced to the many facets of product design and development while simultaneously working to conceive and develop a marketable product and business.

ENAS 440a / MENG 440a, Applied Numerical Methods for Algebraic Systems, Eigensystems, and Function Approximation  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 experience with Matlab, C++, or Fortran programming.  QR

* ENAS 450b / APHY 450b / MENG 450b, Advanced Synchrotron Techniques and Electron Spectroscopy of Materials  Charles Ahn
Introduction to concepts of advanced x-ray and electron-based techniques used for understanding the electronic, structural, and chemical behavior of materials. Students learn from world-leading experts on fundamentals and practical applications of various diffraction, spectroscopy, and microscopy methods. Course highlights the use of synchrotrons in practical experiments. Prerequisites: physics and quantum mechanics/physical chemistry courses for physical science and engineering majors, or by permission of instructor.  QR, SC

English Language and Literature (ENGL)

* ENGL 028b / AFST 028b / LITR 025b, African Literature in the World  Cajetan Iheka
This seminar introduces students to a subset of African literature that has entered the canon of world literature. Bookended by the writings of Chinua Achebe and Chimamanda Adichie, we explore the marks of regional specificity in these works and how they transcend local geographical markers to become worldly artifacts. Our considerations include why certain texts cross the boundaries of nation and region while others remain confined within territorial bounds. We also examine advantages of the global circulation of African literary works and the pitfalls of a global readership. The class moves from an introductory unit that orients students to African and world literature to focus on close reading of primary texts informed by historical and theoretical nuances. From analyzing works responding to the colonial condition and the articulation of anticolonial sensibilities, to those narrating the African nation at
independence and the postcolonial disillusionment that followed, the seminar attends to the formal and thematic implications of globalization for African literary writing. Authors include Chinua Achebe, Mariama Ba, Ngugi wa Thiong’o, Mbolo Mbue, NoViolet Bulawayo, Taiye Selasi, and Chimamanda Adichie. Enrollment limited to first-year students. Preregistration required; see under First-Year Seminar Program.

* ENGL 029b / AMST 029b, Henry Thoreau  
Henry Thoreau played a critical role in the development of environmentalism, American prose, civil rights, and the politics of protest. We read his writing in depth, and with care, understanding it both in its historical context and in its relation to present concerns of democracy and climate change. We read his published writing and parts of the journal, as well as biographical and contextual material. The class makes a field trip to Walden Pond and Concord, learning about climate change at Walden as revealed by Thoreau’s unparalleled documentation of his biotic surroundings. Student’s consider Thoreau’s place in current debates about the environment and politics, and are encouraged to make connection with those debates in a final paper. Enrollment limited to first-year students. Preregistration required; see under First-Year Seminar Program.

HU

* ENGL 034b / WGSS 034b, Transgender, Queer, & Feminist #Activism Now  
Jill Richards
This course focuses on the art and politics of the present, through a selection of trans, queer, feminist, and antiracist #activisms ongoing right now. Organized as a series of interlocking episodes, the course highlights the emergence of #BlackLivesMatter, the Dakota Access Pipeline Protests (#NoDAPL), #AbolishICE, and the #MeToo movement. A significant portion of the class follows contemporary legislative battles surrounding transgender rights, including bathroom bills, access to gender affirming healthcare, and the legal status of trans kids. Course materials are various, including recent zines, graphic novels, memoir, poetry, science fiction, film, and television, including selections from Euphoria and I May Destroy You. Enrollment limited to first-year students. Preregistration required; see under First-Year Seminar Program.

HU

* ENGL 068b / HUMS 068b, Speculative Fiction and Film  
Staff
Study of how speculative ideas about race and gender, good and evil, and religion and culture reflect and influence changing ideas about what it means to be human, with special attention to Afrofuturist texts. Authors include Samuel Delany, N.K. Jemisin, Liu Cixin, Frank Herbert, & Ursula K. LeGuin. Major films include Akira, Get Out, La Jetee, and the video work of Janelle Monae. Enrollment limited to first-year students. Preregistration required; see under First-Year Seminar Program.

WR, HU RP

* ENGL 114a, Writing Seminars  
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 the city, childhood, globalization, inequality, food culture, sports, and war.

WR

* ENGL 115a, Literature Seminars  
Staff
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

* ENGL 120a, Reading and Writing the Modern Essay  Staff
Close reading of great nonfiction prepares students to develop mastery of the craft of powerful writing in the humanities and in all fields of human endeavor, within the university and beyond. Study of some of the finest essayists in the English language, including James Baldwin, Joan Didion, Leslie Jamison, Jhumpa Lahiri, George Orwell, David Foster Wallace, and Virginia Woolf. Assignments challenge students to craft persuasive arguments from personal experience, to portray people and places, and to interpret fundamental aspects of modern culture. WR

* ENGL 123a, Introduction to Creative Writing  Staff
Introduction to the writing of fiction, poetry, and drama. Development of the basic skills used to create imaginative literature. Fundamentals of craft and composition; the distinct but related techniques used in the three genres. Story, scene, and character in fiction; sound, line, image, and voice in poetry; monologue, dialogue, and action in drama. HU

* ENGL 125a or b, Readings in English Poetry I  Staff
Introduction to the English literary tradition through close reading of select poems from the seventh through the seventeenth centuries. Emphasis on developing skills of literary interpretation and critical writing; diverse linguistic and social histories; and the many varieties of identity and authority in early literary cultures. Readings may include Beowulf, The Canterbury Tales, Middle English lyrics, The Faerie Queene, Paradise Lost, and poems by Isabella Whitney, Philip Sidney, William Shakespeare, Amelia Lanyer, John Donne, and George Herbert, among others. Preregistration required; see under English Department. WR, HU

* ENGL 126a or b, Readings in English Poetry II  Staff
Introduction to the English literary tradition through close reading of select poems from the eighteenth century through the present. Emphasis on developing skills of literary interpretation and critical writing; diverse genres and social histories; and modernity's multiple canons and traditions. Authors may include Alexander Pope, William Wordsworth, Elizabeth Barrett Browning, Robert Browning, W. B. Yeats, T. S. Eliot, Langston Hughes, Gertrude Stein, Gwendolyn Brooks, Elizabeth Bishop, and Derek Walcott, among others. Preregistration required; see under English Department. WR, HU

* ENGL 127a or b, Readings in American Literature  Staff
Introduction to the American literary tradition in a variety of poetic and narrative forms and in diverse historical contexts. Emphasis on developing skills of literary interpretation and critical writing; diverse linguistic and social histories; and the place of race, class, gender, and sexuality in American literary culture. Authors may include Phillis Wheatley, Henry David Thoreau, Herman Melville, Walt Whitman, Emily Dickinson, Frederick Douglass, Gertrude Stein, Langston Hughes, Ralph Ellison, Flannery O'Connor, Allen Ginsberg, Chang-Rae Lee, and Toni Morrison, among others. WR, HU

* ENGL 128a or b, Readings in Comparative World English Literatures  Staff
An introduction to the literary traditions of the Anglophone world in a variety of poetic and narrative forms and historical contexts. Emphasis on developing skills of literary
interpretation and critical writing; diverse linguistic, cultural and racial histories; and on
the politics of empire and liberation struggles. Authors may include Daniel Defoe,
Mary Prince, J. M. Synge, James Joyce, C. L. R. James, Claude McKay, Jean Rhys,
Yvonne Vera, Chinua Achebe, endencies wa Thiong'o, J. M. Coetzee, Brian Friel, Amitav
Ghosh, Salman Rushdie, Alice Munro, Derek Walcott, and Patrick White, among
others. Preregistration required; see under English Department.  WR, HU

* ENGL 129a or b / HUMS 127a or b / LITR 168a or b / THST 129a or b, Tragedy in
the European Literary Tradition  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 might include Aristotle's *Poetics* or Homer's *Iliad*
and plays by Aeschylus, Sophocles, Euripides, Seneca, Hrotsvitha, Shakespeare, Lope
de Vega, Calderon, Racine, Büchner, Ibsen, Strindberg, Chekhov, Wedekind, Synge,
Lorca, Breckett, Beckett, Soyinka, Tarell Alvin McCraney, and Lynn Nottage. Focus on
textual analysis and on developing the craft of persuasive argument through writing.
WR, HU

* ENGL 130a or b / LITR 169a or b, Epic in the European Literary Tradition  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 on developing the craft of persuasive argument through
writing.  WR

* ENGL 149b / LING 109b, History of the English Language  Staff
The evolution of English from its beginnings nearly 1500 years ago to the language
of *Beowulf*, Chaucer, Shakespeare, Milton, Jane Austen, Melville, Twain, Langston
Hughes, Bernie Sanders, Maya Angelou, and Cardi B. An overview of the 'Englishes'
that populate our globe, including a look at the ways that technology affects language.
HU

* ENGL 150a / LING 150a, Old English  Emily Thornbury
An introduction to the language, 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*, which are read in the original Old English.  HU

ENGL 160b, Milton  Feisal Mohamed
A study of John Milton's poetry, his engagement with the cultural, social, political,
and philosophical struggles of the seventeenth century, and the surprising influence
of *Paradise Lost* on eighteenth- and nineteenth-century American letters and religion.
Formerly ENGL 220.  WR, HU  0 Course cr

ENGL 163b / WGSS 163b, Vampires, Castles, and Werewolves  Heather Klemann
Study of eighteenth- and nineteenth-century gothic fiction and the persistence,
resurgence, and adaptation of gothic tropes in twentieth- and twenty-first-century film,
television, and prose. Readings include *Frankenstein*, *Northanger Abbey*, *The Strange Case
of Dr. Jekyll and Mr. Hyde*, and *Dracula*. Films and TV include *Inception*, *Black Swan*,
Alfred Hitchcock’s *Rebecca*, and episodes from *Buffy the Vampire Slayer*. Formerly ENGL
136. Prerequisite: First years must have taken a WR seminar course in the fall term.

**ENGL 183a, Poetry since 1950**  Staff

An introduction to poetry in English from the mid-twentieth century to the age of Trump and Black Lives Matter, including major figures and movements in the United States, England, Ireland and Northern Ireland, and the Caribbean. Special attention to poetic form and meaning and to themes of personal identity, home and homelessness, gender, sexuality, and race, in the context of consumerism, the Cold War, second wave feminism, decolonization, and the AIDS epidemic. Poets include Bishop, Lowell, Ginsberg, O’Hara, Plath, Baraka, Rich, Brooks, Gunn, Larkin, Heaney, Walcott, Brathwaite, and Rankine.  WR, HU  o Course cr

**ENGL 187a / AMST 239a, Love and Hate in the American South**  Staff


**ENGL 189a, Literature and Social Justice**  Staff

This lecture course introduces students to a range of thinking about the relationship between literature and projects of social justice within political modernity. We read works by a wide range of literary and political thinkers from the last two-and-a-half centuries or so, reflecting especially on questions such as: What is the relationship between literature and politics? How does social change play out in literature, and, in turn, what role might literature play in social change? Where does the category of the ‘literary’ come from, and how does it relate to key political categories such as ‘the people’? How might literature – and the arts generally – be of use to us in our attempts to create a more just, free, and equal society? How might a more just, free, and equal society allow us to relate to literature and the arts? On the literary side, our writers may include William Wordsworth, Jane Austen, W.B. Yeats, Virginia Woolf, Federico García Lorca, Pablo Neruda, Czeslaw Milosz, Wislawa Szymborska, Audre Lorde, Seamus Heaney, Milan Kundera. On the political side, our thinkers may include Edmund Burke, Mary Wollstonecraft, J.S. Mill, Karl Marx, Karl Popper, Immanuel Wallerstein.  WR, HU  o Course cr

**ENGL 192b / FILM 240b / LITR 143b, World Cinema**  Marta Figlerowicz

Development of ways to engage films from around the globe productively. Close analysis of a dozen complex films, with historical contextualization of their production and cultural functions. Attention to the development of critical skills. Includes weekly screenings, each followed immediately by discussion.  HU

**ENGL 196b / FILM 160b, Introduction to Media**  John Peters

Introduction to the long history of media as understood in classical and foundational (and even more recent experimental) theories. Topics involve the technologies of
modernity, reproduction, and commodity, as well as questions regarding knowledge, representation, public spheres, and spectatorship. Special attention given to philosophies of language, visuality, and the environment, including how digital culture continues to shape these realms.  WR, HU  o Course cr

* ENGL 200a, Laboring through the Middle Ages  Emily Thornbury and Seamus Dwyer

Society is stratified, and the Haves seem to inhabit a different world than the Have-Nots. The work you do—or don’t do—determines not just the way you live, but your value as a human being. And then a pandemic arrives, and in its aftermath society and its rules for work don’t seem so natural after all...This is the 2020s, but it’s also the 1350s, when the Black Death laid waste to Europe’s population and caused both revolt and retrenchment. In the generation after the plague, society both changed and didn’t; and those who survived produced some of the greatest literary art of the Middle Ages. In this junior seminar, we explore the ideology of work (and its opposite, idleness) across the Middle Ages in England. We consider big questions, like: are you different from what you do? Is art work? Is prayer? Should you have to work to get into heaven? And why does anyone have to work at all? This course covers a time period that is both very different from and eerily similar to our own. Students experience some great works of visual and verbal art, and the manuscripts and artifacts in which they’re embodied—the visible, tangible result of medieval labor. Students develop perspective on what labor meant in the Middle Ages, and means to us today.  WR, HU

* ENGL 201b / WGSS 203b, The Victorian Problem Novel  Ruth Yeazell and Colton Valentine

This seminar invites you to see the Victorian novel anew: to experience it as provocative and radical, unexpected, and disquieting. To this end, we take a deep dive into four major works of Victorian fiction that challenged readers at the time—and often continues to do so—both substantively and formally. What, we ask, justifies thinking of these novels as “problems,” and how, if at all, have those problems changed over the last hundred and fifty years? What should we make of these works’ conflicting attitudes toward gender and class? How should we best approach their struggles with national, ethnic, and religious identity? In what ways do they challenge readers’ expectations about narrative voice, the structure of the plot, or the limits of realism? To think more concretely about how readers other than ourselves have responded to these works, our principal texts are supplemented by commentaries from Victorian reviewers and modern literary critics. Prior acquaintance with some Victorian fiction, including other novels by our writers, is recommended but not required.  WR, HU

* ENGL 205b / HUMS 200b / LITR 195b / MUSI 462b, Medieval Songlines  Ardis Butterfield

Introduction to medieval song in England via modern poetic theory, material culture, affect theory, and sound studies. Song is studied through foregrounding music as well as words, words as well as music.  WR, HU

* ENGL 208b / HUMS 218b, Neoplatonism Across Time and Faith  Feisal Mohamed

Engaging in questions of Platonic influence may seem to support a traditional, unitary view of Western culture unified by its roots in ancient Greece. This course poses a strong challenge to that narrative. By focusing on the Platonism of late antiquity, we in fact engage in a profound re-mapping of cultural and intellectual traditions—classical, medieval, early modern, and modern—less centered on Athens and Rome and taking
into its ken Alexandria, Damascus, and Baghdad. The course also explores engagements of the Neoplatonic tradition across all three Abrahamic faiths.  

* ENGL 214b, Moby-Dick  
David Bromwich  
This seminar engages in the interpretation of a single great book, *Moby-Dick* by Herman Melville. Some attention is given to its historical and literary context, with readings in Emerson, Hawthorne, Webster, and Douglass, Shakespeare and Montaigne, and Melville’s own earlier and later writings. Mostly we discuss the book itself, for its portrait of the energy and madness of American industry and enterprise, its criticism of American ideals, and its allegory of the romantic will.  

* ENGL 224a / LITR 349a / THST 317a, Tragedy and Drama of Reconciliation  
Jan Hagens  
Close reading of dramas of reconciliation from the Western canon that have traditionally been categorized as tragedies. Ways in which the recategorization of such plays lends additional complexity and meaning to their endings and allows for new interpretations of the texts, their authors, and the history of drama.  

* ENGL 228a / AFAM 289a, Counternarratives: Black Historical Fictions  
Elleza Kelley  
While historical records have long been the source from which we draw our picture of the past, it is with literature and art that we attempt to speculatively work out that which falls between the cracks of conventional archival documentation, that which cannot be contained by historical record—emotion, gesture, the sensory, the sonic, the inner life, the afterlife, the neglected and erased. This course examines how contemporary black writers have imagined and attempted to represent black life from the late 17th to the early 20th centuries, it asks what fiction can tell us about history. Reading these works as alternative archives, or “counterarchives,” which index the excess and fugitive material of black histories in the Americas, we probe the uses, limits, and revelations of historical fictions, from the experimental and realist novel, to works of poetry and drama. Drawing on the work of various interdisciplinary scholars, we use these historical fictions to explore and enter into urgent and ongoing conversations around black life & death, African-American history & memory, black aesthetics, and the problem of “The Archive.” Some familiarity with the events and themes of African American history is strongly recommended, but not required. This course is not open to students who have already take AFAM 013/ENGL 005.  

* ENGL 236a / AMST 330a, 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.  

* ENGL 241b / THST 214b, English Comic Drama, 1660-1800  
Jill Campbell  
An exploration of the distinctive wit, social functions, conditions of theatrical production, and changing forms of comic drama in Britain from the reopening of the theaters in 1660 to 1800. Particular attention to the construction of gender and sexuality in these plays, including the figures of the effeminate fop and male and female libertines; sexual harassment and coercion; same-sex and opposite-sex eroticism; and the interplay between sexual and verbal pleasures. Other topics to include representations of labor and social class; the shaping force of imperial trade on

* ENGL 246a / AMST 245a / PLSC 247a, The Media and Democracy  Joanne Lipman
In an era of "fake news," when mainstream media is attacked as the "enemy of the people" and social platforms are enabling the spread of misinformation, how do journalists hold power to account? Students explore topics including objectivity versus advocacy, and hate speech versus First Amendment speech protections. Case studies will span from 19th century yellow journalism to the media's role in #MeToo and #BlackLivesMatter movements.  SO

* ENGL 248a / HSHM 476a / HUMS 430a / LITR 483a / PHIL 361a, Thought Experiments: Connecting Literature, Philosophy and the Natural Sciences  Paul Grimstad
The course looks closely at the intersection of literature, philosophy and natural science through the lens of the thought experiment. Do thought experiments yield new knowledge about the world? What role does narrative or scene setting play in thought experiments? Can works of literary fiction or films function as thought experiments? Readings take up topics such as personal identity, artificial intelligence, meaning and intentionality, free will, time travel, the riddle of induction, "trolley problems" in ethics and the hard problem of consciousness. Authors may include Mary Shelley, Plato, Albert Einstein, Franz Kafka, H.G. Wells, Rene Descartes, Kazuo Ishiguro, Rivka Galchen, Alan Turing, Hilary Putnam, as well as films (The Imitation Game) and television shows (Black Mirror). Students should have taken at least one course involving close analysis of works of literature or philosophy.  WR, HU

* ENGL 250a, Romanticism and Anti-Romanticism  Leslie Brisman
Romanticism is traditionally conceived as the “great turn inward,” where interest in exploring the complexities and depths of the human mind replaces a focus on heroic action and social interaction. But the great Romantic poets were equally concerned with interpersonal relations and political problems and reform. Some of the great recent criticism of Romantic Poets emphasize the anti-Romantic elements within the great Romantic poems. This course attempts to focus on both. Readings are mostly in the work of Blake, Coleridge, Wordsworth, Shelley, and Keats, with some attention to Byron, Charlotte Smith, Scott, and the minor poets.  WR, HU  RP

* ENGL 251a / WGSS 251a, Experiments in the Novel: The Eighteenth Century  Jill Campbell
The course provides an introduction to English-language novels of the long eighteenth century (1688-1818), the period in which the novel has traditionally been understood to have "risen." Emphasizing the experimental nature of novel-writing in this early period of its history, the course foregrounds persistent questions about the genre as well as a literary-historical survey: What is the status of fictional characters? How does narrative sequence impart political or moral implications? How do conventions of the novel form shape our experience of gender? What kind of being is a narrator? Likely authors include Aphra Behn, Daniel Defoe, Samuel Richardson, Henry Fielding, Laurence Sterne, Maria Edgeworth, Jane Austen, Jennifer Egan, Colson Whitehead, and Richard Powers.  WR, HU
* ENGL 256a / AMST 241a / HUMS 245a, Poets and their Papers  
Karin Roffman  
This Beinecke-intensive course considers the published works of living poets alongside the processes they used to create them: drafts, letters, journals, fragments, objects and other artworks that were directly or indirectly part of their artistic development. The course includes the participation of some of the poets themselves, a generation of writers who grew up with an acute awareness that their papers would someday be in a library. That long-term recognition of a public future for often seemingly private thoughts and ideas gives these papers particularly vital value and interest. The kinds of casual phrases and inclusions that were a crucial part of postwar American poetry one sees being worked out in poets’ attitudes of curiosity and attention toward works-in-progress, collaborative experiments and correspondence. Like the poets themselves, this course takes the Beinecke archives as primary not secondary to the production of late 20th and early 21st century poetry. An aspect of the course is the opportunity to talk with multiple generations of poets about their processes of creation, collection and organization and to capture their vision of archives as distinct from (and not merely preparatory to) publication.  

WR, HU

* ENGL 263a / HUMS 327a, The Victorian Political Novel  
Stefanie Markovits  
The engagement of the Victorian novel with the world of politics. Emphasis on how systems interact with individual agents to make stories and how methods such as realism, romance, and the courtship plot portray the mechanics of government. Units on revolution and riot (Dickens and Gaskell), reform (Eliot and Trollope), and anarchy (James and Conrad).  

WR, HU

* ENGL 268a / HUMS 254a / LITR 463a / PHIL 227a, Literature and Philosophy, Revolution to Romanticism  
Jonathan Kramnick  
This is a course on the interrelations between philosophical and literary writing beginning with the English Revolution and ending with the beginnings of Romanticism. We read major works in empiricism, political philosophy, and ethics alongside poetry and fiction in several genres. Topics include the mind/body problem, political ideology, subjectivity and gender, and aesthetic experience as they take philosophical and literary form during a long moment of historical change.  

WR, HU

* ENGL 275b, Emerson, Dickinson, and Melville  
Richard Deming  
Study of central works by three foundational writers of the nineteenth century. Cultural and historical context; questions concerning American identity, ethics, and culture, as well as the function of literature; the authors’ views on the intersections of philosophy and religious belief, culture, race, gender, and aesthetics. Readings include novels, poems, short fiction, and essays.  

WR, HU

* ENGL 281b / AMST 358b, Animals in Modern American Fiction  
James Berger  
Literary portrayals of animals are 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

* ENGL 283a / AMST 425a / EVST 430a, American Culture and the Rise of the Environment  
Michael Warner  
U.S. literature from the late eighteenth century to the Civil War explored in the context of climate change. Development of the modern concept of the environment; the formation and legacy of key ideas in environmentalism; effects of industrialization and
national expansion; utopian and dystopian visions of the future. Formerly ENGL 430.

WR, HU

* ENGL 292a / HUMS 237a, Modernities: Past and Present in Fiction since 1789
  Katja Lindskog
  Drawing on English-language literature, art, and history-writing since 1800, this class explores how the past can illuminate and complicate the ways we perceive the present. We begin with the geopolitical and social revolutions of the 1800s as seen through essays and fictions by George Eliot, Thomas Babington Macaulay, and Thomas Carlyle, and end with the memoir-as-history of Hazel Carby’s *Imperial Intimacies* (2019). Along the way, we explore a variety of approaches to making the past come alive in the present; through the “what if” posed by alternate history speculations, through didactic history in fact and fiction imagined for children, the use of the past as a site of romance, and through visual media like paintings and cinema. Throughout the course, we address questions like: how does fiction work to interpret the past? How does our interpretation of the past reflect and help us process present day concerns? Is the past best imagined as a foreign country full of exotic difference to the present, as a mirror to ourselves?
  HU

* ENGL 324b, Modern Irish Literature and Culture
  Joe Cleary
  This course offers an introduction to some significant lines of development in modern Irish culture from the Great Famine in the 1840s through to the recent centenaries of the southern and northern Irish states founded in 1921-22. It covers topics including the decline and partial recovery of the Irish language and the consolidation of a new national literature in Hiberno-English; the role of Catholicism and critiques of Catholicism; the Protestant Ascendancy tradition in the Revival and post-Revival periods; modernism, modernity, and the critique of modernization; and the post-1960s changes brought about by the Northern Irish Troubles, the women’s movement and other social movements, Europeanization and Americanization. The seminar covers poetry, drama, the novel, and memoir and occasionally examines other media including song, music, dance, visual arts and cinema. Key authors may include W. B. Yeats, John Millington Synge, James Joyce, Sean O’Casey, Elizabeth Bowen, Kate O’Brien, Maírtín Ó Cadhain, Samuel Beckett, Edna O’Brien, Seamus Heaney, Brian Friel, Derek Mahon, Eavan Boland, Patrick McCabe, Anne Enright, Sally Rooney, and others.
  HU

* ENGL 325b / AMST 257b, 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

* ENGL 330b, Henry James
  Ruth Yeazell
  Selected novels by Henry James, from *Roderick Hudson* through *The Golden Bowl*. Particular attention to the international theme and to the ways in which James’s later novels revisit and transform the matter of his earlier ones. Formerly ENGL 435.
  WR, HU
* ENGL 344b / 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 345a, Elizabeth Bishop and Robert Lowell  Langdon Hammer
Intensive study of Elizabeth Bishop and Robert Lowell, with a focus on their poetry, personal correspondence, and literary friendship, in the context of key conflicts in American literature and society. Opportunities for archival study and creative writing in addition to literary analysis.  WR, HU

* ENGL 354b / AMST 235b, 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

* ENGL 356b, The Young Adult Dystopian Novel  Jill Richards
Survey of young adult fiction across the twentieth century, with a focus on American writers. Topics include environmental apocalypse, biopolitics, youth indebtedness, juvenile sentencing, sexual violence, and racial profiling. Creative and critical writing components.  WR, HU

* ENGL 368a / HIST 341Ja / SAST 474a, The Novel and the Nation: Reading India in Vikram Seth’s A Suitable Boy  Priyasha Mukhopadhyay and Rohit De
This course pairs two interconnected phenomena: the rise of the Indian Republic and the birth of the postcolonial novel. Over the course of the semester, we read a single primary text: Vikram Seth’s A Suitable Boy (1993). Set in the 1950s in the aftermath of India’s Independence and Partition, Seth’s encyclopaedic novel is the story of four families brought together by a mother’s search for a “suitable boy” for her daughter to marry. In the process, it builds a microcosm of an Indian society coming to terms with postcolonial statehood and weighing the aftereffects of British colonialism. Entwined in its plot about marriage, love, and relationships are some of the most urgent cultural and political concerns facing the new nation: legislative changes and land reforms, the violent aftermath of the Partition, secularism tainted by communal tensions, the disintegration of courtly forms of sociality, the reconstruction of city life, and the fate of the English novel in the postcolonial classroom. We read A Suitable Boy as literary critics and historians, pairing close readings of language and literary form with historical scholarship. Over the course of our discussions, we address the following questions: what is the relationship between the nation, the novel, and identity in the postcolonial world? How do we read narratives of “nation building” as literary and cultural constructions? What do we make of “literature” and “history” as disciplinary categories and formations? The seminar introduces students to methods of literary criticism and textual studies, and teaches them how to read a range of primary sources, from legislative debates, bureaucratic reports, newspapers, poetry, cinema, and radio.  HU
* ENGL 372a, The Colonial Encounter  Caryl Phillips
Study of the various ways in which contemporary literature has represented the encounter between the center and the periphery, with special attention paid to how this operates in the context of the British Empire.  WR, HU

* ENGL 378b / AFAM 449b / AFST 449b, Challenges to Realism in Contemporary African Fiction  Stephanie Newell
Introduction to experimental African novels that challenge realist and documentary modes of representation. Topics include mythology, gender subversion, politics, the city, migration, and the self. Ways of reading African and postcolonial literature through the lenses of identity, history, and nation. Formerly ENGL 449.  WR, HU

* ENGL 382a / FILM 280a / PSYC 320a, The Science and Culture of Memory  John Williams and Samuel McDougle
This is an FAS-sponsored cross-divisional course. This course offers a comparative and interdisciplinary approach to the science and culture of memory. We aim to bring traditional philosophies, narratives, and histories of memory into conversation with both long established and cutting-edge research findings on the neuroscience of memory. Questions explored in the course include: What is memory and how does it work? How has memory been conceptualized over time in both culture and science? What are the various media through which we process memories, including collective and individual forms? What can we learn from moments of mnemonic failure? What new technologies of memory are on the horizon? How is our vision of the future influenced by the content and processes of memory? In wrestling with these questions, we encounter a wide selection of narratives, art objects, films, and scientific data. Students also have an opportunity to explore their own experiences in learning and memory (including experiential assignments, e.g., asking them to memorize certain things and report on the experience, as well as opportunities to reflect on their experiences of and access to forms of collective, communal memory).  HU, SO

* ENGL 383a, What is Criticism For?  Joseph North
Literary and art criticism sometimes seem a bit hard to justify. Why spend so much time discussing books and artworks? What does it achieve? The same is sometimes said of literary and artistic education. What use is an English major? Do artsy types perform any useful social function? Many sophisticated thinkers have tried to answer these questions, and in this course we read some of the most interesting of them. We focus on thinkers who were writing between 1850 and 1950, and on two traditions of thought in particular: an English Liberal tradition (represented by figures such as John Stuart Mill, Matthew Arnold, Virginia Woolf, and E.M. Forster), and a European Marxist one (represented by figures such as Karl Marx, Alexandra Kollontai, Rosa Luxemburg, Leon Trotsky, and Antonio Gramsci). Their answers are often surprising. Judging by these thinkers, it seems that if you want to understand what criticism is good for, then you need to develop nothing less than a thoroughgoing account of the whole of human life—a big ask! By the end of the course, we should be in a better position to think seriously about the social function of literary criticism, art criticism, and aesthetic education.  HU

* ENGL 386a / WGSS 383a, Queer Writing Before Stonewall  Michael Warner
The focus of this course is gay, lesbian, and queer writing from the period between Whitman and Stonewall. How did queer writers find an audience in the years before the emergence of a gay/lesbian public? What languages of identity and sexuality did
they develop? The course begins with Walt Whitman and Emily Dickinson, writing before the idea of sexual minorities took hold. We read some late 19C writers in their wake, including Charles Warren Stoddard, and the literary culture of the “Boston marriage,” before turning to the conjunction of sexual culture and modernism. Queer modernism has been much studied in recent years, including such figures as Wilde, Freud, Joyce, Woolf, Stein, Barnes, Firbank, Crane, Thurman, Hughes, and Proust; in the same years, a language of homosexual rights began to develop with such works as *Imre*, by Edward Prime Stevenson. Many of the writers in the period explored unsettled sexualities and worlds of abjection, in ways that can still disturb readers. They influenced one another across the Atlantic and across genres. We touch on the British and Irish writers who came of age after WWI (Isherwood, Auden, Spender, Ackerley, Barnes), as well as the paradigmatically queer writing of those for whom queerness was linked to a language of criminality—notably Jean Genet, Patricia Highsmith, and William Burroughs. Students are encouraged to pursue research projects in each of these moments, reaching up to the Beats (Burroughs, Ginsberg, Kerouac), the New York poets (O’Hara, Ashbery, Schuyler) the San Francisco Renaissance (Spicer, Duncan, Broughton), Southern queer writers (McCullers, Capote, Williams), black queer writing after the Harlem Renaissance (Baldwin, Hansberry), and other figures of the 60s from both high literary and underground backgrounds (Nabokov, Elizabeth Bishop, Joe Orton, and Vidal, but also Jack Smith, Jane Rule, and Iceberg Slim). Along the way we talk about the various ways that these writers charted a queer take on the world, including their engagements with criminality and psychopathology—the main connotations of queerness in the period—as well as the development of a queer language of abjection and its advantages for life. Students are encouraged to delve into the rich holdings of the Beinecke for research projects not limited to the writers on the syllabus, including the lesbian pulp fiction collection and holdings in the related fields of photography, film, and other arts.

* ENGL 395b / HUMS 380b / LITR 154b, The Bible as a 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.  WR, HU  RP  

* ENGL 404a or b, Reading Fiction for Craft  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. Formerly ENGL 134.  HU  

* ENGL 407a or b, Introduction to Writing Fiction  Staff  An intensive introduction to the craft of fiction, designed for aspiring creative writers. Focus on the fundamentals of narrative technique and peer review. Formerly ENGL 245.  

* ENGL 408a, Introduction to Writing Poetry  Cynthia Zarin  A seminar workshop for students who are beginning to write poetry or who have no prior workshop experience at Yale. Formerly ENGL 246.  RP  

* ENGL 411b, American Horror Stories  Richard Deming  From its earliest days, the horror genre, although often denigrated, has had a persistent presence in American literature and culture. This course investigates the reasons for this hold on the American imagination and what its social function has been. We explore
how the genre is a way that people can navigate questions concerning identity, gender, sexuality, and ethics, as well as grief, loss, and the fear of isolation. We look at the fraught representations of violence, subjectivity, and otherness these works provide. Texts include novels, short fiction, and films. The course is an exciting blend of creative and critical writing. Students write short creative responses and present on specific films and literary texts. The end of the course culminates in a longer project that can be either a scholarly engagement with specific texts and issues or a creative response that explores the ideas arising from the semester’s discussions. This allows students to work with the ideas in ways that most suits their strengths and interests. HU

* ENGL 414a / AFAM 284a / AMST 282a / ER&M 284a, Black Life and the Human/Body  Cera Smith

African American activists have long demanded equal rights by asserting the humanity of Black people. These activists have rejected their racist treatment as animals and property by championing the qualities ascribed to Western Man. More recently, however, scholars have questioned whether claims to humanity really result in freedom and justice for all Black people. They ask, “Does mobilizing humanity as a strategy for recognition and respect benefit Black non-men, disabled people, or the working class? What impact does this assertion of humanity have on our species’ relationship to other living beings and our environments? Ultimately, are all people allowed to be ‘human?’” In this course, we evaluate the category of the “human” by studying the challenge that the U.S. Black past and present pose to the category’s assumed neutrality. We attend to how Black peoples’ bodily experiences confirm, deny, and complicate humanness. We read poetry, short fiction, novels, and creative nonfiction to investigate what it means to live a Black life. Analyzing historical, social scientific, legal, and theoretical texts alongside literature helps us explore the debates over the power dynamics that underlie claims to humanity. Through writing and in-class discussions, we explore the relationship between race, species, and political strategy. HU

* ENGL 418a / EVST 224a, Writing About The Environment  Alan Burdick

Exploration of ways in which the environment and the natural world can be channeled for literary expression. Reading and discussion of essays, reportage, and book-length works, by scientists and non-scientists alike. Students learn how to create narrative tension while also conveying complex – sometimes highly technical – information; the role of the first person in this type of writing; and where the human environment ends and the non-human one begins. Formerly ENGL 241. Admission by permission of the instructor only. Students interested in the course should email the instructor at alan.burdick@gmail.com with the following information: 1.) A few paragraphs describing your interest in taking the class. 2.) A non-academic writing sample that best represents you. WR

* ENGL 419a / HSAR 460a / HUMS 185a, Writing about Contemporary Figurative Art  Margaret Spillane

A workshop on journalistic strategies for looking at and writing about contemporary paintings of the human figure. Practitioners and theorists of figurative painting; controversies, partisans, and opponents. Includes field trips to museums and galleries in New York City. Formerly ENGL 247. WR, HU
* ENGL 423b / FILM 397b / THST 228b, Writing about the Performing Arts
  Margaret Spillane
Introduction to journalistic reporting on performances as current events, with attention to writing in newspapers, magazines, and the blogosphere. The idea of the audience explored in relation to both a live act or screening and a piece of writing about such an event. Students attend screenings and live professional performances of plays, music concerts, and dance events. Formerly ENGL 244. WR, HU

* ENGL 425a or b, Writing the Television Drama  Staff
Crafting the television drama with a strong emphasis on creating and developing an original concept from premise to pilot; with consideration that the finest television dramas being created today aspire to literary quality. Students read original scripts of current and recent critically acclaimed series and create a series document which will include formal story and world descriptions, orchestrated character biographies, a detailed pilot outline, and two or more acts of an original series pilot. Formerly ENGL 248.

* ENGL 428b, Young Adult Writing  Jacob Halpern
A course on the craft of fiction writing for young adult readers. At the start of the semester, we read widely in the genre to identify the principles of craft at the sentence—and narrative—level, with the aim of creating a style that is original and a story narrative that is powerful. In the second half of the semester, students read and critique one another’s fiction. Open to writers of all levels and abilities. Formerly ENGL 259.

* ENGL 429b, Writing Humor  Ryan Wepler
Skills essential to humor writing, with an emphasis on texture, tone, character, and narrative. Students read the work of classmates and pieces by professional humor writers with the goal of generating an ever-expanding set of techniques for both reading humor and writing humorously. Formerly ENGL 255. Recommended preparation: ENGL 120. WR

* ENGL 434a / THST 215a, Writing Dance  Brian Seibert
The esteemed choreographer Merce Cunningham once compared writing about dance to trying to nail Jello-O to the wall. This seminar and workshop takes on the challenge. Taught by a dance critic for the New York Times, the course uses a close reading of exemplary dance writing to introduce approaches that students then try themselves, in response to filmed dance and live performances in New York City, in the widest possible variety of genres. No previous knowledge of dance is required. WR, HU

* ENGL 437b / AMST 184b / HUMS 184b, Writing and Reading Biography  Karin Roffman
The art of biography explored through groundbreaking examples, with particular emphasis on contemporary texts that explore the lives and work of artists. Topics on biographical theory and practice include: the balance of life and work; the relationship between biographer and subject; creative approaches to archives and research; and imaginative narrative strategies. Some classes take place at the Beinecke Library and there are some visits by working biographers. Students must complete an original biographical project by the end of the semester. HU

* ENGL 447a, Shakespeare and the Craft of Writing Poetry  Danielle Chapman
Shakespeare’s Craft brings students into conversation with Shakespeare’s plays and his sonnets; and teaches students how to draw from his many modes when writing their
own poems—without attempting to sound "Shakespearean." Over the course of the semester, we read three plays and a selection of the sonnets, pairing close readings with contemporary poems that use similar techniques. We also watch performances and learn how actors and directors find personal ways into Shakespeare’s protean language and meanings. Weekly assignments include both critical responses and creative assignments, focusing on specific craft elements, such as: "The Outlandish List: How to Keep Anaphora Interesting," "Verbs: How to Hurtle a Poem Forward," "Concrete Nouns and Death-defying Descriptions," "The Poet as Culture Vulture: Collecting Contemporary Details," "Exciting Enjambments and Measured Meter" and "Finis: How to Make a Poem End." This hybrid course is an exciting blend of creative and critical writing. Students decide before midterm whether they want to take the course as a Renaissance Literature or Creative Writing Credit, and this determines whether their final project is a creative portfolio or critical paper.

* ENGL 449a, The Art of Editing  Meghan O'Rourke
This course is an intensive practicum in which students are introduced to key aspects of the history and contemporary practice of professional editing and publication. Under the instruction of the current editor of The Yale Review (which is undergoing a transformation and relaunching primarily as a digital publication) students look at many aspects of editing text across forms—from magazine to newspaper to book editing. We also talk about the art of podcast editing and distinguish the demands of storytelling in audio from those of storytelling in print. Students do some coursework at The Yale Review and attend editorial meetings for hands-on professional editorial experience. Because text editing is inseparable from good reading students reading a lot. Through exchanges with weekly visitors, all of whom are experts in their field, students develop an array of hands-on skills and understand the full dimensionality of professional editing. A serious interest in the contemporary practice of publication. Prospective students need not have taken a creative writing class; rather, they might have backgrounds in student publications on campus, or a background with literature, podcasting, art and art history, technology, and/or film.  HU

* ENGL 450b, Daily Themes  Andrew Ehrgood
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 open to all undergraduates. Counts as a nonfiction course in the writing concentration.  WR

* ENGL 453a / THST 320a, Playwriting  Donald Margulies
A seminar and workshop on reading for craft and writing for the stage. In addition to weekly prompts and exercises, readings include modern American and British plays by Pinter, Mamet, Churchill, Kushner, Nottage, Williams, Hansberry, Hwang, Vogel, and Wilder. Emphasis on play structure, character, and conflict.  RP

* ENGL 455b, Writing about Oneself  Anne Fadiman
A seminar/workshop/lecture 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 American and British memoirs, autobiographies, personal essays, and letters. An older work, often from the nineteenth or early twentieth century, is paired each week with a more recent one on the same theme.  WR, HU
* **ENGL 456b / HUMS 427b / JDST 316b / LITR 348b, The Practice of Literary Translation**  Robyn Creswell
This course combines a seminar on the history and theory of translation (Tuesdays) with a hands-on workshop (Thursdays). The readings lead us through a series of case studies comparing, on the one hand, multiple translations of given literary works and, on the other, classic statements about translation – by translators themselves and prominent theorists. We consider both poetry and prose from the Bible, selections from Chinese, Greek, and Latin verse, classical Arabic and Persian literature, prose by Cervantes, Borges, and others, and modern European poetry (including Pushkin, Baudelaire, and Rilke). Students are expected to prepare short class presentations, participate in a weekly workshop, try their hand at a series of translation exercises, and undertake an intensive, semester-long translation project. Proficiency in a foreign language is required.  HU

* **ENGL 459b / EVST 215b / MB&B 459b, Writing about Science, Medicine, and the Environment**  Carl Zimmer
Advanced non-fiction workshop in which students write about science, medicine, and the environment for a broad public audience. Students read exemplary work, ranging from newspaper articles to book excerpts, to learn how to translate complex subjects into compelling prose. Admission by permission of the instructor only. Applicants should email the instructor at carl@carlzimmer.com with the following information:
1. One or two samples of nonacademic, nonfiction writing. (No fiction or scientific papers, please.) Indicate the course or publication, if any, for which you wrote each sample. 2. A note in which you briefly describe your background (including writing experience and courses) and explain why you’d like to take the course.  WR  RP

* **ENGL 460a or b, Advanced Poetry Writing**  Cynthia Zarin
A seminar and workshop in the writing of verse. May be repeated for credit with a different instructor.  RP

* **ENGL 461a or b, The Art and Craft of Television Drama**  Staff
This is an advanced seminar on the craft of dramatic television writing. Each week we’ll conduct an intensive review of one or two elements of craft, using scripts from the contemporary era of prestige drama. We’ll read full and partial scripts to demonstrate the element of craft being studied, and employ weekly writing exercises (both in-class and by assignment) to hone our skills on the particular elements under consideration. Students learn how to develop character backstories, series bibles, story areas, and outlines. The final assignment for the class is the completion of a working draft of a full-length script for an original series pilot. ENGL 425 and at least one other intro-level creative writing course are highly recommended. Permission of instructor or an application is required for enrollment.

* **ENGL 462b / FILM 401b / THST 453b, Writing Screenplay Adaptations**  Donald Margulies
A workshop on the art of screenplay adaptation. Students read short stories, novels, and non-fiction; the screenplays based on that source material; and view and analyze the final product, the films themselves. Instruction focuses on the form, economy, and structure specific to screenwriting. Weekly writing exercises supplement the creation of a final project: a short screenplay based on source material of the student’s choosing.
Previous experience in writing for film or stage would be advantageous but is not required. Restricted to juniors and seniors, or by permission of the instructor.  

* ENGL 465a or b, Advanced Fiction Writing  
Staff
An advanced workshop in the craft of writing fiction. May be repeated for credit with a different instructor.

* ENGL 467a or b / PLSC 253a or b, Journalism  
Staff
Examination of the practices, methods, and impact of journalism, with focus on reporting and writing; consideration of how others have done it, what works, and what doesn’t. Students learn how to improve story drafts, follow best practices in journalism, improve methods for obtaining, skeptically evaluating, and assessing information, as well as writing a story for others to read. The core course for Yale Journalism Scholars. No prerequisites.  

* 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 people and places, and address the theme themselves in both reportorial and first-person work. Application required in advance; see the English website for deadline and instructions.

* ENGL 473b, The Journalism of Ideas  
James Surowiecki
The history and practice of writing journalistic essays or articles in which the principal actor is a notion or idea. Conventions, tropes, and authorial strategies that give rise to the best work in the genre; focus on twentieth- and twenty-first-century writers such as George Orwell, Hannah Arendt, Janet Malcolm, Michael Lewis, and Ta-Nehisi Coates. Students write their own example of the journalism of ideas.

* ENGL 474a, The Genre of the Sentence  
Verlyn Klinkenborg
A workshop that explores the sentence as the basic unit of writing and the smallest unit of perception. The importance of the sentence itself versus that of form or genre. Writing as an act of discovery. Includes weekly writing assignments. Not open to freshmen.

* ENGL 478a or b / ARCH 392b, Writing about Place  
Cynthia Zarin
An exploration of reading and writing about place. Definitions of home; different meanings and intent of travel. Readings include exemplary contemporary essays from the eighteenth century to the present. Workshop for assigned student essays.

* ENGL 480b, Reporting and Crafting the Long-form Narrative  
Sarah Stillman
A feature-writing workshop in the reporting and writing of memorable long-form magazine narratives. Close readings of exemplary investigative works. Emphasis on reporting strategies and storytelling tools for interviewing diverse subjects, generating suspense, crafting scenes, and reconstructing events through use of human and non-human sources.

* ENGL 481a / THST 322a, Advanced Playwriting  
Deborah 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

* ENGL 483b / HUMS 428b / JDST 343b / LITR 305b, Advanced Literary Translation
Robyn Creswell
A sequel to LITR 348, The Practice of Literary Translation. Students apply to this workshop with a project in mind that they have been developing, either on their own or for a senior thesis, and they present this work during the class on a regular basis. Practical translation is supplemented by readings in the history of translation practice and theory, and by the reflections of practitioners on their art. These readings are selected jointly by the instructor and members of the class. Topics include the history of literary translation—Western and Eastern; comparative approaches to translating a single work; the political dimension of translation; and translation in the context of religion and theology. Class time is divided into student presentations of short passages of their own work, including related key readings; background readings in the history of the field; and close examination of relevant translations by accomplished translators. Students receive intensive scrutiny by the group and instructor. Prerequisite: LITR 348.

* ENGL 487a or b, Tutorial in Writing
Staff
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. Proposals must be submitted to the DUS in the previous term; deadlines and instructions are posted at english.yale.edu/undergraduate/applications-and-deadlines. Prerequisites: two courses in writing.

* ENGL 488a or b, Special Projects for Juniors or Seniors
Staff
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. Proposals must be signed by the faculty adviser and submitted to the DUS in the previous term; deadlines and instructions are posted at english.yale.edu/undergraduate/applications-and-deadlines.

* ENGL 489a or b, The Writing Concentration Senior Project
Staff
A term-long project in writing, under tutorial supervision, aimed at producing a single longer work (or a collection of related shorter works). The writing concentration accepts students with demonstrated commitment to creative writing at the end of the junior year or, occasionally, in the first term of senior year. Proposals for the writing concentration should be submitted during the designated sign-up period in the term before enrollment is intended. 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). Proposal instructions and deadlines are posted at english.yale.edu/undergraduate/applications-and-deadlines.

* ENGL 490a or b, The Senior Essay I
Staff
Students wishing to undertake an independent senior essay in English must submit a proposal to the DUS in the previous term; deadlines and instructions are posted at
english.yale.edu/undergraduate/applications-and-deadlines. 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  Staff
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. Students must submit a proposal to the DUS in the previous term; deadlines and instructions are posted at english.yale.edu/undergraduate/applications-and-deadlines. After ENGL 490.

* ENGL 499a, The Iseman Seminar in Poetry  Louise Gluck
The Iseman Poetry Seminar provides the opportunity for students to work closely on the craft of writing original poetry with the Iseman Professor of Poetry. Discussions, feedback, assigned readings, and writing assignments are designed to deepen the student’s understanding of the craft of writing and to hone their abilities in light of students’ individual strengths and needs. Discussion-oriented writing workshops at the opening of the term transition to one-on-one tutorials for the rest of the semester, culminating in a final reconvening of the group at the end of the semester. Enrollment is limited to six students in order to maximize contact between each student and the Iseman Professor. The main component of the course will be weekly writing assignments, which will receive written and oral feedback from the instructor.  HU

Environmental Engineering (ENVE)

* ENVE 120b / CENG 120b / ENAS 120b, Introduction to Environmental Engineering  John Fortner
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 161, 165 or CHEM 163, 167 (may be taken concurrently) or permission of instructor.  QR, SC

ENVE 314a / CENG 314a, Transport Phenomena I  Kyle Vanderlick
First of a two-semester sequence. 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 the instructor.  QR, SC  RP

ENVE 315b / CENG 315b, Transport Phenomena II  Michael Loewenberg
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

* ENVE 320a / ENRG 320a / MENG 320a, Energy, Engines, and Climate  Alessandro Gomez
The course aims to cover the fundamentals of a field that is central to the future of the world. The field is rapidly evolving and, although an effort will be made to keep abreast of the latest developments, the course emphasis is on timeless fundamentals, especially from a physics perspective. Topics under consideration include: key concepts of climate change as a result of global warming, which is the primary motivator of a shift in energy supply and technologies to wean humanity off fossil fuels; carbon-free energy sources, with primary focus on solar, wind and associated needs for energy storage and grid upgrade; traditional fossil-fuel power plants and engines, that are currently involved in 85% of energy conversion worldwide and we can’t “turn on a dime”. Elements of thermodynamics are covered throughout the course as needed, including the definition of various forms of energy, work and heat as energy transfer, the principle of conservation of energy, first law and second law, and rudiments of heat engines. We conclude with some considerations on energy policy and with the "big picture" on how to tackle future energy needs. Designed for juniors and seniors in science and engineering. Prerequisite: MENG 211 or permission from the instructor. QR, SC

ENVE 360b / ENAS 360b, Green Engineering and Sustainable Design  Julie Zimmerman
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 161, 165 or 163, 167 (or CHEM 112, 113, or 114, 115), or permission of instructor.

ENVE 373a / CENG 373a, Air Pollution Control  Drew Gentner
An overview of air quality problems worldwide with a focus on emissions, chemistry, transport, and other processes that govern dynamic behavior in the atmosphere. Quantitative assessment of the determining factors of air pollution (e.g., transportation and other combustion–related sources, chemical transformations), climate change, photochemical “smog,” pollutant measurement techniques, and air quality management strategies. Prerequisite: ENVE 120. QR, SC RP

* ENVE 377a / CENG 377a, Water-Energy Nexus  Staff
This course explores processes and technologies at the water-energy nexus. We utilize chemical and environmental engineering fundamentals to explore the links between maintaining clean water supply and energy security globally, as well as implications for environmental contamination and climate change. We develop a quantitative understanding of water chemistry and energy considerations for topics including traditional water and wastewater treatment, energy recovery from wastewater, membrane processes, water electrolysis for energy storage and electrochemical
contaminant conversion, industrial water consumption and wastewater production, underground water sources and water for oil and gas, opportunities for reuse of nontraditional source waters and contaminant valorization, and considerations for decentralization, resilience, and electrification. Quantitative understanding of these processes will be attained based on mass and energy balances, systems engineering, thermodynamics, and kinetics. Prerequisite: ENVE 120 or permission of instructor. The course is primarily designed for juniors and seniors majoring in environmental engineering, but students in other engineering majors are welcome. Students in non-engineering majors are also welcome but are encouraged to communicate with the instructor to make sure they have sufficient background knowledge in required mathematics.  QR, SC

ENVE 416b / CENG 416b, Chemical Engineering Process Design  Yehia Khalil
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. Enrollment limited to seniors majoring in Chemical Engineering or Environmental Engineering.  QR, SC RP

ENVE 438a, Environmental Organic Chemistry  John Fortner
This course examines major physical and chemical attributes and processes affecting the behavior of organic compounds in environmental systems, including volatilization, sorption/attachment, diffusion, and reactivity. Emphasis is placed on legacy pollutants (e.g. TCE, PCBs, DDT) and along with emerging contaminants of concern (e.g. pharmaceuticals, explosives, etc). The course reviews basic concepts from physical chemistry and examines the relationships between chemical structure, properties, and environmental behavior of organic compounds. Physical and chemical processes important to the fate, treatment, and transformation of specific organic compounds are addressed including solubility, volatilization, partitioning, sorption/attachment, bioaccumulation, and bulk environmental transformation pathways. Equilibrium and kinetic models based on these principles are used to predict the fate and transport of organic contaminants in the environment. Priority given to seniors or permission of instructor.  QR, SC

ENVE 441a, 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 161, 165, or 163, 167 (or CHEM 112, 113, or 114, 115, or 118); MCDB 290 or equivalent; or with permission of instructor.  SC

ENVE 473b, Air Quality and Energy  Drew Gentner
The production and use of energy explored as a source of air pollution worldwide. Assessment of emissions and physical/chemical processes; the effects of emissions from energy sources; the behavior of pollutants in energy systems and in the atmosphere. Topics include traditional and emerging energy technology, climate
change, atmospheric aerosols, tropospheric ozone, and transport/modeling/mitigation. Prerequisite: ENVE 373 or equivalent.  SC

* ENVE 490a or b, Senior Project  John Fortner
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 (EVST)

* EVST 030b / ARCG 031b / NELC 026b, Origins of Civilization: Egypt and Mesopotamia  Harvey Weiss
The origins of the earliest civilizations in Mesopotamia and Egypt along the Nile and Tigris–Euphrates Rivers explored with archaeological, historical and environmental data for the origins of agriculture, the classes and hierarchies that marked earliest cities, states and empires, the innovative monumental architecture, writing, imperial expansion, and new national ideologies. How and why these civilizational processes occurred with the momentous societal collapses at periods of abrupt climate change. Enrollment limited to first-year students. Preregistration required; see under First-Year Seminar Program.  HU, SO

* EVST 040a, Collections of the Peabody Museum  David Skelly
Exploration of scientific questions through the study and analysis of objects within the Peabody Museum’s collections. Formulating a research question and carrying out a project that addresses it are the core activities of the course. Enrollment limited to first-year students. Preregistration required; see under First-Year Seminar Program.  SC

* EVST 060b, Topics in Environmental Justice  Michael Fotos
This seminar introduces students to key concepts in environmental justice and to a selection of cases representing a wide range of environmental dilemmas. Course readings and discussions impart awareness of the diverse contexts in which problems of environmental justice might be studied, whether historical, geographic, racial, social, economic, political, biological, geophysical, or epistemic. Enrollment limited to first-year students. Preregistration required; see under First-Year Seminar Program.  WR, SC

* EVST 100b / PHY 100b / ENAS 100b / EPS 105b / PHYS 100b, Energy, Environment, and Public Policy  Daniel Prober
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.  QR, SC

EVST 123a / ENAS 123a, You, Your Planet, and A Sustainable Future  Aaron Dollar
This course attempts to give a holistic view of the major inter-relationships between humans and our planet, along with an examination of options for paths to a future that is more sustainable. It seeks to be personal and practical where possible, with a strong focus on ways that individuals can make a difference in their daily lives to the pressing issues around the climate and biodiversity crises. We examine concepts primarily through simple, fundamental physical principles which help to “see the forest for the trees” without getting bogged down by complex details.  SC
EVST 189b / HIST 246b, The History of Food  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 0 Course cr

EVST 191b, Trees: Environmental Biology and Global Significance  Craig Brodersen
This introductory level course explores the fundamental physiological and anatomical principles that govern tree biology. We cover the biophysics of energy balance, long-distance water transport, and gas exchange at multiple scales, from individual plant cells and organs to the tree and forest canopy. Understanding these processes requires foundational knowledge in the principles of cells and membranes, the fundamental differences between plant and animal cells, reproductive cycles, nutrient cycling, and phenology. Our focus then turns to regional and global patterns in forest dynamics, the implications of disruptions in the biotic and abiotic environment, and the role that trees play in the carbon cycle and carbon sequestration. We also consider the cultural significance of trees and forest products, with explorations of wood use in musical instruments and building materials  SC

* EVST 212a / EP&E 390a / PLSC 212a, 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. WR, SO

* EVST 215b / ENGL 459b / MB&B 459b, Writing about Science, Medicine, and the Environment  Carl Zimmer
Advanced non-fiction workshop in which students write about science, medicine, and the environment for a broad public audience. Students read exemplary work, ranging from newspaper articles to book excerpts, to learn how to translate complex subjects into compelling prose. Admission by permission of the instructor only. Applicants should email the instructor at carl@carlzimmer.com with the following information: 1. One or two samples of nonacademic, nonfiction writing. (No fiction or scientific papers, please.) Indicate the course or publication, if any, for which you wrote each sample. 2. A note in which you briefly describe your background (including writing experience and courses) and explain why you’d like to take the course. WR RP

EVST 219b / PHIL 290b, Philosophical Environmental Ethics  Stephen Latham
This is a philosophical introduction to environmental ethics. The course introduces students to the basic contours of the field and to a small number of special philosophical problems within the field. No philosophical background is required or expected. Readings are posted on Canvas and consist almost entirely of contemporary essays by philosophers and environmentalists. SO 0 Course cr

EVST 223a / E&EB 220a, General Ecology  David Vasseur
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 0 Course cr

* EVST 224a / ENGL 418a, Writing About The Environment  Alan Burdick
Exploration of ways in which the environment and the natural world can be channeled for literary expression. Reading and discussion of essays, reportage, and book-length works, by scientists and non-scientists alike. Students learn how to create narrative tension while also conveying complex—sometimes highly technical—information; the role of the first person in this type of writing; and where the human environment ends and the non-human one begins. Formerly ENGL 241. Admission by permission of the instructor only. Students interested in the course should email the instructor at alan.burdick@gmail.com with the following information: 1.) A few paragraphs describing your interest in taking the class. 2.) A non-academic writing sample that best represents you. WR

* 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 255b / F&ES 255b / GLBL 282b / PLSC 215b, Environmental Law and Politics  John Wargo
We explore relations among environmental quality, health, and law. We consider global-scale avoidable challenges such as: environmentally related human illness, climate instability, water depletion and contamination, food and agriculture, air pollution, energy, packaging, culinary globalization, and biodiversity loss. We evaluate the effectiveness of laws and regulations intended to reduce or prevent environmental and health damages. Additional laws considered include rights of secrecy, property, speech, worker protection, and freedom from discrimination. Comparisons among the US and EU legal standards and precautionary policies will also be examined. Ethical concerns of justice, equity, and transparency are prominent themes. SO 0 Course cr

* EVST 290b / URBN 319b, 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 307b, Organic Pollutants in the Environment  Shimon Anisfeld
An overview of the pollution problems posed by toxic organic chemicals, including petroleum, pesticides, PCBs, dioxins, chlorinated solvents, and emerging contaminants. Processes governing the environmental fate of organic pollutants, e.g., evaporation, bioconcentration, sorption, and biodegradation. Technologies for prevention and remediation of organic pollution. No background in organic chemistry required. SC

* EVST 323a, Wetlands Ecology Conservation & Management  Kealoha Freidenburg
Wetlands are ubiquitous. Collectively they cover 370,000 square miles in the United States and globally encompass more than 5 million square miles. Most points on a map are less than 1 km from the nearest wetland. Yet wetlands are nearly invisible to most people. In this course we explore wetlands in all of their dimensions, including the critical services they provide to other systems, the rich biodiversity
they harbor, their impact on global climate, and the links by which they connect to other systems. Additionally, wetlands are lynchpin environments for scientific policy and regulation. The overarching aim of the course is to connect what we know about wetlands from a scientific perspective to the ways in which wetlands matter for people.

* EVST 324b / ANTH 322b / SAST 306b, Environmental Justice in South Asia
  Kalyanakrishnan Sivaramakrishnan
  Study of South Asia’s nation building and economic development in the aftermath of war and decolonization in the 20th century. How it generated unprecedented stress on natural environments; increased social disparity; and exposure of the poor and minorities to environmental risks and loss of homes, livelihoods, and cultural resources. Discussion of the rise of environmental justice movements and policies in the region as the world comes to grips with living in the Anthropocene.

EVST 340a / ECON 330a, Economics of Natural Resources
  Staff
  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.

* EVST 349b / HIST 449Jb / HSHM 449b / URBN 382b, Critical Data Visualization: History, Theory, and Practice
  Bill Rankin
  Critical analysis of the creation, use, and cultural meanings of data visualization, with emphasis on both the theory and the politics of visual communication. Seminar discussions include close readings of historical data graphics since the late eighteenth century and conceptual engagement with graphic semiotics, ideals of objectivity and honesty, and recent approaches of feminist and participatory data design. Course assignments focus on the research, production, and workshopping of students’ own data graphics; topics include both historical and contemporary material. No prior software experience is required; tutorials are integrated into weekly meetings. Basic proficiency in standard graphics software is expected by the end of the term, with optional support for more advanced programming and mapping software.

* EVST 350a, Writing the World
  Verlyn Klinkenborg
  This is a practical writing course meant to develop the student’s skills as a writer. But its real subject is perception and the writer’s authority—the relationship between what you notice in the world around you and what, culturally speaking, you are allowed to notice. What you write during the term is driven entirely by your own interest and attention. How you write is the question at hand. We explore the overlapping habitats of language—present and past—and the natural environment. And, to a lesser extent, we explore the character of persuasion in environmental themes. Every member of the class writes every week, and we all read what everyone writes every week. It makes no difference whether you are a would-be journalist, scientist, environmental advocate, or policy maker. The goal is to rework your writing and sharpen your perceptions, both sensory and intellectual. Enrollment limited to fifteen.
Ancient states were societies with surplus agricultural production, classes, specialization of labor, political hierarchies, monumental public architecture and, frequently, irrigation, cities, and writing. Pristine state societies, the earliest civilizations, arose independently from simple egalitarian hunting and gathering societies in six areas of the world. How and why these earliest states arose are among the great questions of post-Enlightenment social science. This course explains (1) why this is a problem, to this day, (2) the dynamic environmental forces that drove early state formation, and (3) the unresolved fundamental questions of ancient state genesis and crisis, –law-like regularities or a chance coincidence of heterogenous forces? HU, SO

This course examines historical case studies of several significant global commodities produced in Africa to explore interactions between world market forces and African resources and societies. Through the lens of four specific commodities–ivory, rubber, cotton, and diamonds–this course evaluates diverse industries and their historical trajectories in sub-Saharan Africa within a global context from ~1870-1990s. Students become acquainted with the historical method by developing their own research paper on a commodity using both primary and secondary sources. WR, HU

This is the second course in a spring-fall sequence. The course is primarily for students who have already taken "Observing and Measuring Behavior I: Study Design" (ANTH 376) and who have conducted summer research as part of an NSF-funded Summer Program in Argentina (https://www.owlmonkeyproject.com/open-calls). In this course students learn how to analyze the data they have collected, strategies for interpreting and presenting results, including considerations of study design issues and a priori statistical protocols; predictive and/or explanatory power and interpretation of statistical significance, scientific inference and research relevance. Students practice writing and oral skills associated with how to write communicating the results of their study. Prerequisite: ANTH 376. QR, SC, SO

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.

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.
* EVST 422a / ANTH 409a / ER&M 394a / F&ES 422a / GLBL 394a, Climate and Society: Perspectives from the Social Sciences and Humanities  
Michael Dove

Discussion of the major currents of thought regarding climate and climate change; focusing on equity, collapse, folk knowledge, historic and contemporary visions, western and non-western perspectives, drawing on the social sciences and humanities.  
WR, SO

* EVST 430a / AMST 425a / ENGL 283a, American Culture and the Rise of the Environment  
Michael Warner

U.S. literature from the late eighteenth century to the Civil War explored in the context of climate change. Development of the modern concept of the environment; the formation and legacy of key ideas in environmentalism; effects of industrialization and national expansion; utopian and dystopian visions of the future. Formerly ENGL 430.  
WR, HU

EVST 431b, The Physical Science of Climate Change  
Peter Raymond and Xuhui Lee

The course provides students with core knowledge on the processes controlling the earth’s climate system. The first half of the class focuses on the four components of the earth climate system, providing a knowledge base on the atmospheric energy and water budgets and the roles of anthropogenic greenhouse gases, the oceans, land and cryosphere in altering these budgets. Students also learn how to run a climate GCM (general circulation model). The second half of the class focuses on impacts of climate change on a number of societal sectors including natural ecosystems, energy use, water resources, the food system and the built environment.  
SC

* EVST 463a / AMST 463a / FILM 455a / THST 457a, Documentary Film Workshop  
Charles Musser

A yearlong workshop designed primarily for majors in Film and Media Studies or American Studies who are making documentaries as senior projects. Seniors in other majors admitted as space permits.  
RP

* EVST 496a or b, Senior Research Project and Colloquium  
Jeffrey Park, Michael Fotos, and Kealoha Freidenburg

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. Seniors in the BS track typically write a two semester senior essay by enrolling in EVST 496 and EVST 496. For the B.A. degree, students most often complete one term of EVST 496, in either the fall or spring semester of their senior year. Students writing the one-term essay in the BA track must also complete an additional advanced seminar in the environment. Two-term senior research projects in the BA track require the permission of the DUS. Single semester essays are permissible also for students completing a double major that involves writing a senior essay in another department or program with permission of the DUS and subject to Yale College academic regulations governing completion of two majors.
Ethics, Politics, & Economics (EP&E)

EP&E 203a / PLSC 452a / S&DS 102a, Introduction to Statistics: Political Science
Jonathan Reuning-Scherer
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

EP&E 209a / PLSC 453a / S&DS 103a, 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

* EP&E 215a or b, Classics of Ethics, Politics, and Economics  Boris Kapustin
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

The purpose of this course is to examine the interdisciplinary subjects of ethics, politics, and economics through the lens of African-American thought and to grasp how African-American thinkers have deepened our understanding of the interaction between race and socioeconomic debates and controversies throughout U.S. history. Far from being a univocal tradition, African-American thought encompasses a rich variety of intellectual perspectives that have critically assessed the impact of slavery, education, capitalism, and religion, among a number of topics, on African-Americans. While the study of American racial relations can include a wide range of topics, our thematic focus remains on the ethical, political, sociological, and economic dimensions of African-American experiences from the eighteenth century to the present day. This inquiry further prompts us to reflect on the various conceptions of liberty, justice, and equality that have informed the Declaration of Independence and U.S. Constitution and that lie at the core of intellectual discussion over race in American history. HU

The purpose of this course is to explore the intellectual origins of liberalism and conservatism through an EP&E framework. We discuss the tensions between collective wisdom and individual reason in the early modern period and survey the thought of thinkers in the proto-liberal and proto-conservative traditions, such as Thomas Hobbes and John Locke on sovereignty, individual autonomy, reason, and toleration; and Robert Filmer, Richard Hooker, and David Hume on order, custom, and utility. Our main object of inquiry, however, is the intellectual division that emerged between supporters and critics of the French Revolution, the historical event that prompted the modern political identities of liberalism and conservatism. Accordingly, we examine the political, moral, and economic theories of the Revolution; reactions to the Revolution from Edmund Burke, Joseph de Maistre, and other counterrevolutionaries; critical responses to their reactions, including those from Thomas Paine, Mary Wollstonecraft, and James Mackintosh; and the impact of this debate on the evolution
of liberalism and conservatism in the nineteenth and twentieth centuries in Europe and the United States. Class discussions and readings confront liberal and conservative perspectives on human nature; reason; freedom; tradition; individual rights; religion; the Enlightenment; market economies; democratic participation; and equality.

* EP&E 224b / ECON 465b / GLBL 330b, 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.

* EP&E 235b / PHIL 457b / PLSC 283b, 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.

* EP&E 241a / PLSC 415a / SOCY 172a, Religion and Politics in the World  Katharine Baldwin
A broad overview of the relationship between religion and politics around the world, especially Christianity and Islam. Religions are considered to constitute not just theologies but also sets of institutions, networks, interests, and sub-cultures. The course’s principal aim is to understand how religion affects politics as an empirical matter, rather than to explore moral dimensions of this relationship.

* EP&E 244a / ECON 449a / PLSC 374a, The Economic Analysis of Conflict  Gerard Padro
In this course we apply microeconomic techniques, theoretical and empirical, to the analysis of internal violent conflict, including civil wars, terrorism and insurgencies, its causes and consequences. Topics include forced migration, ethnic conflict, long-term consequences of war and individual choices to participate in violence. Readings comprise frontier research papers and students will learn to critically engage with cutting-edge research designs. Prerequisites: Intermediate econometrics.

* EP&E 248b / PLSC 256b, American Political Institutions  Michael Fotos
The origins and development of American political institutions, especially in relation to constitutional choice and the agency of persons seeking freedom, equality, and self-governing capabilities as a driver of constitutional change. Key concepts include: American federalism, compound republic, citizenship, social movements, racial justice, and nonviolence.

* EP&E 257a / LAST 251a / PLSC 399a, Political Power and Inequality in Latin America  Ana De La O
Overview and analysis of politics in Latin America. The emergence of democracy and the forces that led to the unprecedented increase in inequality in the twentieth century. Topics include institutional design, historical legacies, corruption, clientelism, and violence.
* EP&E 286a / ECON 475a, 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.

  Many today believe that the model of representative government that we have inherited from its 18th century founders is broken. It is seen as too oligarchic, disconnected, and unresponsive to the demands of 21st century citizens and, as such, no longer fitting the ideal of democracy that it was supposed to render possible in large, industrial societies. In this course we explore possible reforms and alternatives to the existing political and social system from both empirical and normative perspectives. We try to think both beyond representation by looking at new ways in which citizens can directly affect policy-making by either working with or by-passing entirely elected officials, and beyond government itself, by questioning the assumed divide between the political and the economic spheres and interrogating the internal structure and governance of the workplace.

EP&E 295a / PLSC 344a, Game Theory and Political Science  Staff
  Introduction to game theory—a method by which strategic interactions among individuals and groups in society are mathematically modeled—and its applications to political science. Concepts employed by game theorists, such as Nash equilibrium, subgame perfect equilibrium, and perfect Bayesian equilibrium. Problems of cooperation, time-consistency, signaling, and reputation formation. Political applications include candidate competition, policy making, political bargaining, and international conflict. No prerequisites other than high school algebra. Political Science majors who take this course may not count ECON 159 toward the major. QR, SO

* EP&E 297b / 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.

* EP&E 299a / GLBL 299a / PLSC 332a, Philosophy of Science for the Study of Politics  Ian Shapiro
  An examination of the philosophy of science from the perspective of the study of politics. Particular attention to the ways in which assumptions about science influence models of political behavior, the methods adopted to study that behavior, and the relations between science and democracy. Readings include works by both classic and contemporary authors.

* EP&E 306a / PLSC 228a, First Amendment and Ethics of Law  Karen Goodrow
  This course addresses the First Amendment and freedom of speech, focusing on the ethical implications of restrictions on free speech, as well as the exercise of free speech.
Course topics and discussions include the “fighting words” doctrine, hate speech, true threats, content regulated speech, freedom of speech and the internet, and the so-called “right to be forgotten.” By the end of the course, students recognize the role free speech plays in society, including its negative and positive impacts on various segments of society. Students also have an understanding of the competing interests arising from the First Amendment’s right to free speech, and can analyze how these competing interests are weighed and measured in the United States as compared with other countries.

* EP&E 312a / PLSC 297a, Moral Choices in Politics  Boris Kapustin

* EP&E 313a / ECON 209a, Economic Analysis of Law  Robin Landis
This course is intended to provide an introduction to the economic analysis of law. We examine the economic rationale(s) underlying various legal doctrines of both common law and statutory law, as well as the economic consequences of different legal doctrines. Previous coursework in economics, while helpful, is not a prerequisite for the course.

* EP&E 317a / AFST 324a / HIST 368Ja / PLSC 324a, Nelson and Winnie Mandela  Jonny Steinberg
A study of Nelson and Winnie Mandela’s marriage and public careers and the political and philosophical questions the marriage raises. Students examine the Mandelas’ conflicting ideas on race and on the colonial experience and compare them to those of Mohandas Gandhi and Franz Fanon. Students also read recent philosophical work on forgiveness and on violence in order critically to assess the politics of reconciliation that so divided the Mandelas. The course examines the politics of global celebrity and the portrayal of men and women in public media.

* EP&E 325b / PLSC 304b, Business Ethics and Law  Robin Landis
This seminar is intended to provide frameworks for the analysis of ethical issues that may arise in the context of business decisions, including such aspects as the role of ethics, competing values and interests, and tools for making principled decisions. The course also covers, as appropriate, some aspects of law as they relate to business ethics. Previous courses in philosophy and ethics may be helpful.

* EP&E 328a / PLSC 347a / S&DS 172a, YData: Data Science for Political Campaigns  Joshua Kalla
Political campaigns have become increasingly data driven. Data science is used to inform where campaigns compete, which messages they use, how they deliver them, and among which voters. In this course, we explore how data science is being used to design winning campaigns. Students gain an understanding of what data is available to campaigns, how campaigns use this data to identify supporters, and the use of experiments in campaigns. This course provides students with an introduction to political campaigns, an introduction to data science tools necessary for studying politics, and opportunities to practice the data science skills presented in S&DS 123, YData.
* EP&E 350a / AFST 385a / HIST 391Ja / HLTH 385a / PLSC 429a, Pandemics in Africa: From the Spanish Influenza to Covid-19  
  Jonny Steinberg

The overarching aim of the course is to understand the unfolding Covid-19 pandemic in Africa in the context of a century of pandemics, their political and administrative management, the responses of ordinary people, and the lasting changes they wrought. The first eight meetings examine some of the best social science-literature on 20th-century African pandemics before Covid-19. From the Spanish Influenza to cholera to AIDS, to the misdiagnosis of yaws as syphilis, and tuberculosis as hereditary, the social-science literature can be assembled to ask a host of vital questions in political theory: on the limits of coercion, on the connection between political power and scientific expertise, between pandemic disease and political legitimacy, and pervasively, across all modern African epidemics, between infection and the politics of race. The remaining four meetings look at Covid-19. We chronicle the evolving responses of policymakers, scholars, religious leaders, opposition figures, and, to the extent that we can, ordinary people. The idea is to assemble sufficient information to facilitate a real-time study of thinking and deciding in times of radical uncertainty and to examine, too, the consequences of decisions on the course of events. There are of course so many moving parts: health systems, international political economy, finance, policing, and more. We also bring guests into the classroom, among them frontline actors in the current pandemic as well as veterans of previous pandemics well placed to share provisional comparative thinking. This last dimension is especially emphasized: the current period, studied in the light of a century of epidemic disease, affording us the opportunity to see path dependencies and novelties, the old and the new.  

* EP&E 353b / PLSC 305b, 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.

* EP&E 356a, Constitutional Law and Business Ethics  
  Gregory Collins

This course has three specific aims: 1) Examine influential Supreme Court cases that have had a significant impact on the practice of American business activities; 2) Identify the critical ethical questions that these legal controversies raise about such activities; and 3) Connect these legal and ethical insights to a broader theoretical understanding of the proper role of government in regulating private economic activity. Prerequisites: Familiarity with major theories in the business ethics discipline (virtue ethics, deontological ethics, utilitarianism, natural rights theory) and the U.S. Constitution.

* EP&E 364b / ECON 302b / PHIL 304b, Choice Theory and its Critics  
  Daniel Greco
  and Larry Samuelson

The aim of the course is to build up a sufficiently strong foundation in the philosophy of science to allow students to critically assess the challenge posed to the rational choice framework in social science by evidence of human irrationality. Readings are drawn from philosophy, economics (including behavioral economics), and psychology. Prerequisites: Four courses in a combination of economics, philosophy, and psychology.

HU, SO
* EP&E 390a / EVST 212a / PLSC 212a, 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.  WR, SO

* EP&E 421b / PLSC 320b, Ethics, Law, and Current Issues  Karen Goodrow
Examination of how freedom of speech and bias influence the criminal justice system, focusing on wrongful convictions and administration of the death penalty. Understanding the role of potential bias at various levels and the competing interests of protecting speech, due process, and the innocent. Topics include limitations on speech, practical effects of speech, the efficacy of the death penalty, actual innocence, gender/race/economic bias and its effects on the justice system, as well as best practices for improving our sense of justice.

* EP&E 471a, Directed Reading and Research  Bonnie Weir
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.

Introduction to the emerging field of moral cognition. Focus on questions about the philosophical significance of psychological findings. Topics include the role of emotion in moral judgment; the significance of character traits in virtue ethics and personality psychology; the reliability of intuitions and the psychological processes that underlie them.  HU

* EP&E 491a, The Senior Essay  Bonnie Weir
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.

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.
EP&E 494a / AFAM 198a / CGSC 277a / EDST 177a / PHIL 177a, Propaganda, Ideology, and Democracy  Jason Stanley
Historical, philosophical, psychological, and linguistic introduction to the issues and challenges that propaganda raises for liberal democracy. How propaganda can work to undermine democracy; ways in which schools and the press are implicated; the use of propaganda by social movements to address democracy’s deficiencies; the legitimacy of propaganda in cases of political crisis.  HU  o Course cr

Ethnicity, Race, & Migration (ER&M)

* ER&M 050b, Health and Disease in the Latinx Borderlands  Ximena Lopez Carrillo
This course examines the politics of disease, health, and the history of the public health in the Latinx borderlands from the mid-nineteenth century to the present. Students analyze how the discourses of health and disease reveal notions of morality, colonialism, race, national identity, and national belonging. By looking at specific case studies, students learn how social conditions have led to healthcare inequalities, and that public health programs targeting Latinx communities have been an important tool for the construction of race, ethnicity, and national belonging to the United States. The class materials cover topics such as reproductive politics, epidemics, U.S. imperialism, sexuality, and Latinx activism. Enrollment limited to first-year students. Preregistration required; see under First-Year Seminar Program.  SO

* ER&M 081a / MUSI 081a / SOCY 081a, Race and Place in British New Wave, K-Pop, and Beyond  Grace Kao
This seminar introduces you to several popular musical genres and explores how they are tied to racial, regional, and national identities. We examine how music is exported via migrants, return migrants, industry professionals, and the nation-state (in the case of Korean Popular Music, or K-Pop). Readings and discussions focus primarily on the British New Wave (from about 1979 to 1985) and K-Pop (1992-present), but we also discuss first-wave reggae, ska, rocksteady from the 1960s-70s, British and American punk rock music (1970s-1980s), the precursors of modern K-Pop, and have a brief discussion of Japanese City Pop. The class focuses mainly on the British New Wave and K-Pop because these two genres of popular music have strong ties to particular geographic areas, but they became or have become extremely popular in other parts of the world. We also investigate the importance of music videos in the development of these genres. Enrollment limited to first year students. Pre-registration required: see under First Year Seminar Program.  SO

* ER&M 095a / AMST 095a / SAST 061a / THST 095a, South Asian American Theater and Performance  Shilarna Stokes
South Asian Americans have appeared on U.S. stages since the late nineteenth century, yet only in the last quarter century have plays and performances by South Asian Americans begun to dismantle dominant cultural representations of South Asian and South Asian American communities and to imagine new ways of belonging. This seminar introduces you to contemporary works of performance (plays, stand-up sets, multimedia events, and more) written and created by U.S.-based artists of South Asian descent as well as artists of the South Asian diaspora whose works have had an impact on U.S. audiences. With awareness that the South Asian American diaspora comprises multiple, contested, and contingent identities, we investigate how artists have worked to manifest complex representations of South Asian Americans onstage, challenge
institutional and professional norms, and navigate the perils and pleasures of becoming visible. Enrollment limited to first-year students. Preregistration required; see under First-Year Seminar Program. HU

**ER&M 187b / AMST 133b / HIST 107b, Introduction to American Indian History**
Ned Blackhawk
Survey of American Indian history, beginning with creation traditions and migration theories and continuing to the present day. Focus on American Indian nations whose homelands are located within the contemporary United States. Complexity and change within American Indian societies, with emphasis on creative adaptations to changing historical circumstances. HU

**ER&M 200a, Introduction to Ethnicity, Race, and Migration** Staff
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 209b / LITR 279b / VIET 220b, Introduction to Vietnamese Culture, Values, and Literature** Quang Van
Introduction to Vietnamese culture and values. Topics include cultural and national identity, aesthetics, the meaning of life, war, and death. Selected readings from Zen poems, folklore, autobiographies, and religious and philosophical writings. Course is taught in English and is an alternative to Western perspectives. Readings in translation. No previous knowledge of Vietnamese required. HU

**ER&M 219a / HIST 219a / JDST 200a / MMES 149a / RLST 148a, Jewish History and Thought 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 non-Western distributional credit within the History major, upon application to the director of undergraduate studies. HU RP

* **ER&M 221b / AMST 206b / WGSS 222b, Introduction to Critical Refugee Studies** Quan Tran
Reconfiguring refugees as fluid subjects and sites of social, political, and cultural critiques. Departing from dominant understandings of refugees as victims, consideration instead of refugees as complex historical actors, made visible through processes of colonization, imperialism, war, displacement, state violence, and globalization, as well as ethical, social, legal, and political transformations. Focus on second-half of the twentieth century. SO

**ER&M 238a / AFAM 192a / AFST 238a / AMST 238a, Third World Studies** Staff
Introduction to the historical and contemporary theories and articulations of Third World studies (comparative ethnic studies) as an academic field and practice. Consideration of subject matters; methodologies and theories; literatures; and practitioners and institutional arrangements. SO Course cr

**ER&M 241a / ANTH 140a / SOCY 138a, The Corporation** Douglas Rogers
Survey of the rise, diversity, and power of the capitalist corporation in global contexts, with a focus on the 20th and 21st centuries. Topics include: the corporation as
legal entity and the social and cultural consequences of this status; corporations in the colonial era; relationships among corporations, states, and non-governmental organizations in Western and non-Western contexts; anti-corporate critique and response; corporate social responsibility; and race, gender, and indigeneity.  HU, SO

ER&M 243b / AMST 234b / HIST 188b / RLST 342b, Spiritual But Not Religious  Zareena Grewal
Study of the historical and contemporary “unchurching” trends in American religious life in a comparative perspective and across different scales of analysis in order to think about the relationship between spirituality, formal religion, secular psychology and the self-help industry.  HU, SO

* ER&M 257a / WGSS 206a, Transnational Approaches to Gender & Sexuality  Evren Savci
Examination of transnational debates about gender and sexuality as they unfold in specific contexts. Gender as a category that can or cannot travel; feminist critiques of liberal rights paradigms; globalization of particular models of gender/queer advocacy; the role of NGOs in global debates about gender and sexuality.  WR

ER&M 263b / HIST 264b / RSEE 268b, 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  o Course cr

* ER&M 284a / AFAM 284a / AMST 282a / ENGL 414a, Black Life and the Human/Body  Cera Smith
African American activists have long demanded equal rights by asserting the humanity of Black people. These activists have rejected their racist treatment as animals and property by championing the qualities ascribed to Western Man. More recently, however, scholars have questioned whether claims to humanity really result in freedom and justice for all Black people. They ask, “Does mobilizing humanity as a strategy for recognition and respect benefit Black non-men, disabled people, or the working class? What impact does this assertion of humanity have on our species’ relationship to other living beings and our environments? Ultimately, are all people allowed to be ‘human?’” In this course, we evaluate the category of the “human” by studying the challenge that the U.S. Black past and present pose to the category’s assumed neutrality. We attend to how Black peoples’ bodily experiences confirm, deny, and complicate humanness. We read poetry, short fiction, novels, and creative nonfiction to investigate what it means to live a Black life. Analyzing historical, social scientific, legal, and theoretical texts alongside literature helps us explore the debates over the power dynamics that underlie claims to humanity. Through writing and in-class discussions, we explore the relationship between race, species, and political strategy.  HU

* ER&M 300a or b, Comparative Ethnic Studies  Staff
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. 

* ER&M 306b / JDST 353b / LITR 308b / MMES 308b, Literature at the Limit from Palestine and Israel  
  Hannan Hever
Readings and films from post-1948 Palestine and Israel, with special attention given to historical and political contexts. Consideration of the limit, in the geographical sense of borders and checkpoints, as well as in the existential sense of extremity and trauma.  

HU

* ER&M 318a / AFAM 309a / WGSS 318a, Race as Spectacle  
  Fatima El-Tayeb
In this course, we analyze how race is both naturalized and deconstructed through visual media. We center one aspect: race as spectacle—the multiple ways in which race is produced as a visual mass culture commodity. This happens in political campaigns, music videos, local news reports, fashion, kids’ cartoons, mug shots, and countless other sites. We explore the modes of production of these racialized images as well as the conditions of their reception and political and philosophical analyses of this process—particularly those relating to questions of gender, class, sexuality, religion, and nation. We also explore counterstrategies, which rather than rejecting visual mass culture attempt to use it to undermine dominant images.  

HU, SO

* ER&M 325b / AFST 335b / HIST 335b, A History of South Africa  
  Daniel Magaziner
An introduction to the history of southern Africa, especially South Africa. Indigenous communities; early colonial contact; the legacies of colonial rule; postcolonial mismanagement; the vagaries of the environment; the mineral revolution; segregationist regimes; persistent inequality and crime since the end of apartheid; the specter of AIDS; postcolonial challenges in Zimbabwe, Angola, and Mozambique.  

HU

* ER&M 332b, Cultural and Racial History of Mental Health  
  Ximena Lopez Carrillo
Since the 1960s, social scientists have analyzed how the scientific ideas about mental illness, mental health policies, institutions, healing practices, and popular discourses surrounding mental health have been influenced by the social and cultural contexts. This course introduces students to the debates and questions guiding the history of mental health since the Civil Rights and the Psychiatric Survivor Movements in the 1960s, especially those that relate to Critical Race Theory. Through primary sources and secondary literature, students learn about the intersections between mental illness, race, and ethnicity. The class materials include topics such as disability justice, psychopharmacology, the community mental health movement, and the history of asylums in a comparative perspective.  

SO

* ER&M 342a / HIST 372Ja / LAST 372a, Revolutionary Change and Cold War in Latin America  
  Greg Grandin
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

* ER&M 349a / AFAM 227a / AMST 227a / HIST 137Ja, From the Voting Rights Act to #blacklivesmatter  
  Ferentz Lafargue
This course explores the period beginning from 1964 through the emergence of the #blacklivesmatter movement in 2013. Key concepts covered in this course include the Black Panther Party and rise of the Black Power movement; political campaigns of
Shirley Chisholm, Jesse Jackson, and Barack Obama. The seminar concludes with an examination of the #blacklivesmatter movement and broader efforts addressing mass incarceration, poverty, and opportunity gaps in education.  

* ER&M 360a / HLTH 370a / HSHM 432a / SOCY 390a / WGSS 390a, Politics of Reproduction  
  Rene Almeling  
  Reproduction as a process that is simultaneously biological and social, involving male and female bodies, family formation, and powerful social institutions such as medicine, law, and the marketplace. Sociological research on reproductive topics such as pregnancy, birth, abortion, contraception, infertility, reproductive technology, and aging. Core sociological concepts used to examine how the politics of reproduction are shaped by the intersecting inequalities of gender, race, class, and sexuality.  WR, SO  

* ER&M 370a / AMST 441a / HIST 130Ja, Indians and the Spanish Borderlands  
  Ned Blackhawk  
  The experiences of Native Americans during centuries of relations with North America's first imperial power, Spain. The history and long-term legacies of Spanish colonialism from Florida to California.  WR, HU  

* ER&M 376b / MGRK 304b / PLSC 376b / SOCY 307b, Extreme and Radical Right Movements  
  Paris Aslanidis  
  Extreme and radical right movements and political parties are a recurrent phenomenon found in most parts of the world. Discussion of their foundational values and the causes of their continuous, even increasing, support among citizens and voters.  SO  

* ER&M 380b / AFAM 397b / WGSS 381b, New Developments in Global African Diaspora Studies  
  Fatima El-Tayeb  
  This course traces recent developments in African Diaspora Theory, among them Afropessimism, Queer of Color Critique, Black Trans Studies and Afropessimism. We pay particular attention to interactions between theory, art, and activism. The scope is transnational with a focus on, but not restricted to, the Anglophone Diaspora. Each session roughly follows this structure: One theoretical text representing a recent development in African diaspora studies, one earlier key text that the reading builds on, one theoretical text that does not necessarily fall under the category of diaspora studies but speaks to our topic and one text that relates to the topic but uses a non-theoretical format. Students are expected to develop their own thematically related project over the course of the semester. Preference given to juniors and seniors. Email instructor for more information.  HU, SO  

* ER&M 387b, Migrants and Borders in the Americas  
  Alicia Schmidt Camacho  
  Migration and human mobility across North America, with a focus on 1994 to the present. Critical and thematic readings examine Central America, Mexico, and the United States as integrated spaces of migration, governance, and cultural and social exchange. Migrant social movements, indigenous migration, gender and sexual dynamics of migration, human trafficking, crime and social violence, deportation and detention, immigration policing, and militarized security.  HU, SO  

* ER&M 394a / ANTH 409a / EVST 422a / F&ES 422a / GLBL 394a, Climate and Society: Perspectives from the Social Sciences and Humanities  
  Michael Dove  
  Discussion of the major currents of thought regarding climate and climate change; focusing on equity, collapse, folk knowledge, historic and contemporary visions,
western and non-western perspectives, drawing on the social sciences and humanities.

* ER&M 401a or b, Writer/Rioter: Public Writing in the 21st Century  Leah Mirakhor
In his collection *Lunch with A Bigot: The Writer in the World*, Amitava Kumar asks “What divides the writer from the rioter?” This class is concerned with unpacking the various ways writers participate in the 21st century world as disturbers of the peace. This century has seen great advances in technology, health, alternative energies, new forms of communication, but also vast consolidations of power, mass incarceration, climate change, poverty, homelessness, wars, state surveillance, and sexual violence. Our current historical moment increasingly asks us to craft broader and deeper connections between personal, local, national, and international issues. This course explores cultural criticism on a range of issues that examine the intersections of history, politics, media, and various crises in the 21st century by writers from a variety of backgrounds: journalists, academics, activists, artists, scientists, and politicians. We analyze how these writers use their professional expertise to craft work for the public arena, and what it means to create a history of the present. The course’s four sections cover various responses to some of the issues most publicly contested across college campuses nationwide, and here at Yale: racial unrest, sexual assault, climate change, poverty, incarceration, fascism, and gun violence.  

* ER&M 402a / AFAM 459a / AMST 479a, The Displaced: Migrant and Refugee Narratives of the 20th and 21st Centuries  Leah Mirakhor
This course examines a series of transnational literary texts and films that illuminate how the displaced—migrants, exiles, and refugees—remake home away from their native countries. The twentieth and twenty-first centuries have produced massive displacements due to wars, genocides, racial, ethnic and religious conflicts, economic and climate change, among other factors. Our course focuses on several texts that explore questions of home, nation, and self in the context of specific historical events such as the Holocaust, civil rights movements in the U.S., internment, the Indian partition, African decolonization, and Middle Eastern/Arab ethno-religious conflicts and wars. We examine these events alongside the shifting legal and political policies and categories related to asylum, humanitarian parole, refugee, and illegal alien status. Exploring themes such as nostalgia, longing, trauma, and memory, we look at the possibilities and limitations of creating, contesting, and imagining home in the diaspora. Our objective is to debate and develop the ethical, political, geographic, and imaginative articulations of home in an era of mass displacements and geo-political crises. We examine how notions of home are imagined alongside and against categories of race, gender, and sexuality.  

* ER&M 406a / EDST 211a, Latinx Communities and Education in the United States  Staff
This course is an interdisciplinary and comparative study of Latinx communities and their experiences with K-12 education in the United States. The Latinx population in the United States continues to grow, with the Census Bureau projecting that the Latinx population will comprise 27.5 percent of the nation’s population by 2060.[1] In fact, in 2018, more than a quarter of the nation’s newborns were Latinx.[2] Yet, even as the Latinx population continues to grow, the education field has a relatively broad understanding of Latinx communities in the United States—frequently treating them as
a monolith when designing everything from curriculum to education reform policies. To understand why such an approach to education studies may yield limited insight on Latinx communities, the course draws on research about the broader histories and experiences of Latinx communities in the United States before returning to the topic of K-12 education. EDST 110 Foundations in Education Studies recommended.  

* ER&M 409a / AMST 345a / WGSS 408a, Latinx Ethnography  Ana Ramos-Zayas  
Consideration of ethnography within the genealogy and intellectual traditions of Latinx Studies. Topics include: questions of knowledge production and epistemological traditions in Latin America and U.S. Latino communities; conceptions of migration, transnationalism, and space; perspectives on “(il)legality” and criminalization; labor, wealth, and class identities; contextual understandings of gender and sexuality; theorizations of affect and intimate lives; and the politics of race and inequality under white liberalism and conservatism in the United States.  

* ER&M 412a / PSYC 312a, Native American Mental Health  Mark Beitel and Christopher Cutter  
Issues of health policy, research, and service delivery in Native American communities, with a focus on historical antecedents that shape health outcomes and social policy for indigenous communities. Urgent problems in health and wellness, with special attention to Native American mental health. The roles of the Indian Health Service, state and local agencies, and tribal health centers; comparison of Native American and European American conceptions of health and illness.  

* ER&M 438a / AFAM 455a / EDST 340a, Anti-Racist Curriculum and Pedagogy  Daniel HoSang  
This seminar explores the pedagogical and conceptual tools, resources and frameworks used to teach about race and racism at the primary and secondary levels, across diverse disciplines and subject areas. Moving beyond the more limited paradigms of racial colorblindness and diversity, the seminar introduces curricular strategies for centering race and racism in ways that are accessible to students from a broad range of backgrounds, and that work to advance the overall goals of the curriculum. Prerequisite: ER&M 200 or an equivalent course addressing histories of race, ethnicity, and migration.  

* ER&M 439a / AMST 439a, Fruits of Empire  Gary Okihiro  
Readings, discussions, and research on imperialism and "green gold" and their consequences for the imperial powers and their colonies and neo-colonies. Spatially conceived as a world-system that enmeshes the planet and as earth's latitudes that divide the temperate from the tropical zones, imperialism as discourse and material relations is this seminar’s focus together with its implantations—an empire of plants. Vast plantations of sugar, cotton, tea, coffee, bananas, and pineapples occupy land cultivated by native and migrant workers, and their fruits move from the tropical to the temperate zones, impoverishing the periphery while profiting the core. Fruits of Empire, thus, implicates power and the social formation of race, gender, sexuality, class, and nation.  

* ER&M 462b / AMST 462b / WGSS 463b, The Study of Privilege in the Americas  Ana Ramos-Zayas  
Examination of inequality, not only through experiences of the poor and marginal, but also through institutions, beliefs, social norms, and everyday practices of the
privileged. Topics include: critical examination of key concepts like “studying up,” “elite,” and “privilege,” as well as variations in forms of capital; institutional sites of privilege (elite prep schools, Wall Street); living spaces and social networks (gated communities, private clubs); privilege in intersectional contexts (privilege and race, class, and gender); and everyday practices of intimacy and affect that characterize, solidify, and promote privilege.

**ER&M 470a, Independent Study**  Staff
For students who wish to pursue a close study in the subjects of ethnicity, race, and/or migration, not otherwise covered by departmental offerings. May be used for research, a special project, or a substantial research paper 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.

* **ER&M 471a, Individual Reading and Research for Juniors and Seniors**  Staff
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**  Quan Tran
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. Not available

* **ER&M 492b, The Senior Essay or Project**  Quan Tran
Independent research on a one-term senior essay or project.

**Film and Media Studies (FILM)**

**FILM 150a, Introduction to Film Studies**  Staff
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 0 Course cr**

**FILM 160b / ENGL 196b, Introduction to Media**  John Peters
Introduction to the long history of media as understood in classical and foundational (and even more recent experimental) theories. Topics involve the technologies of modernity, reproduction, and commodity, as well as questions regarding knowledge, representation, public spheres, and spectatorship. Special attention given to philosophies of language, visuality, and the environment, including how digital culture continues to shape these realms.  **WR, HU 0 Course cr**

* **FILM 161a / ART 241a, Introductory Film Writing and Directing**  Jonathan Andrews
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. Emphasis on the writing
and production of short dramatic scenes. Priority to majors in Art and in Film & Media Studies. RP

* FILM 162a or b / ART 142a or b, Introductory Documentary Filmmaking  A.L. Steiner
The art and craft of documentary filmmaking. Basic technological and creative tools for capturing and editing moving images. The processes of research, planning, interviewing, writing, and gathering of visual elements to tell a compelling story with integrity and responsibility toward the subject. The creation of nonfiction narratives. Issues include creative discipline, ethical questions, space, the recreation of time, and how to represent "the truth." RP

FILM 209a / GMAN 209a, Classics of German Cinema: From Haunted Screen to Hyperreality  Fatima Naqvi
This course introduces students to German films of the Weimar, Nazi, post-war and post-wall period. In exploring issues of class, gender, nation, migration, and conflict by means of close analysis, the course seeks to sensitize students to the cultural context of these films and the changing socio-political and historical climates in which they arose. Special attention is paid to the issue of film style. We also reflect on what constitutes the "canon" when discussing films, especially those of recent vintage. Directors include Robert Wiene, F.W. Murnau, Fritz Lang, Lotte Reiniger, Leni Riefenstahl, Alexander Kluge, Volker Schlöndorff, Werner Herzog, Wim Wenders, Rainer Werner Fassbinder, Andreas Dresen, Christian Petzold, Jessica Hausner, Michael Haneke, Angela Schanelec, Barbara Albert. Taught in English. HU

* FILM 233a / EDST 233a, Children and Schools in Global Cinema  Dudley Andrew
Children have long been, and remain, the target of many films. They precipitated some of the earliest studies of the new medium and its regulation as well. But this seminar turns the tables on the premise that children have also been dangerous for the cinema. As subjects and actors in films, they have proven recalcitrant, unpredictable, combustible; in short, they have behaved as children often do. Insofar as cinema is an institution, children must be disciplined to ensure its smooth operation. And yet much of what is valuable in cinema involves the very unpredictability that is natural in children. This seminar operates as a dialogue between education and cinema across the living bodies of children. We give the cinema and children the first and last words in this dialogue, 'education' being asked to learn, not teach. We defamiliarize education by bringing into our classroom children and films foreign to the United States, including films from France, Africa, Iran, and East Asia Foundations in Education Studies recommended. HU

FILM 240b / ENGL 192b / LITR 143b, World Cinema  Marta Figlerowicz
Development of ways to engage films from around the globe productively. Close analysis of a dozen complex films, with historical contextualization of their production and cultural functions. Attention to the development of critical skills. Includes weekly screenings, each followed immediately by discussion. HU

* FILM 241b / PLSH 246b, 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.  

* FILM 280a / ENGL 382a / PSYC 320a, The Science and Culture of Memory  
John Williams and Samuel McDougle
This is an FAS-sponsored cross-divisional course. This course offers a comparative and interdisciplinary approach to the science and culture of memory. We aim to bring traditional philosophies, narratives, and histories of memory into conversation with both long established and cutting-edge research findings on the neuroscience of memory. Questions explored in the course include: What is memory and how does it work? How has memory been conceptualized over time in both culture and science? What are the various media through which we process memories, including collective and individual forms? What can we learn from moments of mnemonic failure? What new technologies of memory are on the horizon? How is our vision of the future influenced by the content and processes of memory? In wrestling with these questions, we encounter a wide selection of narratives, art objects, films, and scientific data. Students also have an opportunity to explore their own experiences in learning and memory (including experiential assignments, e.g., asking them to memorize certain things and report on the experience, as well as opportunities to reflect on their experiences of and access to forms of collective, communal memory).  

HU, SO

* FILM 307a / EALL 280a / EAST 260a, East Asian Martial Arts Film  
Staff
The martial arts film has not only been a central genre for many East Asian cinemas, it has been the cinematic form that has most defined those cinemas for others. Domestically, martial arts films have served to promote the nation, while on the international arena, they have been one of the primary conduits of transnational cinematic interaction, as kung-fu or samurai films have influenced films inside and outside East Asia, from The Matrix to Kill Bill. Martial arts cinema has become a crucial means for thinking through such issues as nation, ethnicity, history, East vs. West, the body, gender, sexuality, stardom, industry, spirituality, philosophy, and mediality, from modernity to postmodernity. It is thus not surprising that martial arts films have also attracted some of the world’s best filmmakers, ranging from Kurosawa Akira to Wong Kar Wai. This course focuses on films from Japan, China, Hong Kong, Taiwan, and South Korea—as well as on works from other countries influenced by them—covering such martial arts genres such as the samurai film, kung-fu, karate, wuxia, and related historical epics. It provides a historical survey of each nation and genre, while connecting them to other genres, countries, and media.  

HU, 0 Course cr

* FILM 325a / GMAN 379a / LITR 374a, German Cinema 1918–1933  
Jan Hagens
The years between 1918 and 1933 are the Golden Age of German film. In its development from Expressionism to Social Realism, this German cinema produced works of great variety, many of them in the international avantgarde. This introductory seminar gives an overview of the silent movies and sound films made during the Weimar Republic and situate them in their artistic, cultural, social, and political context between WWI and WWII, between the Kaiser’s German Empire and the Nazis’ Third Reich. Further objectives include: familiarizing students with basic categories of film studies and film analysis; showing how these films have shaped the history and the language of film; discussing topic-oriented and methodological issues such as: film
genres (horror film, film noir, science fiction, street film, documentary film); set design, camera work, acting styles; narration in film; avantgarde cinema; the advent and use of sound in film; Realism versus Expressionism; film and popular mythology; melodrama; representation of women; modern urban life as spectacle; film and politics. Directors studied include: Grune, Lang, Lubitsch, Murnau, Pabst, Richter, Ruttmann, Sagan, von Sternberg, Wiene, et al.

WR, HU

* FILM 327a / AMST 395a, Studies in Documentary Film  Charles Musser
This course examines key works, crucial texts, and fundamental concepts in the critical study of non-fiction cinema, exploring the participant-observer dialectic, the performative, and changing ideas of truth in documentary forms. HU RP

* FILM 330a, The Screenwriter's Craft  Camille Thomasson
A rigorous writer's workshop. Students conjure, write, rewrite, and study films. Read screenplays, view movie clips, parse films, and develop characters and a scenario for a feature length screenplay. By the end of term, each student will have created a story outline and written a minimum of fifteen pages of an original script. All majors welcome. Application required. Please find the link to the application form on the syllabus.

* FILM 341a / MGRK 238a / WGSS 233a, Weird Greek Wave Cinema  George Syrimis
The course examines the cinematic production of Greece in the last fifteen years or so and looks critically at the popular term “weird Greek wave” applied to it. Noted for their absurd tropes, bizarre narratives, and quirky characters, the films question and disturb traditional gender and social roles, as well as international viewers’ expectations of national stereotypes of classical luminosity – the proverbial “Greek light” – Dionysian exuberance, or touristic leisure. Instead, these works frustrate not only a wholistic reading of Greece as a unified and coherent social construct, but also the physical or aesthetic pleasure of its landscape and its ‘quaint’ people with their insistence on grotesque, violent, or otherwise disturbing images or themes (incest, sexual otherness and violence, aggression, corporeality, and xenophobia). The course also pays particular attention on the economic and political climate of the Greek financial crisis during which these films are produced and consumed and to which they partake. None  HU

* FILM 350a or b, Screenwriting  Marc Lapadula
A beginning course in screenplay writing. Foundations of the craft introduced through the reading of professional scripts and the analysis of classic films. A series of classroom exercises culminates in intensive scene work. Prerequisite: FILM 150. Not open to freshmen.

* FILM 351a / RUSS 338a / SLAV 351a, Documentary, Fiction, Docufiction  John MacKay
A seminar on the relationship between nonfictional and fictional media practice, with a particular focus on the “docufiction” form. Topics to be discussed include debates over the coherence of the notion of “documentary”; the epistemological and political claims of fiction and documentary; and the relationship of documentary and fictional practice to questions of nationhood, ethnicity, and gender. Films by directors such as Vertov, Eisenstein, Shub, Flaherty, Ivens, Visconti, Varda, Makavejev, Trinh Minh-ha, Costa, and Kiarostami. HU
FILM 355b / ART 341b, Intermediate Film Writing and Directing  Jonathan Andrews
In the first half of the term, students write three-scene short films and learn the tools and techniques of staging, lighting, and capturing and editing the dramatic scene. In the second half of the term, students work collaboratively to produce their films. Focus on using the tools of cinema to tell meaningful dramatic stories. Priority to majors in Art and in Film & Media Studies. Prerequisites: ART 241.  RP

FILM 356b / ART 342b, Intermediate Documentary Filmmaking  Michel Auder
Students explore the storytelling potential of the film medium by making documentary art. The class concentrates 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 are considered using examples of students' work. Exercises in storytelling principles. Limited enrollment. Priority to majors in Art and in Film & Media Studies. Prerequisites: ART 141 or 142, and FILM 150.  HU  RP

* FILM 360b / LITR 301b / RSEE 380b / RUSS 380b, Putin's Russia and Protest Culture  Marijeta Bozovic
Survey of Russian literature and culture since the fall of communism. The chaos of the 1990s; the solidification of power in Putin's Russia; the recent rise of protest culture. Sources include literature, film, and performances by art collectives. Readings and discussion in English; texts available in Russian.  WR, HU

* FILM 364b / CZEC 246b / RSEE 240b, Milos Forman and His Films  Karen von Kuness
An in-depth examination of selected films by Milos Forman and representatives of the New Wave, cinéma vérité in Czech filmmaking. Special attention to Forman's artistic and aesthetic development as a Hollywood director in such films as Hair, One Flew over the Cuckoo's Nest, Ragtime, and Amadeus. Screenings and discussion in English.  HU

* FILM 366a / ITAL 306a, Spotlight on Sicily in Literature and Film  Millicent Marcus
Sicily has always occupied a privileged place in the Italian imagination. The course focuses on a series of fictional works and films—from the early 20th century until today—which reveal how this island has served as a vital space for cinematic experimentation and artistic self-discovery. Topics range from unification history, the Mafia, the migrant crisis, environmental issues, gender, and social/sexual mores. The course is taught in English, but those who wish to enroll for credit towards the certificate in Italian, or the major, can make arrangements to do so.  WR, HU

* FILM 395b, Intermediate Screenwriting  Marc Lapadula
A workshop in writing short screenplays. Frequent revisions of each student's script focus on uniting narrative, well-delineated characters, dramatic action, tone, and dialogue into a polished final screenplay. Prerequisite: FILM 350. Priority to majors in Film & Media Studies.

* FILM 397b / ENGL 423b / THST 228b, Writing about the Performing Arts  Margaret Spillane
Introduction to journalistic reporting on performances as current events, with attention to writing in newspapers, magazines, and the blogosphere. The idea of the audience explored in relation to both a live act or screening and a piece of writing about such an event. Students attend screenings and live professional performances of plays, music concerts, and dance events. Formerly ENGL 244.  WR, HU
* FILM 401b / ENGL 462b / THST 453b, Writing Screenplay Adaptations  Donald Margulies
A workshop on the art of screenplay adaptation. Students read short stories, novels, and non-fiction; the screenplays based on that source material; and view and analyze the final product, the films themselves. Instruction focuses on the form, economy, and structure specific to screenwriting. Weekly writing exercises supplement the creation of a final project: a short screenplay based on source material of the student’s choosing. Previous experience in writing for film or stage would be advantageous but is not required. Restricted to juniors and seniors, or by permission of the instructor.  HU

* FILM 433a / AFAM 216a, Family Narratives/Cultural Shifts  Thomas Allen Harris
This course looks at films that are redefining ideas around family and family narratives in relation to social movements. We focus on personal films by filmmakers who consider themselves artists, activists, or agents of change but are united in their use of the nonfiction format to speak truth to power. In different ways, these films use media to build community and build family and ultimately, to build family albums and archives that future generations can use to build their own practices. Just as the family album seeks to unite people across time, space, and difference, the films and texts explored in this course are also journeys that culminate in linkages, helping us understand nuances of identity while illuminating personal relationships to larger cultural, social, and historical movements.  HU

* FILM 434b / AFAM 220b, Archive Aesthetics and Community Storytelling  Thomas Allen Harris
This production course explores strategies of archive aesthetics and community storytelling in film and media. It allows students to create projects that draw from archives—including news sources, personal narratives, and found archives—to produce collaborative community storytelling. Conducted as a production workshop, the course explores the use of archives in constructing real and fictive narratives across a variety of disciplines, such as—participants create and develop autobiographies, biographies, or fiction-based projects, tailored to their own work in film/new media around Natalie Goldberg’s concept that “our lives are at once ordinary and mythical.”  HU

* FILM 446b / EALL 252b / EAST 251b / LITR 384b, Japanese Cinema before 1960  Aaron Gerow
The history of Japanese cinema to 1960, including the social, cultural, and industrial backgrounds to its development. Periods covered include the silent era, the coming of sound and the wartime period, the occupation era, the golden age of the 1950s, and the new modernism of the late 1950s. No knowledge of Japanese required. Formerly JAPN 270.  HU TR

* FILM 455a / AMST 463a / EVST 463a / THST 457a, Documentary Film Workshop  Charles Musser
A yearlong workshop designed primarily for majors in Film and Media Studies or American Studies who are making documentaries as senior projects. Seniors in other majors admitted as space permits.  RP

* FILM 471a or b, Independent Directed Study  Staff
For students who wish to explore an aspect of film and media 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 483a and FILM 484b / ART 442a and ART 443b, Advanced Film Writing and Directing  Jonathan Andrews
A yearlong workshop designed primarily for majors in Art and in Film & Media Studies 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. Priority to majors in Art and in Film & Media Studies. Prerequisite: ART 341.

* FILM 487a and FILM 488b, Advanced Screenwriting  Marc Lapadula
Students write a feature-length screenplay. Emphasis on multiple drafts and revision. Admission in the fall term based on acceptance of a complete step-sheet outline for the story to be written during the coming year. Primarily for Film & Media Studies majors working on senior projects. Prerequisite: FILM 395 or permission of instructor.

* FILM 491a and FILM 492b, The Senior Essay  Staff
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 FILM 494b, The Senior Project  Staff
For students making a film or video, either fiction or nonfiction, as their senior project. Senior projects require the approval of the Film and Media 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.

Finnish (FNSH)

* FNSH 110a, Elementary Finnish I  Staff
The structure of the Elementary Finnish course ensures that students receive a solid grounding in both the language and the culture of Finland. The course promotes the development of language ability through the students’ participation in communicative activities and discussions. Course taught through distance learning using videoconferencing technology from Columbia University. Enrollment limited; interested students should e-mail minjin.hashbat@yale.edu for more information.  L1

* FNSH 120b, Elementary Finnish II  Staff
Continuation of FNSH 110. The structure of the Elementary Finnish course sequence ensures that students receive a solid grounding in both the language and the culture of Finland. This course continues to promote the development of language ability
through the students’ participation in communicative activities and discussions. Course taught through distance learning using videoconferencing technology from Columbia University. Enrollment limited; interested students should e-mail minjin.hashbat@yale.edu for more information. Credit only on completion of FNSH 110. L2 RP 1½ Course cr

French (FREN)

* FREN 096b, Women’s Narratives of Self in Modern French Literature  Maryam Sanjabi
The course explores women’s autobiographical literature, demonstrating their uniqueness from an individual perspective and capturing the social, economic, religious, and ethnic themes of the period and their authors’ intellectual standpoints. The selected books represent a variety of literary genres ranging from memoir to journal, graphic novel, and film scripts with a focus on the 20th and 21st centuries as they appear in the works of: Colette, Simone de Beauvoir, Nathalie Sarraute, Lucie Aubrac, Hélène Berr, Assia Djebar, Ken Bugul, Agnès Varda, Marjane Satrapi, Marguerite Duras, Annie Ernaux, and Camille Laurens among others. This course thus aims at a critical awareness of what modernity has meant in women’s experiences and why debate about its consequences often revolves around women’s lives. While some authors explore the coming of age of European gender awareness, others deal with the war and resistance and more recent non-Western voices in French pose the question of identity of the “Other.” Course readings include short theoretical essays and a number of secondary works. Readings and discussions are in French, but papers may be submitted in French or English. Enrollment limited to first-year students. Preregistration required; see under First-Year Seminar Program. HU

* FREN 109a, French for Reading  Candace Skorupa
Fundamental grammar structures and basic vocabulary are acquired 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.

* FREN 110a, Elementary and Intermediate French I  Matuku Ngame
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. Extensive use of audio and video material. Conducted entirely in French. To be followed by FREN 120. For students with no previous experience of French. Daily classroom attendance is required. L1 RP 1½ Course cr

* FREN 120b, Elementary and Intermediate French II  Staff
Continuation of FREN 110. Open only to students who took FREN 110 (L1) at Yale. Conducted entirely in French. Only after FREN 110. To be followed by FREN 130. L2 RP 1½ Course cr

* FREN 121a, Intermediate French  Candace Skorupa
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. Online preregistration required; see french.yale.edu for details. 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. Conducted entirely in French. For students of superior linguistic ability. No preregistration required. L1, L2 RP 2 Course cr

* FREN 130a or b, Intermediate and Advanced French I 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, novels, and films. Admits to FREN 140. Conducted entirely in French. After FREN 120, 121, or a satisfactory placement test score. L3 RP 1½ Course cr

* FREN 140a or b, Intermediate and Advanced French II 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. Conducted entirely in French. After FREN 130 or a satisfactory placement test score. L4 RP 1½ Course cr

* FREN 145b, Intensive Intermediate and Advanced French Staff
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. For students of superior linguistic ability. Conducted entirely in French. After FREN 120, 121, or 125. No preregistration required. L3, L4 RP 2 Course cr

* FREN 150a or b, Advanced Language Practice 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. Conducted entirely in French. After FREN 140, 145, or a satisfactory placement test score. Online preregistration required; see http://french.yale.edu/academics/placement-and-registration for details. L5

* FREN 160a or b, Advanced Conversation Through Culture, Film, and Media 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. Conducted entirely in French. 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
* FREN 170a or b, Introduction to Literatures in French  
Staff  
Introduction to close reading and analysis of literary texts written in French. Works by authors such as Marie de France, Molière, Balzac, Hugo, Baudelaire, Duras, Proust, and Genet. May not be taken after FREN 171.  
L5, HU

* FREN 182b, Advanced Writing Workshop  
Lauren Pinzka  
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). Recommended for prospective majors. Conducted entirely in French. After FREN 150 or higher, or a satisfactory placement test score. May be taken after courses in the 200–449 range.  
L5

* FREN 183a, Medical French: Conversation and Culture  
Leo Tertrain  
An advanced language course emphasizing verbal communication and culture. Designed to foster the acquisition of the linguistic and cultural skills required to evolve within a Francophone medical environment. Discussions, in-class activities, and group projects in simulated professional situations, with a focus on ethical questions. Topics such as public health policies, pandemics, medicine in Francophone Africa, humanitarian NGOs, assisted reproductive technologies, end-of-life care, and organ donation are explored through films, documentaries, articles, excerpts from essays and literary texts. Conducted entirely in French. Prerequisite: FREN 150 or a satisfactory placement test score, or with permission of instructor. May be taken concurrently with or after FREN 160 and FREN 170.  
L5

* FREN 184b, Business French: Communication and Culture  
Leo Tertrain  
An advanced language course emphasizing verbal communication and culture. Designed to foster the acquisition of the linguistic and cultural skills required to evolve within a Francophone business environment. Discussions, in-class activities, individual and group presentations, often with a focus on ethical questions. Topics such as the sharing economy, privatization, the energy transition, labor unions, taxation, banking, human resources, and labor law are explored through films, documentaries, articles, excerpts from essays, a biographical narrative, a graphic novel, and a literary text. Conducted entirely in French. Prerequisite: FREN 150 or a satisfactory placement test score, or with permission of instructor. May be taken concurrently with or after FREN 160 and FREN 170.  
L5

* FREN 191a, Translation  
Candace Skorupa  
An introduction to the practice and theory of literary translation, conducted in workshop format. Stress on close reading, with emphasis initially on grammatical structures and vocabulary, subsequently on stylistics and aesthetics. Translation as a means to understand and communicate cultural difference in the case of French, African, Caribbean, and Québécois authors. Texts by Benjamin, Beckett, Borges, Steiner, and others. Readings in French and in English. After FREN 150 and 151 or with permission of instructor. Preference to juniors and seniors.  
HU

* FREN 192b, Intermediate Literary Translation  
Staff  
A continuation of FREN 191 for students who wish to work on a longer project and to deepen their reading in translation theory.  
Prerequisite: FREN 191.  
HU
*FREN 233a, Novels of the Twenty-First Century*  Morgane Cadieu  
Exploration of twenty-first-century novels by Bernheim, Bouraoui, Darrieussecq, Garréta, NDiaye, Modiano, Pireyre, Rolin, and Volodine. Emphasis on new literary movements and genres as well as on literary life (media, prizes, publishing houses, literary quarrels, digitalization). Topics of the novels include: description of urban and rural settings; memory, war, and migrations; queer and postcolonial subjectivities, ecology; global France and world-literature. Students will be invited to select and read a novel of their choice from the Fall 2021 list of new releases.  L5, HU  

FREN 244a / LITR 383a / THST 225a, The French Stage: History and Performance of French Theater from Molière to Césaire  Staff  
From Molière to Marie Ndiaye, via Augustin de Beaumarchais, Olympe de Gouges, George Sand and Wouajdi Mouhawad, theater is at the center of French artistic and political culture. This course covers four centuries of theater history, from the age of Versailles to the beginning of the twenty-first century. We discover the plays, their relationship to current events, their political and aesthetic dimensions, the history of their staging, and the material aspects of their productions.  HU 0 Course cr  

*FREN 247b / LITR 446b, Experimental Literature, Theory, and Manifestoes*  Morgane Cadieu  
A survey of the French experimental prose of the 20th and 21st centuries. Corpus includes novels and plays, literary and political manifestoes, and landmark articles on literary theory, structuralism, and poststructuralism. Topics include: inspiration and creativity; the aesthetics of manifestoes and the politics of literature; automatic writing and constrained prose; feminist and queer writings; urban spaces in avant-garde literary movements. Works by: Bataille, Beauvoir, Beckett, Breton, Perec, Sarraute, Wittig. Theoretical excerpts by: Barthes, Deleuze, Derrida, Foucault, Glissant, Malabou.  L5, HU  

*FREN 267b, Translation, Literature, Culture*  Alice Kaplan  
The seminar explores cultural issues and debates around contemporary translations of English-French/French-English fiction. Weekly themes include: the music of language and the physicality of translation; translation and ideology; economies of translation; retranslations; analyzing translators’ manuscripts at the Beinecke; translation as a factor in the formation of transnational dialogue; and the question of who translates. Each class session includes a practical component of translation exercises. The course qualifies for the French Department translation track and the Yale College translation certificate. This course can be taken as a sequel to FREN 191 and FREN 192.  HU  

FREN 270a / GMAN 214a / LITR 284a, Mad Poets  Staff  
A lecture course introducing undergraduates to the rich tradition of poetry written in French (and German) during the nineteenth and twentieth centuries. Each week is devoted to exploring the life and work of a poet whose ways of behaving, creating, and perceiving the world might be described as insane. There is, perhaps, no shortage of mad poets, but those whose life and work provide topics for discussion here include Hölderlin, Nerval, Baudelaire, Rimbaud, Verlaine, Mallarmé, Lautréamont, Apollinaire, Breton, Artaud, and Celan. Students become familiar with the tools required to read, interpret, understand, and enjoy poetry, and develop an understanding of the poems’ broader literary historical, philosophical, and political significance. Regular references are made to other modes of expression, including painting, photography, film, music, dance, philosophy, theater, and architecture. Lectures in English. Sections in English or
French. Readings available both in original language and in English translation. WR, HU

* FREN 280a, The Rise of Sensibility in Early Modern France from Racine to Rousseau  Christophe Schuwey

Early Modern France, the age of Versailles, is also the age of tears—of joy and of sadness. Sensibility, an aesthetic that transforms all the arts, aims above all to trigger the emotions of readers and spectators. These new ways of reading, seeing, and listening fostered a new model of society. This seminar explores this defining moment in Western cultural history. By bringing the arts in conversation with politics, science and especially medicine, the rise of sensibility in the seventeenth and eighteenth centuries defined the modern Western relationship to the arts, world, nature, family, friendship and community in all its richness and complexity.

* FREN 309a, Fictions of Consumer Society  Morgane Cadieu

The seminar examines literary and cinematic versions of the consumer society—from the late nineteenth to the twenty-first century—by discussing: the aesthetics of everyday life; the representation of stores, supermarkets, and malls in rural and urban settings; consumerism and colonization; mythologies, commodities, and gender norms; labor and waste; and the attention to objects (still lives, window displays). Works by Danticat, Ernaux, Houellebecq, NDiaye, Perec, Reza, and Zola. Films by Demy, Godard, Tati, and Varda. Short theoretical excerpts by Baudrillard, Barthes, and Moudileno. No knowledge of French required.

* FREN 350b / HUMS 355b, Baudelaire  Thomas Connolly

An undergraduate seminar on the life and work of one the greatest poets of all time, and founder of modernity, Charles Baudelaire (1821-1867). Readings include œuvre de jeunesse, his collection of poems in verse, Les fleurs du mal, his collection of poems in prose, Le spleen de Paris, as well as his writings on fashion, contemporary culture, drugs, the arts, especially painting, his translations from English and American including Edgar Allan Poe, his private journals, the infamous late writings on Belgium and the Belgians, as well as his rare attempts at theater. His afterlives in literature, painting, music, dance, film, translation, and philosophy. Secondary materials including but not limited to Benjamin, Bonnefoy, Derrida, Fondane, Sartre. Readings in French, discussions in English. Ability to read in French is necessary.

* FREN 366a / HSAR 251a, Writers and Artists in Paris, 1780–1914  Marie Girard

Ways in which the transformation of Paris shaped the representation of artists who lived and worked in the French capital from the end of the Old Regime until the eve of World War I. The emergence of Paris as a cultural marker; the role played by the image of the bohemian or the artiste maudit. Authors and artists include David, Balzac, Delacroix, Baudelaire, Manet, Mallarmé, impressionist painters, and Picasso.

FREN 375b / HSAR 374b, Icons in French Art  Marie Girard

The purpose of the course is to focus on the emergence of some of the visual myths, which the large diffusion of pictures through all kind of media (prints, lithographs, photographs, ads) along the 19th century made possible. Based on a selection of works painted between Renaissance and 20th century, which have long been part of the French collections and belong for the most of them to the Musée du Louvre and the Musée d’Orsay, the course focuses on both the genesis of these pictures and the emotional, social, and political response they gained form the public audience when
they appeared. Putting them in context and reading some of the main critical texts by Gautier, Baudelaire, Zola and Foucault among others, helps to understand what made Delacroix’s *Liberté* or Millet’s *Angelus* survive as emblems of the period and keys to French culture. That illuminates how artists shaped French history and sensibility through emblematic works which are still at the center of the visual culture today and how collective myths can grow. Prerequisite: French L5. L5, HU

* FREN 380b, Modern Francophone Poetry  
  Thomas Connolly
  An introduction to poetry written in French from across the globe throughout the twentieth century. Attention is paid to literary, as well as philosophical, social, political, religious, and historical contexts including the rise of Communism, Surrealism, secularism, the Holocaust, the Occupation and Resistance, colonialism, decolonization, industrialization, migration, and the environment, as well as collaborations with other art forms, including painting, textiles, dance, and music. Course includes instruction on how to read and write about modern poetry. Poets studied may include Rabéarivelo, Amrouche, Fondane, Césaire, Senghor, Glissant, Stétié, Luca, Char, Gréki, Meddeb, and Farès, with relevant secondary readings. Readings and discussions in French. Reading and discussion in French. HU

* FREN 388b / HUMS 162b, Feminine Voices in French Literature  
  R Howard Bloch and Pierre Saint-Amand
  An exploration of women’s voices in French literature from the Middle Ages to the mid-twentieth century. The specificity of the feminine voice, the plurality of feminine voices, love and sexuality, and social and professional identity. Authors include Marie de France, Marguerite de Navarre, Francoise de Graffigny, Maryse Condé, and Marguerite Duras. Readings and discussion in English. WR, HU

* FREN 442b / AFST 443b / LITR 484b / MMES 402b, Decolonizing Memory: Africa & the Politics of Testimony  
  Jill Jarvis
  This seminar explores the politics and poetics of memory in a time of unfinished decolonization. It also provides students with a working introduction to anticolonial, postcolonial, and decolonial critique. Together we bring key works on the topics of state violence, trauma, and testimony into contact with literary works and films by artists of the former French and British empires in Africa. Reading literary and theoretical works together permits us to investigate archival silences and begin to chart a future for the critical study of colonial violence and its enduring effects. Literary readings may include works by Djebar, Rahmani, Ouologuem, Sebbar, Diop, Head, Krog. Films by Djebar, Leuvrey, Sembène, and Sissako. Theoretical readings may include works by Arendt, Azoulay, Césaire, Derrida, Fanon, Mbembe, Ngugi, Spivak, and Trouillot. WR, HU

* FREN 470a or b, Special Tutorial for Juniors and Seniors  
  Staff
  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 / FREN 492a or b, The Senior Essay  Staff
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 492a or b / FREN 491a or b, The Senior Essay—Translation Track  Staff
A one-term research project completed under the direction of a ladder faculty member in the Department of French and resulting in a substantial translation (roughly 30 pages) from French to English, with a critical introduction of a length to be determined by the student in consultation with the advising ladder faculty member. Materials submitted for the translation track cannot be the same as the materials submitted for the translation courses. For additional information, consult the director of undergraduate studies.

FREN 493a or b / FREN 495a or b, The Senior Essay in the Intensive Major  Staff
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.

FREN 495a or b / FREN 493a or b, The Senior Essay in the Intensive Major—Translation Track  Staff
First term of a yearlong research project completed under the direction of a ladder faculty member in the Department of French and resulting in a translation of considerable length (roughly 60 pages), from French to English, with a critical introduction of a length to be determined by the student in consultation with the advising ladder faculty member. Materials submitted for the translation track cannot be the same as the materials submitted for the translation courses. For additional information, consult the director of undergraduate studies.

German Studies (GMAN)

* GMAN 100a, 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.

* GMAN 110a, Elementary German I  Staff
A beginning content- and task-based course that focuses on the acquisition of spoken and written communication skills, as well as on the development of cultural awareness and of foundations in grammar and vocabulary. Topics such as school, family life, and housing. Course materials include a variety of authentic readings, a feature film, and shorter video clips. Tutors are available for extra help. To be followed by GMAN 120. Enrollment limited to 14 per section. Students must preregister through Preference Selection during the online preregistration period. Details and a link to Preference Selection are provided on the German department Web site at http://german.yale.edu. L1  1½ Course cr

GMAN 120a, Elementary German II  Staff
Continuation of GMAN 110. A content- and task-based course that focuses on the acquisition of communicative competence in speaking and writing and on the development of strong cultural awareness. Topics such as multiculturalism, food,
childhood, and travel; units on Switzerland and Austria. Course materials include a variety of authentic readings, a feature film, and shorter video clips. Tutors are available for extra help. To be followed by GMAN 130. Enrollment limited to 14 per section. Students must preregister through Preference Selection during the online preregistration period. Details and a link to Preference Selection are provided on the German department Web site at http://german.yale.edu.

GMAN 125a, Intensive German I  Lieselotte Sippel
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 2 Course cr

GMAN 130a, Intermediate German I  Staff
Builds on and expands knowledge acquired in GMAN 120. A content- and task-based course that helps students improve their oral and written linguistic skills and their cultural awareness through a variety of materials related to German literature, culture, history, and politics. Course materials include authentic readings, a feature film, and shorter video clips. Tutors are available for extra help. After GMAN 120 or according to placement examination. Followed by GMAN 140. Enrollment limited to 14 per section. Students must preregister through Preference Selection during the online preregistration period. Details and a link to Preference Selection are provided on the German department Web site at http://german.yale.edu.

GMAN 140a, Intermediate German II  Marion Gehlker
Builds on and expands knowledge acquired in GMAN 130. A content- and task-based course that helps students improve their oral and written linguistic skills and their cultural awareness through a variety of materials related to German literature, culture, history, and politics. Course materials include authentic readings, a feature film, and shorter video clips. Tutors are available for extra help. 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. Students must preregister through Preference Selection during the online preregistration period. Details and a link to Preference Selection are provided on the German department Web site at http://german.yale.edu.

* GMAN 152a, Advanced German, Contemporary Germany  Theresa Schenker
An advanced language and culture course focusing on contemporary Germany. Analysis and discussion of current events in Germany and Europe through the lens of German media, including newspapers, books, TV, film radio, and modern electronic media formats. Focus on oral and written production to achieve advanced linguistic skills. 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. Students must preregister through Preference Selection during the online preregistration period. Details and a link to Preference Selection are provided on the German department Web site at http://german.yale.edu.

* GMAN 162a, Pre-1945 German Culture and History  Marion Gehlker
An advanced language course focusing on improving upper-level written and oral language skills through the discussion of selected aspects of pre-1945 German culture, politics, and history in literary and nonliterary texts, films, and the arts. Topics include the Kaiserreich, the Weimar Republic, Expressionist art and film, youth
movements, social democracy, and Nazi Germany. Emphasis on vocabulary building through frequent oral and written assignments. After GMAN 140, 145, or 150, or with permission of instructor. L5, HU

* GMAN 172a, Introduction to German Theater  
  Staff
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 209a / FILM 209a, Classics of German Cinema: From Haunted Screen to Hyperreality  
  Fatima Naqvi
This course introduces students to German films of the Weimar, Nazi, post-war and post-wall period. In exploring issues of class, gender, nation, migration, and conflict by means of close analysis, the course seeks to sensitize students to the cultural context of these films and the changing socio-political and historical climates in which they arose. Special attention is paid to the issue of film style. We also reflect on what constitutes the “canon” when discussing films, especially those of recent vintage. Directors include Robert Wiene, F.W. Murnau, Fritz Lang, Lotte Reiniger, Leni Riefenstahl, Alexander Kluge, Volker Schlöndorff, Werner Herzog, Wim Wenders, Rainer Werner Fassbinder, Andreas Dresen, Christian Petzold, Jessica Hausner, Michael Haneke, Angela Schanelec, Barbara Albert. Taught in English. HU

GMAN 214a / FREN 270a / LITR 284a, Mad Poets  
  Staff
A lecture course introducing undergraduates to the rich tradition of poetry written in French (and German) during the nineteenth and twentieth centuries. Each week is devoted to exploring the life and work of a poet whose ways of behaving, creating, and perceiving the world might be described as insane. There is, perhaps, no shortage of mad poets, but those whose life and work provide topics for discussion here include Hölderlin, Nerval, Baudelaire, Rimbaud, Verlaine, Mallarmé, Lautréamont, Apollinaire, Breton, Artaud, and Celan. Students become familiar with the tools required to read, interpret, understand, and enjoy poetry, and develop an understanding of the poems’ broader literary historical, philosophical, and political significance. Regular references are made to other modes of expression, including painting, photography, film, music, dance, philosophy, theater, and architecture. Lectures in English. Sections in English or French. Readings available both in original language and in English translation. WR, HU

* GMAN 227b / HUMS 330b / LITR 330b / PHIL 402b, Heidegger's Being and Time  
  Martin Hagglund
Systematic, chapter by chapter study of Heidegger’s *Being and Time*, arguably the most important work of philosophy in the twentieth-century. All major themes addressed in detail, with particular emphasis on care, time, death, and the meaning of being. HU

* GMAN 277b / HUMS 248b / LITR 447b / THST 277b, I and Thou – Dialogue and Miscommunication in Theory and Literature  
  Shira Miron
Dialogue constitutes an integral part of human experience and culture ever since antiquity. Whether as a rhetorical or a dramatic device, written or oral, fictional or not – dialogue substantiates the core of any intersubjective communication, building bridges between the self and the Other while maintaining them as two separate entities. This seminar explores the form and function of dialogue through a wide range of
theoretical and literary texts, focusing on a set of social, hermeneutical, poetical, and political questions. Specific attention is given to literary cases of failed dialogues and miscomprehension, aiming at the unique ability of the literary text to draw our attention beyond the limits of human communication and language. Readings include texts by Plato, Schlegel, Novalis, Bachtin, Levinas, Buber, Gadamer, Parsons, Kleist, Beckett, Melville, Schnitzler, Celan, Bachmann,, and others.  

* GMAN 288a / HUMS 480a / LITR 482a / PHIL 469a, The Mortality of the Soul: From Aristotle to Heidegger  
  Martin Hagglund  
  This course explores fundamental philosophical questions of the relation between matter and form, life and spirit, necessity and freedom, by proceeding from Aristotle’s analysis of the soul in *De Anima* and his notion of practical agency in the *Nicomachean Ethics*. We study Aristotle in conjunction with seminal works by contemporary neo-Aristotelian philosophers (Korsgaard, Nussbaum, Brague, and McDowell). We in turn pursue the implications of Aristotle’s notion of life by engaging with contemporary philosophical discussions of death that take their point of departure in Epicurus (Nagel, Williams, Scheffler). We conclude by analyzing Heidegger’s notion of constitutive mortality, in order to make explicit what is implicit in the form of the soul in Aristotle.  

* GMAN 329a / JDST 348a / PHIL 466a, German Idealism and Religion  
  Paul Franks  
  The philosophies of Kant and his German Idealist successors address a number of central questions in the philosophy of religion and also presuppose a religious background in their approaches to questions of general metaphysics, epistemology and ethics. In this course, we explore the relevant religious context—both in works of Erasmus and Luther and also in the writings of the kabbalists of Safed, Christian kabbalah, and Jakob Boehme. We then read major works by Kant, Hegel and Schelling against that background. Other authors include Conway, Herrera, Jacobi, Kierkegaard, Lessing and Mendelssohn. Issues considered include freedom of the will and determinism, pantheism and panentheism, infinity and finitude, knowledge and faith, love and law, commandment and antinomianism, love of God and love of neighbor. Some prior study of Kant and German Idealism is recommended.  

* GMAN 379a / FILM 325a / LITR 374a, German Cinema 1918–1933  
  Jan Hagens  
  The years between 1918 and 1933 are the Golden Age of German film. In its development from Expressionism to Social Realism, this German cinema produced works of great variety, many of them in the international avantgarde. This introductory seminar gives an overview of the silent movies and sound films made during the Weimar Republic and situate them in their artistic, cultural, social, and political context between WWI and WWII, between the Kaiser's German Empire and the Nazis' Third Reich. Further objectives include: familiarizing students with basic categories of film studies and film analysis; showing how these films have shaped the history and the language of film; discussing topic-oriented and methodological issues such as: film genres (horror film, film noir, science fiction, street film, documentary film); set design, camera work, acting styles; narration in film; avantgarde cinema; the advent and use of sound in film; Realism versus Expressionism; film and popular mythology; melodrama; representation of women; modern urban life as spectacle; film and politics. Directors studied include: Grune, Lang, Lubitsch, Murnau, Pabst, Richter, Ruttmann, Sagan, von Sternberg, Wiene, et al.  

  WR, HU
* GMAN 492a, The Senior Essay Tutorial  Staff
Preparation of an original essay under the direction of a faculty adviser.

Global Affairs (GLBL)

GLBL 101a, Gateway to Global Affairs  Staff
Collaboration between faculty and practitioners to discuss key topics and themes related to diplomacy, development, and defense.  SO  o Course cr

GLBL 121a, Applied Quantitative Analysis  Staff
This course is an introduction to statistics and their application in public policy and global affairs research. Throughout the term we cover issues related to data collection (including surveys, sampling, and weighted data), data description (graphical and numerical techniques for summarizing data), probability and probability distributions, confidence intervals, hypothesis testing, measures of association, and regression analysis. The course assumes no prior knowledge of statistics and no mathematical knowledge beyond calculus.  QR  o Course cr

GLBL 122b, Applied Quantitative Analysis II  Justin Thomas
This course introduces students to multiple regression analysis and other tools of causal inference and program evaluation. The course focuses on applying these tools to real data on various topics in global affairs and public policy. Applications are drawn from a wide range of areas including education, social welfare, unemployment, security, health, immigration, the environment, and economic development. We develop the core analytical tools of single and multi-variable regression and discuss fixed effects, difference-in-difference, natural experiment, instrumental variables, regression discontinuity, event study, and matching approaches. Students are trained to thoughtfully produce their own empirical research and to critically consume empirical research done by others. Prerequisite: GLBL 121 or equivalent.  QR  o Course cr

GLBL 159a / ECON 159a, Game Theory  Staff
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  o Course cr

GLBL 201a / AMST 228a / HIST 128a, Origins of U.S. Global Power  Staff
This course examines the causes and the consequences of American global power in the “long 20th century,” peeking back briefly into the 19th century as well as forward into the present one. The focus is on foreign relations, which includes but is not limited to foreign policy; indeed, America’s global role was rooted as much in its economic and cultural power as it was in diplomacy and military strength. We study events like wars, crises, treaties, and summits — but also trade shows and movie openings. Our principal subjects include plenty of State Department officials, but also missionaries, business people, and journalists. We pay close attention also to conceptions of American power; how did observers in and beyond the United States understand the nature, origins, and operations of American power?  HU  o Course cr
Investigation of the populist phenomenon in party systems and the social movement arena. Conceptual, historical, and methodological analyses are supported by comparative assessments of various empirical instances in the US and around the world, from populist politicians such as Donald Trump and Bernie Sanders, to populist social movements such as the Tea Party and Occupy Wall Street.

**GLBL 215a / LAST 386a / MGRK 237a / PLSC 375a / SOCY 389a, Populism**  
Aslanidis

Introduction to modern macroeconomic models and how to use the models to examine some of the key issues that have faced monetary policymakers during and after the global financial crisis of 2008–2009. Prerequisites: Intermediate level macroeconomics (ECON 122 or 126) and introductory econometrics.

**GLBL 210b / ECON 375b, Monetary Policy**  
William English

Empire has been a main form of state structure throughout much of human history. Many of the key challenges the world faces today have their origins in imperial structures and policies, from wars and terror to racism and environmental destruction. This seminar looks at the transformation empires and imperialisms went through from the middle part of the nineteenth century and up to today. Our discussions center on how and why imperialisms moved from strategies of territorial occupation and raw exploitation, the “smash and grab” version of empire, and on to policies of racial hierarchies, social control and reform, and colonial concepts of civilizations progress, many of which are still with us today. The seminar also covers anti-colonial resistance, revolutionary organizations and ideas, and processes of decolonization.

**GLBL 224a / HIST 224Ja, Empires and Imperialism Since 1840**  
Arne Westad

This seminar will explore the principal challenges facing both advanced and developing economies in managing their respective transitions to a clean energy future and the goals of the Paris climate change agreement, while simultaneously meeting energy security needs and keeping economies competitive. By the end of the course, students should be fully conversant with key features of the global energy and climate change architecture; principal challenges facing policymakers in meeting climate change goals; and opportunities and hurdles for the deployment of key clean energy technologies in coming decades.

**GLBL 230b, Approaches to International Development**  
Staff

This course focuses on understanding poverty and economic development. The emphasis is on applying the tools of economics and empirical analysis for thinking critically about the nature, causes and potential policy solutions to poverty. Topics include the measurement of poverty; economic growth; institutions and colonialism; social capital; inequality; migration and forced displacement; rural finance and labor markets; and gender. Enrollment limited to sophomores, juniors, and seniors. Prerequisite: GLBL 121.

**GLBL 236a / PLSC 182a, The Politics of International Law and Cooperation**  
Tyler Pratt

This course focuses on the political processes and institutions that facilitate cooperation among states. Students examine the obstacles to cooperation in the international arena, the reasons for the creation of international laws and institutions, and the extent to
which such institutions actually affect state policy. Students also explore the tension between international cooperation and concerns about power, state sovereignty, and institutional legitimacy. Course materials draw from a variety of substantive issues, including conflict prevention, trade, human rights, and environmental protection.

* GLBL 237a / ECON 185a, Global Economy  Aleh Tsyvinski
A global view of the world economy and the salient issues in the short and the long run. Economics of crises, fiscal policy, debt, inequality, global imbalances, climate change. The course is based on reading, debating, and applying cutting edge macroeconomic research.  

* GLBL 244a / PLSC 445a, The Politics of Fascism  Lauren Young
The subject of this course is fascism: its rise in Europe in the 1930s and deployment during the Second World War as a road map to understanding the resurgence of nationalism and populism in today’s political landscape, both in Europe and the United States. The course begins with an examination of the historic debates around fascism, nationalism, populism, and democracy. It then moves geographically through the 1930s and 1940s in Europe, looking specifically at Weimar Germany, Vichy France, the rise of fascism in England in the 1930s, and how fascist ideology was reflected in Italy’s colonial ambitions during the Abyssinian War. The course examines fascism and the implementation of racial theory and the example of anti-Semitism as an ideological and political tool. It also looks at the emergence of fascism in visual culture. The second part of the seminar turns to fascist ideology and the realities of today’s political world.

We examine the political considerations of building a democratic state, question the compromise between security and the preservation of civil liberties and look at the resurgence of populism and nationalism in Europe and the US. The course concludes by examining the role of globalization in contemporary political discourse.

* GLBL 251b / EALL 256b / EAST 358b / HUMS 272b / LITR 265b, China in the World  Jing Tsu
Recent headlines about China in the world, deciphered in both modern and historical contexts. Interpretation of new events and diverse texts through transnational connections. Topics include China and Africa, Mandarinization, Chinese America, science and technology, science fiction, and entrepreneurship culture. Readings and discussion in English.  

GLBL 260a / PLSC 130a, Nuclear Politics  Alex 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.

GLBL 275a, Approaches to International Security  Staff
Introduction to major approaches and central topics in the field of international security, with primary focus on the principal man-made threats to human security: the use of violence among and within states, both by state and non-state actors. Priority to Global Affairs majors. Non-majors require permission of the instructor.
GLBL 281a / HIST 221a, Military History of the West since 1500  Staff
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 and Naval ROTC programs.  HU  o Course cr

* GLBL 282b / EVST 255b / F&ES 255b / PLSC 215b, Environmental Law and Politics  John Wargo
We explore relations among environmental quality, health, and law. We consider global-scale avoidable challenges such as: environmentally related human illness, climate instability, water depletion and contamination, food and agriculture, air pollution, energy, packaging, culinary globalization, and biodiversity loss. We evaluate the effectiveness of laws and regulations intended to reduce or prevent environmental and health damages. Additional laws considered include rights of secrecy, property, speech, worker protection, and freedom from discrimination. Comparisons among the US and EU legal standards and precautionary policies will also be examined. Ethical concerns of justice, equity, and transparency are prominent themes.  SO  o Course cr

* GLBL 284b / PLSC 167b, Mass Atrocities in Global Politics  David Simon
Examination of the impact of global politics and institutions on the commission, execution, prevention, and aftermath of mass atrocities.  SO

* GLBL 289a / HIST 245Ja / PLSC 431a, War and Peace in Northern Ireland  Bonnie Weir
Examination of theoretical and empirical literature in response to questions about the insurgency and uneasy peace in Northern Ireland following the peace agreement of 1998 which formally ended the three-decade long civil conflict known widely as The Troubles and was often lauded as the most successful of its kind in modern history. Consideration of how both the conflict and the peace have been messier and arguably more divisive than most outside observers realize.  SO

* GLBL 299a / EP&E 299a / PLSC 332a, Philosophy of Science for the Study of Politics  Ian Shapiro
An examination of the philosophy of science from the perspective of the study of politics. Particular attention to the ways in which assumptions about science influence models of political behavior, the methods adopted to study that behavior, and the relations between science and democracy. Readings include works by both classic and contemporary authors.  SO

* GLBL 307a / ECON 467a, Economic Evolution of the Latin American and Caribbean Countries  Ernesto Zedillo
Economic evolution and prospects of the Latin American and Caribbean (LAC) countries. Topics include the period from independence to the 1930s; import substitution and industrialization to the early 1980s; the debt crisis and the "lost decade"; reform and disappointment in the late 1980s and the 1990s; exploration of selected episodes in particular countries; and speculations about the future. Prerequisites: intermediate microeconomics and macroeconomics.  SO

GLBL 308a / ECON 424a, Central Banking  Staff
Introduction to the different roles and responsibilities of modern central banks, including the operation of payments systems, monetary policy, supervision
and regulation, and financial stability. Discussion of different ways to structure central banks to best manage their responsibilities. Prerequisites: Intermediate Microeconomics, Intermediate Macroeconomics, and Introductory Econometrics.

**GLBL 309a / EAST 310a / PLSC 357a, The Rise of China**  
Staff  
Analysis of Chinese domestic and foreign politics, with a focus on the country’s rise as a major political and economic power. Topics include China’s recent history, government, ruling party, technology, trade, military, diplomacy, and foreign policy.

**GLBL 310a / ECON 407a, International Finance**  
Staff  
A study of how consumers and firms are affected by the globalization of the world economy. Topics include trade costs, the current account, exchange rate pass-through, international macroeconomic co-movement, multinational production, and gains from globalization. Prerequisite: intermediate macroeconomics or equivalent.

**GLBL 311a / ECON 480a, Banking Crises and Financial Stability**  
Sigridur Benediktsdottir  
Focus on systemic risk, banking crises, financial stability and macroprudential policies. Additional emphasis on systemic risk and prudential policies in peripheral European economies and emerging economies. Prerequisites: ECON 115 and 116, or equivalent.

**GLBL 330b / ECON 465b / EP&E 224b, 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.

**GLBL 344a or b / HIST 483Ja or b / PLSC 161a or b, Studies in Grand Strategy II**  
Michael Brenes  
The study of grand strategy, of how individuals and groups can accomplish large ends with limited means. During the fall term, students put into action the ideas studied in the spring term by applying concepts of grand strategy to present day issues. Admission is by application only; the cycle for the current year is closed. This course does not fulfill the history seminar requirement, but may count toward geographical distributional credit within the History major for any region studied, upon application to the director of undergraduate studies. Prerequisite: PLSC 321. Previous study courses in political science, history, global affairs, or subjects with broad interdisciplinary relevance encouraged.

**GLBL 352a, Rebuilding Nations after Conflict**  
David Simon  
Conflict destroys many aspects of the economy, politics, and civil society of the countries in which it takes place. Focusing on post-civil war cases, this course examines the challenges of rebuilding in many dimensions: from rebuilding damaged physical infrastructure and economic management structures to designing equitable and inclusive post-conflict political institutions to transitional justice and memorialization. The course addresses the theory behind elements of rebuilding while examining historical and contemporary cases.
* GLBL 355b, The United States, China, and the Origins of the Korean Peninsula Crisis  David Rank
This course looks at the current situation on the Korean Peninsula and the interaction of the major players there through historical and diplomatic practitioners’ perspectives. The strategic interests of major powers intersect on the Korean Peninsula to a degree found in few other places on earth. In a part of the globe China long viewed as within its sphere of influence, four nuclear powers now rub shoulders and the United States maintains a military presence. With the Armistice that ended the Korean War still in place, Northeast Asia is the Cold War’s last front, but today’s nuclear crisis makes it more than a historical curiosity. Drawing on original diplomatic documents and other source materials, as well as first-hand experience of current-day diplomats, this course considers the trajectory of the two Korea’s relationships with the United States and China and their role in the international politics of East Asia

* GLBL 376a, Asia Now: Human Rights, Globalization, Cultural Conflicts  Jing Tsu
This course examines contemporary and global issues in Asia in a historical and interdisciplinary context. Topics include environmental studies, international law, policy debates, cultural issues, security, military history, media, science and technology, and cyber warfare.  HU, SO

* GLBL 388a, The Politics of American Foreign Policy  Howard Dean
This seminar addresses the domestic political considerations that have affected American foreign policy in the post-World War II world. The goals of the course are to (1) give historical context to the formation of major existing global governance structures, (2) give students an opportunity to research how major foreign policy decisions in the past were influenced by contemporary political pressure, and (3) assess what effect those pressures have had on today’s global issues. Case studies include, but are not limited to: Truman and the Marshall Plan; Johnson and the Vietnam War; Nixon and the opening of China; Reagan and the collapse of the Soviet Union, George HW Bush and Iraq, Clinton and the Balkans, and Obama and the development of a multipolar foreign policy for a multipolar world.  SO

* GLBL 390b, Cybersecurity, Cyberwar, and International Relations  Ted Wittenstein
Analysis of international cyberrelations. Topics include cybercrime, cyberespionage, cyberwar, and cybergovernance. Readings from academic and government sources in the fields of history, law, political science, and sociology.  WR, SO

GLBL 392a, Intelligence, Espionage, and American Foreign Policy  Staff
The discipline, theory, and practice of intelligence; the relationship of intelligence to American foreign policy and national security decision-making. Study of the tools available to analyze international affairs and to communicate that analysis to senior policymakers. Case studies of intelligence successes and failures from World War II to the present.  o Course cr

* GLBL 393b / ANTH 386b, Humanitarian Interventions: Ethics, Politics, and Health  Catherine Panter-Brick
Analysis of humanitarian interventions from a variety of social science disciplinary perspectives. Issues related to policy, legal protection, health care, morality, and governance in relation to the moral imperative to save lives in conditions of extreme adversity. Promotion of dialogue between social scientists and humanitarian practitioners.  WR, SO
* **GLBL 394a / ANTH 409a / ER&M 394a / EVST 422a / F&ES 422a, Climate and Society: Perspectives from the Social Sciences and Humanities**  Michael Dove  Discussion of the major currents of thought regarding climate and climate change; focusing on equity, collapse, folk knowledge, historic and contemporary visions, western and non-western perspectives, drawing on the social sciences and humanities.  
  **WR, SO**

* **GLBL 398a / HIST 426Ja, Yale and the World: Global Power, Local History**  David Engerman  This course uses moments in the history of Yale University to shed light on the forms, functions, and trajectory of U.S. global power from the late 19th century through the early 21st century. Key episodes include missionary work in East Asia, scientific expeditions in South America, mobilization for war and Cold War, and the internationalization of the student body. Students investigate these episodes by reading scholarly work as well as archival sources, and through discussions with Yale faculty and staff.  
  **HU**

* **GLBL 420a / HLTH 490a, Global Health Research Colloquium**  Staff  This course is designed for Global Health Scholars in their senior year as they synthesize their academic studies and practical experiences during their time in the Global Health Studies MAP. In this weekly seminar, Global Health Scholars analyze central challenges in global health and discuss methodological approaches that have responded to these pressing global health concerns. In addition to close reading and discussion, students present on a topic of their choosing and contribute to shaping the agenda for innovative methods in global health research and policy. Prerequisite: HLTH 230 or permission of the instructor. This is a required course for Global Health Scholars and enrollment is limited to Global Health Scholars.  
  **RP**

* **GLBL 450b, 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 460b, Turning Points in American Foreign Policy**  Robert Ford  Examination of American policy decisions and strategies from the founding of the republic to modern day. Topics include American engagement with France and Britain during the American Revolution; post-WWII construction of the modern international order; the breakdown of the Communist system; and the failed states in Yugoslavia and Syria; as well as America’s responses to the current challenges of modern world order, emerging multipolarism, and climate change.

* **GLBL 499a or b, Senior Capstone Project**  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 (HLTH)

* HLTH 081a or b, Current Issues in Medicine and Public Health  Robert Bazell
Analysis of issues in public health and medicine that get extensive media attention and provoke policy debates. The Covid-19 pandemic has revealed severe challenges in the communication between science and health experts and the public. Thus, a prime focus is a survey of epidemiology and related topics such as vaccination attitudes. The class covers other topics including (but not limited to) the value of cancer screening, genetic testing, the U.S. role in global health, physician assisted suicide and the cost of health care. Students learn to understand the scientific literature and critique its coverage in popular media—as well as producing science and medical journalism themselves. Enrollment limited to first-year students. Preregistration required; see under First-Year Seminar Program.  sc

HLTH 140a / SOCY 126a, Health of the Public  Nicholas Christakis
Introduction to the field of public health. The social causes and contexts of illness, death, longevity, and health care in the United States today. How social scientists, biologists, epidemiologists, public health experts, and doctors use theory to understand issues and make causal inferences based on observational or experimental data. Biosocial science and techniques of big data as applied to health.  so

* HLTH 155a / E&EB 106a / MCDB 106a, 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, dengue, and Lyme disease. Biology of the pathogens including modes of transmission, establishment of infection, and immune responses; the challenges associated with vector control, prevention, development of vaccines, and treatments. Intended for non-science majors; preference to freshmen and sophomores. Prerequisite: high school biology.  sc

* HLTH 370a / ER&M 360a / HSHM 432a / SOCY 390a / WGSS 390a, Politics of Reproduction  Rene Almeling
Reproduction as a process that is simultaneously biological and social, involving male and female bodies, family formation, and powerful social institutions such as medicine, law, and the marketplace. Sociological research on reproductive topics such as pregnancy, birth, abortion, contraception, infertility, reproductive technology, and aging. Core sociological concepts used to examine how the politics of reproduction are shaped by the intersecting inequalities of gender, race, class, and sexuality. Wr, so

* HLTH 385a / AFST 385a / EP&E 350a / HIST 391Ja / PLSC 429a, Pandemics in Africa: From the Spanish Influenza to Covid-19  Jonny Steinberg
The overarching aim of the course is to understand the unfolding Covid-19 pandemic in Africa in the context of a century of pandemics, their political and administrative management, the responses of ordinary people, and the lasting changes they wrought. The first eight meetings examine some of the best social science-literature on 20th-century African pandemics before Covid-19. From the Spanish Influenza to cholera to AIDS, to the misdiagnosis of yaws as syphilis, and tuberculosis as hereditary, the social-science literature can be assembled to ask a host of vital questions in political theory: on the limits of coercion, on the connection between political power and scientific expertise, between pandemic disease and political legitimacy, and pervasively, across all modern African epidemics, between infection and the politics of race. The remaining
four meetings look at Covid-19. We chronicle the evolving responses of policymakers, scholars, religious leaders, opposition figures, and, to the extent that we can, ordinary people. The idea is to assemble sufficient information to facilitate a real-time study of thinking and deciding in times of radical uncertainty and to examine, too, the consequences of decisions on the course of events. There are of course so many moving parts: health systems, international political economy, finance, policing, and more. We also bring guests into the classroom, among them frontline actors in the current pandemic as well as veterans of previous pandemics well placed to share provisional comparative thinking. This last dimension is especially emphasized: the current period, studied in the light of a century of epidemic disease, affording us the opportunity to see path dependencies and novelties, the old and the new.

* HLTH 490a / GLBL 420a, Global Health Research Colloquium  Staff
This course is designed for Global Health Scholars in their senior year as they synthesize their academic studies and practical experiences during their time in the Global Health Studies MAP. In this weekly seminar, Global Health Scholars analyze central challenges in global health and discuss methodological approaches that have responded to these pressing global health concerns. In addition to close reading and discussion, students present on a topic of their choosing and contribute to shaping the agenda for innovative methods in global health research and policy. Prerequisite: HLTH 230 or permission of the instructor. This is a required course for Global Health Scholars and enrollment is limited to Global Health Scholars. RP

Hebrew (HEBR)

HEBR 110a, Elementary Modern Hebrew I  Dina Roginsky
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. L1 1½ Course cr

HEBR 117a, Elementary Biblical Hebrew I  Staff
An introduction to biblical Hebrew. Intensive instruction in grammar and vocabulary, supplemented by readings from the Bible. No prior knowledge of Hebrew required. L1

HEBR 120b, Elementary Modern Hebrew II  Orit Yeret
Continuation of HEBR 110. 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. Prerequisite: HEBR 110 or equivalent. L2 RP 1½ Course cr

HEBR 127b, Elementary Biblical Hebrew II  Staff
Continuation of HEBR 117. Prerequisite: HEBR 117. L2

* HEBR 130a, Intermediate Modern Hebrew I  Orit Yeret
Review and continuation of grammatical study, leading to a deeper understanding of style and usage. Focus on selected readings and on writing, comprehension, and speaking skills. Prerequisite: HEBR 120 or equivalent. L3 RP 1½ Course cr

HEBR 140b, Intermediate Modern Hebrew II  Orit Yeret
Continuation of HEBR 130. Review and continuation of grammatical study leading to a deeper comprehension of style and usage. Focus on selected readings and on writing,
comprehension, and speaking skills. Prerequisite: HEBR 130 or equivalent.  

**HEBR 152b / JDST 401b, 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; special concentration on the development of accuracy and fluency. Prerequisite: HEBR 150 or permission of instructor. Conducted in Hebrew.  

**HEBR 156b / JDST 405b / MMES 216b, 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.  

**HEBR 158a / JDST 305a / MMES 168a, Contemporary Israeli Society in Film**  
Shiri Goren  
Examination of major themes in Israeli society through film, with emphasis on language study. Topics include migration, gender and sexuality, Jewish/Israeli identity, and private and collective memory. Readings in Hebrew and English provide a sociohistorical background and bases for class discussion. Prerequisites: HEBR 140 or permission of instructor.  

**HEBR 159a / JDST 409a / MMES 159a, 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.  

**HEBR 161a / JDST 407a / MMES 156a, 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.  

**HEBR 162b / JDST 319b / MMES 161b, Israel in Ideology and Practice**  
Dina Roginsky  
An advanced Hebrew class focusing on changing ideology and politics in Israel. Topics include right and left wing political discourse, elections, State-Religion dynamics, the Jewish-Arab divide, and demographic changes. Materials include newspapers, publications, on-line resources, speeches of different political and religious groups, and contemporary and archival footage. Comparisons to American political and ideological discourse. Prerequisite: HEBR 140 or permission of instructor.
Hindi (HNDI)

* HNDI 110a, Elementary Hindi I  Swapna Sharma
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. L1 1½ Course cr

HNDI 130a, Intermediate Hindi I  Swapna Sharma
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 sociocultural 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 150a, Advanced Hindi  Swapna Sharma
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, Advanced Tutorial  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.

History (HIST)

* HIST 016b / AFAM 060b / AMST 060b, Significance of American Slavery  Edward Rugemer
This first-year seminar explores the significance of racial slavery in the history of the Americas during the eighteenth and nineteenth centuries. We read the work of historians and we explore archival approaches to the study of history. Taught in the Beinecke Library with the assistance of curators and librarians, each week is organized around an archival collection that sheds light on the history of slavery. The course also includes visits to the Department of Manuscripts and Archives in the Sterling Library, the British Art Center, and the Yale University Art Gallery. Each student writes a research paper grounded in archival research in one of the Yale Libraries. Topics
include slavery and slaveholding, the transatlantic slave trade, resistance to slavery, the abolitionist movement, the coming of the American Civil War, the process of emancipation, and post-emancipation experiences. Enrollment limited to first-year students. Preregistration required; see under First-Year Seminar Program. WR, HU

* HIST 017b, American Indians in Higher Education: Introduction to the Indigenous History of American Education  Ned Blackhawk

Education remains an essential element in Native American history, a complex arena full of conflict, resistance, adaptation, and social change. Charting the centuries-long relationships between Native Americans and Euro-American institutions of higher education, this seminar seeks to expose students to the educational history of Native North America. Through in-class assignments, discussion, and sets of experiential campus and off-campus tours, this class both introduces the educational history of Native North America and links it with the broader political history of federal Indian law and policy. Enrollment limited to first-year students. Preregistration required; see under First-Year Seminar Program. WR, HU

* HIST 020a, Jews, Christians, and Muslims in Medieval Spain  Hussein Fancy

It is widely believed that Jews, Christians, Muslims lived together in relative harmony for significant periods of medieval Spanish history, that they experienced what has been called *convivencia*. What is more, the argument continues, because of this harmony, all benefited materially and culturally from diversity and interaction. Through careful reading of primary sources, students take a critical look at *convivencia* as both historical concept and practice. To what degree did tolerance exist in medieval Spain? And perhaps more critically, what do religious interactions in the distant past tell us about the possibilities for religious tolerance in the future. Enrollment limited to first-year students. Preregistration required; see under First-Year Seminar Program. WR, HU

* 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. Enrollment limited to first-year students. Preregistration required; see under First-Year Seminar Program. WR, HU

* HIST 031a, What Makes An American?: U.S. National Identity, Founding to Present  Alvita Akiboh

What makes someone an “American”? This question has plagued the United States since its inception. Most countries, in constructing their national identity, point to shared language, culture, or ethnicity. The United States, on the other hand, has been called a “nation of immigrants,” a “melting pot,” or a “mosaic.” These terms seek to describe how disparate groups of people from all over the globe have come together to form a nation. In this course, students grapple with questions of who has been considered “American” at different points in U.S. history, how the boundaries of this U.S national community have been policed, and why those boundaries have changed over time to allow some to become American while continuing to exclude others. Enrollment limited to first-year students. Preregistration required; see under First-Year Seminar Program. WR, HU
* HIST 036a, Utopia and Dystopia: From Classic Times to the Present in Western Culture  Maria Jordan
We live in a time of dysfunctional societies but, at the same time, in a moment of ecological, egalitarian, and tolerant societies. In this class we examine utopian ideas from Antiquity to the present in Western societies, and compare them with the ones that we formulate in our days. Also, we examine the correlation between dystopias and utopias. Enrollment limited to first-year students. Preregistration required; see under First-Year Seminar Program.  WR, HU

* HIST 040a, Comparative Women's History  Rebecca Tannenbaum
Comparative perspective on the lives of women and their experiences, the ways in which historical forces shaped gender roles in different cultures, and the similarities and differences in gender roles across different time periods and around the world. Topics include work, family roles, political participation, health and sexuality, religious roles, and global feminisms. Enrollment limited to first-year students. Preregistration required; see under First-Year Seminar Program.  WR, HU

* HIST 072b, The History of World History  Valerie Hansen
How the great historians of ancient Greece, Rome, China, the Islamic world, and nineteenth-century Europe created modern historical method. How to evaluate the reliability of sources, both primary and secondary, and assess the relationship between fact and interpretation. Using historical method to make sense of our world today. Strategies for improving reading, writing, and public speaking skills. Enrollment limited to first-year students. Preregistration required; see under First-Year Seminar Program.  WR, HU

HIST 103b, The World Circa 1800  Stuart Semmel
Global history studies cross-cultural interactions, connections, influences, and conflicts. Our subjects include: colonial expansion; war and resistance; slavery; migration and diaspora; the diffusion of ideas and technologies; and the transplanting of crops, livestock, and bacteria. Looking at the world around 1800 lets us consider the impact of European imperial expansion, the French revolution, religious movements, industrialization, and the “international” emergence of “nationalism.” We consider and explore the very notions of “modernization” and “globalization.”  HU

* HIST 104Ja, Climate and Environment in America, 1500–1870  Mark Peterson
This seminar introduces students to the broad range of historical scholarship on climate and environmental conditions and change in North America and the Caribbean from the 15th to the 19th century. Its focus is on the dramatic changes brought about by the encounters among Indigenous, European, and African peoples in this period, the influence of climate and climate change on these encounters, and the environmental transformations brought about by European colonization and conquest and the creation of new economies and polities (including chattel slavery). The course provides a foundation for understanding modern American and global climate and environmental issues. It also introduces students to the wide-ranging opportunities for research and scholarly writing in this field.  WR, HU

* HIST 106Jb, The Monroe Doctrine at 200 Years: History of the United States and Latin America  Greg Grandin
This seminar focuses on the history of the United States and Spanish, French, and Portuguese America, from the Age of Revolution to the present day. It covers
such topics as the American, Haitian, and Spanish-American Revolutions; the Monroe Doctrine; the Confederacy’s foreign policy toward Spanish America, Brazil, and Haiti; William Walker’s invasion and occupation of Nicaragua; the end of slavery throughout the Americas, and the New World consolidation of jus soli (or birthright) notions of citizenship; the War of 1898; the building of the Panama Canal; US counterinsurgencies in Haiti, Nicaragua, and the Dominican Republic; the Good Neighbor Policy; the politics and culture of the Cold War, including CIA interventions in Guatemala, Chile, and Nicaragua; and the Invasion of Panama.

Combining social, intellectual, and diplomatic history, the course covers topics such as the region’s revolutionary wars for independence; comparative republicanisms; the creation of borders; the expansion and abolition of slavery; more revolutions, and counterrevolutions; military interventions and coups; and evolving forms of political economy. The course’s main comparative framework is to examine how the United States and Latin America both advanced, and struggled to define, a set of New World ideas and political forms: Christianity, republicanism, liberalism, democracy, sovereignty, rights, and, above all, the very idea of America.

**HIST 107b / AMST 133b / ER&M 187b, Introduction to American Indian History**  
Ned Blackhawk

Survey of American Indian history, beginning with creation traditions and migration theories and continuing to the present day. Focus on American Indian nations whose homelands are located within the contemporary United States. Complexity and change within American Indian societies, with emphasis on creative adaptations to changing historical circumstances.  

**HIST 108b, U.S. Colonial Empire**  
Alvita Akiboh

The United States was born from a revolution against an empire. Since then, one of the most cherished pieces of national mythology is that the United States, while an incredibly powerful country, has never itself been an empire. But for over a century, the United States has governed an overseas empire of colonies in the Caribbean and the Pacific. This course places the U.S. colonial empire front and center, and asks: what does U.S. history look like from the perspective of the colonies? The first part of the course looks at the origins of U.S. imperialism in the eighteenth and nineteenth centuries. Next, we look at the pivotal year of 1898, when the United States acquired most of its colonial possessions. Lastly, we examine twentieth century struggles in the U.S. empire, including anticolonial revolutions, wars, and the unfinished project of decolonization.  

**HIST 109Jb / HSHM 489b, Activism and Advocacy in the History of American Health Care**  
Kelly O’Donnell

Is health care a human right? Can health advocacy shape health policy? What does it mean to be a health “activist” and to demand change of medicine? Health care in America has always been political. In this seminar students explore the rich history of health activism and health advocacy in the modern United States, focusing primarily on the postwar period through the present day. Each week we encounter new varieties of grassroots organizing, individual activists, and advocacy organizations that have made political claims about health care and pushed for its reform. We examine how health activism shapes broader cultural conversations about health and the practice of medicine itself. This course does not aim to provide a comprehensive history of health activism in modern America, but rather takes a case study approach, for critical
analysis of themes and tactics. For each session, students read a selection of essays, book chapters, or primary source materials about a particular variety of health activism. Through these readings, we discuss how the critiques of activists and the responses by medical practitioners reveal the significant impact of race, gender, class, and sexuality on the provision of health care in this country. We also consider how historians have approached this subject, both as scholars and participant-observers. Students become adept at primary source analysis and able to engage in scholarly conversations with secondary sources. WR, HU

* HIST 110Jb / HSHM 496b, Childbirth in America, 1650-2000  Rebecca Tannenbaum
This course considers the ways childbirth has been conducted in the United states over three centuries. Topics include the connections between childbirth and historical constructions of gender, race, and motherhood, as well as changes in the medical understanding and management of childbirth. WR, HU

HIST 111a, The Revolutionary Transformation of America, 1492-1865  Staff
From the time that permanent contact between Europe and the Americas was established, North America experienced profound changes, in what was truly a world-historical transformation. This course introduces students to the scale and significance of these changes, and provides an intellectual framework for understanding why and how they happened that will be useful in making sense of our contemporary world. The emergence of the United States in the 1770s and its dissolution in Civil War in the 1860s are key events in this story, but the course takes a wider view of the experiences of the peoples of America, Africa, and Europe in shaping the new societies, economies, and polities that emerged in this critical era. HU o Course cr

HIST 114a / HSHM 206a, History of Reproductive Health and Medicine in the U.S.  Staff
This course surveys the history of reproductive health and medicine in the United States from the late eighteenth century to the present. The course emphasizes the cultural and historical contexts of reproductive health; the significance of reproduction within the broader social, cultural, and political history of the United States; and the entanglements of reproductive medicine with social and political categories of race, gender, disability, nation, and kinship. Topics include the management of reproduction in U.S. slavery and empire, reproductive medicine and concepts of race, practitioners and professional authority over childbearing and pregnancy, eugenics and sterilization, movements for reproductive rights and healthcare, reproductive biotechnology, and present-day disparities in access to and quality of reproductive care. HU o Course cr

* HIST 115Jb / AFAM 349b / AMST 326b / WGSS 388b, Civil Rights and Women’s Liberation  Staff
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
* HIST 116Ja, A History of American Citizenship: Membership and Exclusion; Rights and Belonging in U.S. History  Brendan Shanahan
This course explores the contested history of American citizenship from the early republic to the age of Trump. It interrogates both the relative inclusion and/or exclusion of disparate immigrant populations into the American citizenry and campaigns to expand citizenship status and rights to long-marginalized native-born populations throughout the history of the republic. It especially probes the degree to which policies governing U.S. citizenship have been employed to incorporate access to rights for some while restricting access to others. WR, HU

* HIST 118Jb, U.S. Immigration Policy: History, Politics, and Activism, 1607-Present  Brendan Shanahan
How can we study a history so broad, complex, and evolving as the history of American immigration policy? This course explores that question by studying U.S. immigration law, politics, and activism from the colonial era to the present day. Chronologically, we particularly examine: (1) antebellum immigration policy in the context of forced migration, settler colonialism, and slavery, (2) the rise of a federal “gatekeeping” immigration regime in the post-Civil War era, and (3) transformations in immigration policymaking and policies during the long twentieth century. Thematically, we emphasize how U.S. immigration policies have often been framed—and challenged by immigrant rights advocates—on the grounds of racialized and gendered exclusion and/or subordination. WR, HU

* HIST 119Jb / AMST 453b, The United States Constitution of 1787  Mark Peterson
This undergraduate seminar is organized around developing a deep historical understanding of one of our most important documents, the United States Constitution, as it emerged in the late 1780s. In addition to close reading and analysis of this fundamental text, we read a series of other primary sources relevant to the evolution of constitutional thought and practice in the Anglo-American tradition of the early modern period. And we engage relevant secondary scholarship produced by professional historians over the past century or more, in an effort to grapple with the evolution of changing approaches to the Constitution and its meaning over time. This course carries PI credit in History. WR, HU

* HIST 120Ja / AFAM 221a, Writing Histories of Slavery  Edward Rugemer
This seminar considers the historiography of slavery as it has developed from the 1950s until today. We also engage with a series of recent studies that suggest the latest methodologies and styles of writing that historians have developed to illustrate the significance of enslavement in human history. Most readings draw from United States and Caribbean history. Students conduct research in primary sources and write an historical essay. WR, HU

HIST 128a / AMST 228a / GLBL 201a, Origins of U.S. Global Power  Staff
This course examines the causes and the consequences of American global power in the “long 20th century,” peaking back briefly into the 19th century as well as forward into the present one. The focus is on foreign relations, which includes but is not limited to foreign policy; indeed, America’s global role was rooted as much in its economic and cultural power as it was in diplomacy and military strength. We study events like wars, crises, treaties, and summits—but also trade shows and movie openings. Our principal subjects include plenty of State Department officials, but also missionaries, business people, and journalists. We pay close attention also to conceptions of American power;
how did observers in and beyond the United States understand the nature, origins, and operations of American power?  

* HIST 128Jb / HSHM 475b, Race and Disease in American Medicine  
Sakena Abedin  
An exploration of the history of race and disease in American medicine from the late 19th century to the present, focusing on clinical practice and clinical research. We discuss cancer, psychiatric disease, sickle cell disease, and infectious diseases including tuberculosis and HIV. We examine the role of race in the construction of disease and the role of disease in generating and supporting racial hierarchies, with special attention to the role of visibility and the visual in these processes. We also consider the history of race and clinical research, and the implications of racialized disease construction for the production of medical knowledge.  

WR, HU  

* HIST 130Ja / AMST 441a / ER&M 370a, Indians and the Spanish Borderlands  
Ned Blackhawk  
The experiences of Native Americans during centuries of relations with North America’s first imperial power, Spain. The history and long-term legacies of Spanish colonialism from Florida to California.  

WR, HU  

HIST 132b, Mass Incarceration in Historical Perspective  
Elizabeth Hinton  
This course traces the development of legal and penal systems in America over time to investigate the historical process that eventually gave rise to the mass incarceration of Black and Latinx people in the late twentieth century. Over the course of the term, our historical consideration provides us the necessary background to address the ongoing consequences of racial disparities in the criminal justice system and the extraordinary public policy implications of this dynamic.  

WR, HU  

* 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  

* HIST 136Ja, Liberalism and Conservatism in the Modern United States  
Beverly Gage  
American domestic politics and political thought since the New Deal. Emphasis on the decline of midcentury liberalism and the rise of modern American conservatism. Topics include McCarthyism, the civil rights movement, the New Left, labor, business activism, the conservative intellectual movement, the Christian Right, and the Reagan Revolution.  

WR, HU  

* HIST 137Ja / AFAM 227a / AMST 227a / ER&M 349a, From the Voting Rights Act to #blacklivesmatter  
Ferentz Lafargue  
This course explores the period beginning from 1964 through the emergence of the #blacklivesmatter movement in 2013. Key concepts covered in this course include the Black Panther Party and rise of the Black Power movement; political campaigns of Shirley Chisholm, Jesse Jackson, and Barack Obama. The seminar concludes with an examination of the #blacklivesmatter movement and broader efforts addressing mass incarceration, poverty, and opportunity gaps in education.  

HU
* HIST 148Jb / AFAM 210b / AMST 445b, Politics and Culture of the U.S. Color Line
  Matthew Jacobson
The significance of race in U.S. political culture, from the “separate but equal” doctrine
of Plessy v. Ferguson to the election of an African American president. Race as a central
organizer of American political and social life.  HU  RP

* HIST 150Ja / HSHM 406a, Healthcare for the Urban Poor
  Sakena Abedin
Exploration of the institutions, movements, and policies that have attempted to
provide healthcare for the urban poor in America from the late nineteenth century
to the present, with emphasis on the ideas (about health, cities, neighborhoods,
poverty, race, gender, difference, etc) that shaped them. Topics include hospitals, health
centers, public health programs, the medical civil rights movement, the women's health
movement, and national healthcare policies such as Medicare and Medicaid.  wr, HU

* HIST 163Ja / HSHM 419a, Madness and Decolonization
  Marco Ramos
This seminar traces the history of psychiatry through its encounters and entanglements
with colonial and postcolonial power. We begin with a discussion of how psychiatry
has been used as an imperial tool of control in the 18th and 19th centuries. We pay
particular attention to colonial scientific encounters with Indigenous and enslaved
people, and how the psychiatric pathologization of Indigeneity and Blackness informed
the construction of settler European whiteness. Then, we move to decolonization
in the twentieth century to explore the emergence of international mental health, as
former colonies transitioned to independent states. We discuss the attempts of African
and Latin American thinkers, such as Frantz Fanon and Ignacio Martín-Baro, to use
psychiatry for the liberation of oppressed groups in emerging postcolonial spaces. The
seminar finishes with a discussion of the recent emergence of the global mental health
movement and calls from former patients, BIPOC and disability activists, and others
to “decolonize mental health” so that it serves—rather than harms—those traditionally
marginalized by Western psychiatry. Throughout the course, students learn to trace
the contours of psychiatry and decolonization through a variety of sources, including
movies, music, photography, and monographs.  wr, HU

* HIST 164Ja, Foxes, Hedgehogs, and History
  John Gaddis
Application of Isaiah Berlin’s distinction between foxes and hedgehogs to selected
historical case studies extending from the classical age through the recent past.  wr, HU

* HIST 167Ja / PLSC 209a, Congress in the Light of History
  David Mayhew
This course begins by studying analytic themes, including congressional structure,
incentives bearing on members and parties, conditions of party control, supermajority
rules, and polarization, followed by narrative works of major political showdowns
entailing Congress such as those in 1850, 1876-77, 1919 (defeat of the Versailles Treaty),
1937 (defeat of court-packing), 1954 (the McCarthy-Army hearings), 1964 (civil rights),
1973-74 (Watergate), and 1993-94 (defeat of health care). Students also examine a
series of policy performances, for the better or the worse in today’s judgments, ranging
from early state-building through reacting to the Great Depression, constructing a
welfare state, and addressing climate change. This is a reading course and does not
accommodate senior essays.  so
* HIST 168Ja, 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 177Ja / HSHM 448a / WGSS 448a, 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

* HIST 181Jb, Time Machines: Reimagining the Past  John Gaddis
This course explores how representations of the past can help us to reimagine it, and thereby to “travel” there. We explore the concept of time machines and the means by which they might be—or are—constructed. This involves a quick review of the physics involved; some ways historians have used archives to reconstruct times past; the extent to which novelists complement, contradict, or complicate the work of historians; the possibility of “animating” past visual representations, whether through art, film, or computer simulation; and as individual student projects the reading of some digitally available newspaper for some particular place in some particular year.  WR, HU

HIST 184b / AFAM 160b / AFST 184b / AMST 160b, The Rise and Fall of Atlantic Slavery  Edward Rugemer
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.  WR, HU

HIST 187a / AFAM 162a / AMST 162a, African American History from Emancipation to the Present  Staff
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.  WR, HU  o Course cr

HIST 188b / AMST 234b / ER&M 243b / RLST 342b, Spiritual But Not Religious  Zareena Grewal
Study of the historical and contemporary “unchurching” trends in American religious life in a comparative perspective and across different scales of analysis in order to think about the relationship between spirituality, formal religion, secular psychology and the self-help industry.  HU, SO

* HIST 190Ja / HSHM 497a, Technology in American Medicine from Leeches to Surgical Robots  Kelly O’Donnell
From leeches to robot-assisted surgery, technology has both driven and served as a marker of change in the history of medicine. Using technology as our primary frame of analysis, this course focuses on developments in modern medicine and healing practices in the United States, from the nineteenth century through the present day. How have
technologies, tools, and techniques altered medical practice? Are medical technologies necessarily “advances?” How are technologies used to “medicalize” certain aspects of the human experience? In this class we focus on this material culture of medicine, particularly emphasizing themes of consumerism, expertise, professional authority, and gender relations.  

* HIST 196Jb / AMST 353b, 21st-Century US History: The First Decade  Joanne Meyerowitz
Students conduct collaborative primary source research on the first ten years of the 21st century. Topics include September 11th, the wars in Iraq and Afghanistan, Hurricane Katrina, the financial crisis of 2008, the election of Barack Obama, and battles over domestic surveillance, immigration, policing, gun control, same-sex marriage, and reproductive rights.  

* HIST 197Jb / HSHM 409b, Marriage and Medicine in Modern America  Kelly O’Donnell
This seminar explores histories of health, gender, and sexuality, by focusing on the intertwining of two institutions that have fundamentally shaped our culture: medicine and marriage. It uses marriage as a lens for viewing the historical and social transformations of the American medical profession, as well as to examine the medicalization of intimate relationships in the broader society. Weekly readings cover topics such as: eugenics, LGBTQ marriage and adoption, disability rights, sexuality and reproduction, sex education, health activism, the changing gender composition of the health professions, and the reform of medical education and training. Students also analyze a variety of primary sources, ranging from scientific studies and medical advice literature to popular magazines and romantic comedy films.  

HIST 202b, European Civilization, 1648–1945  John Merriman
An overview of the economic, social, political, and intellectual history of modern Europe. Topics include the rise of absolute states, the scientific revolution, the Enlightenment, the French Revolution and Napoleon, the industrial revolution, the revolutions of 1848, nationalism and national unifications, Victorian Britain, the colonization of Africa and Asia, fin-de-siècle culture and society, the Great War, the Russian Revolution, the Europe of political extremes, and World War II.  

HIST 204b / CLCV 200b, Global Leadership, 600 BCE–600 CE  Noel Lenski
This course provides students with an accessible and engaging introduction to both the classical world and the problems of political organization and leadership through time and across societies. Students learn to think comparatively between individuals, societies, and systems and to analyze different ideals of leadership. This means considering not only traditional masculine and military conceptions of rule but also the leadership roles and styles of women, slaves, and rebels. We hope to bring into view, in other words, the intersectional challenges to power faced by non-traditional leaders in a world dominated by gender, class, and cultural prejudices, and to show how non-traditional leaders confronted and overcame these. Students draw upon this experience to access the premodern world as an alternative but related historical reality which can productively inform their engagement with the present.
* HIST 204Jb / ANTH 331b / ARCG 000b / ARCG 354b / EVST 354b / NELC 000b / NELC 324b, The Ancient State: Genesis and Crisis from Mesopotamia to Mexico
Harvey Weiss

Ancient states were societies with surplus agricultural production, classes, specialization of labor, political hierarchies, monumental public architecture and, frequently, irrigation, cities, and writing. Pristine state societies, the earliest civilizations, arose independently from simple egalitarian hunting and gathering societies in six areas of the world. How and why these earliest states arose are among the great questions of post-Enlightenment social science. This course explains (1) why this is a problem, to this day, (2) the dynamic environmental forces that drove early state formation, and (3) the unresolved fundamental questions of ancient state genesis and crisis, –law-like regularities or a chance coincidence of heterogenous forces? HU, SO

HIST 210a, Early Middle Ages, 284-1000 Staff

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

* HIST 210Jb / HUMS 224b, Hobbes and Galileo: Materialism and the Emergence of Modernity William Klein

Hobbes considered himself a disciple of Galileo, but as a systematic philosopher and ideologue during a period of civil unrest in England, he no doubt produced something that Galileo, a Tuscan astrophysicist and impassioned literary critic, was not entirely responsible for: an absolutist theory of the modern state situated within an eschatological time frame. In this course we will reflect on the relation between Galileo's anti-Aristotelian physics and Hobbes' system by reading key texts by Galileo and Hobbes along with an array of interpretations and criticisms of Hobbes that will serve to situate Hobbes in early modern currents of thought in science, religion and politics, while at the same time situating us in contemporary ideological debates about the origins of modernity. HU

HIST 211b, The Birth of Europe, 1000-1500 Hussein Fancy

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

HIST 212a / CLCV 223a, The Ancient Economy Joseph Manning

A survey of the economies of the ancient Mediterranean world, with emphasis on economic institutions, the development of the economies over time, ancient economic thought, and the interrelationships between institutions and economic growth. Material evidence for studying the economies of the ancient world, including coinage, documentary material, and archaeology. HU

* HIST 212Jb / HUMS 313b, Philosophy of Dissent in Central and Eastern Europe Marci Shore

This is a seminar in the field of European intellectual history, based on primary sources. It focuses on how philosophers, novelists, sociologists, and other thinkers developed
and articulated a philosophy of dissent under communism. More specific topics include the relationships between temporality and subjectivity and between truth and lies, and the role that existentialism played in formulating philosophical critiques of repression. Readings consist of a mixture of philosophical and literary works from the Soviet Union, East Germany and the lands in-between. Potential authors include Merab Mamardashvili, Danilo Kiš, Józef Tischner, Adam Michnik, Jacek Kuron, Ladislav Hejdanek, Václav Havel, Jan Patočka, Leszek Kołakowski, Gajo Petrovic, Norman Manea, Lev Kopelev, Igor Pomerantsev, Tomas Venclova.  HU

* 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.  HU

HIST 219a / ER&M 219a / JDST 200a / MMES 149a / RLST 148a, Jewish History and Thought 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 non-Western distributional credit within the History major, upon application to the director of undergraduate studies.  HU  RP

HIST 220b / JDST 201b / RLST 149b, Introduction to Modern Jewish History  David Sorkin
A broad introduction to the history of Jewish culture from the late Middle Ages until the present. Emphasis on the changing interaction of Jews with the larger society as well as the transformation of Judaism in its encounter with modernity.  HU

HIST 221a / GLBL 281a, Military History of the West since 1500  Staff
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 and Naval ROTC programs.  HU  0 Course cr

* HIST 222Jb / RSEE 222b, 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

* HIST 224Ja / GLBL 224a, Empires and Imperialism Since 1840  Arne Westad
Empire has been a main form of state structure throughout much of human history. Many of the key challenges the world faces today have their origins in imperial structures and policies, from wars and terror to racism and environmental destruction. This seminar looks at the transformation empires and imperialisms went through from the middle part of the nineteenth century and up to today. Our discussions center on how and why imperialisms moved from strategies of territorial occupation and raw exploitation, the “smash and grab” version of empire, and on to policies of racial hierarchies, social control and reform, and colonial concepts of civilizational progress,
many of which are still with us today. The seminar also covers anti-colonial resistance, revolutionary organizations and ideas, and processes of decolonization.  

* HIST 225Ja, Perfect Worlds? Utopia and Dystopia in Western Cultures  
  Maria Jordan  
  This course explores the history of utopia and the ways in which societies at different times defined and conceived alternative or ideal worlds. It explores the relationship between real historical conditions and the models of utopia that were elaborated. By examining classic texts like Plato and Thomas More, as well as fictional accounts, students discuss the relationship between utopias and dystopias. The course also discusses how the crises of the last century, with WWII, the fall of the Soviet Union, and the difficulties of global capitalism provoked what some people now consider to be a crisis of utopian thought or, a moment of a redefinition of utopias as more pragmatic, inclusive, and egalitarian of societies.  

* HIST 226Jb / JDST 370b / RLST 231b, Jews and Christians in the Formation of Europe, 500-1500  
  Ivan Marcus  
  Students study how Jews and Christians interacted on a daily basis as medieval Europe became more restrictive and antisemitic, a contributing factor to the Holocaust. In this writing seminar, students discuss a variety of primary sources in class—laws, stories, chronicles, images—while researching and writing their own seminar paper structured by sessions on topics, bibliographies, and outlines.  

* HIST 229a, From Oligarchy to Democracy in Britain, 1780-1914  
  Stuart Semmel  
  British politics, society, and culture in the long nineteenth century, a period of constitutional reform, industrial development, social dislocation, imperial expansion, and cultural criticism.  

* HIST 231b / HUMS 277b, What was Enlightenment?  
  Isaac Nakhimovsky  
  A survey of eighteenth-century European intellectual life, considered in its social and cultural contexts and with attention to its historical legacies, focusing on responses to emerging global networks of trade, finance, and empire.  

* HIST 231Jb, The Dark Years: Collaboration and Resistance in Vichy France  
  John Merriman  
  The concomitants of collaboration and resistance during Vichy France, 1940–44. Topics include the fall of France in 1940; the return of Pétain’s "National Revolution" and its continuities with the French Right during the Third Republic; the extent and nature of resistance (in the context of pre–World War II politics); and the memory of the Vichy years and its influence on subsequent French political life.  

* HIST 232Ja / HUMS 443a / JDST 270a / MMES 342a / RLST 201a, Medieval Jews, Christians, and Muslims In Conversation  
  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. Counts toward either European or Middle Eastern distributional credit within the History major, upon application to the director of undergraduate studies.
* HIST 233Ja, The Emergence of Modern Paris  
John Merriman
The economic, social, political, architectural, and cultural transformation of Paris from the Old Regime to the contemporary era. Topics include revolutionary Paris, the impact of rapid migration, the changing social geography of Paris in the time of Balzac and Zola, the rebuilding of Paris in the Second Empire, Paris and the impressionists, the emergence of the "red belt," and the successes and failures of twentieth-century planning. Reading knowledge of French helpful but not required.  
WR, HU

HIST 236b / HSHM 226b, The Age of the Scientific Revolution  
Ivano Dal Prete
The material, political, cultural, and social transformations that underpinned the rise of modern science between the 14th and 18th century, considered in global context. Topics include artisanal practices and the empirical exploration of nature; global networks of knowledge and trade; figurative arts and the emersion of a visual language of anatomy, astronomy, and natural history.  
HU  
* HIST 236Ja / HUMS 323a, Truth and Sedition  
William Klein
The truth can set you free, but of course it can also get you into trouble. How do the constraints on the pursuit and expression of “truth” change with the nature of the censoring regime, from the family to the church to the modern nation-state? What causes regimes to protect perceived vulnerabilities in the systems of knowledge they privilege? What happens when conflict between regimes implicates modes of knowing? Are there types of truth that any regime would—or should—find dangerous? What are the possible motives and pathways for self-censorship? We begin with the revolt of the Hebrews against polytheistic Egypt and the Socratic questioning of democracy, and end with various contemporary cases of censorship within and between regimes. We consider these events and texts, and their reverberations and reversals in history, in relation to select analyses of the relations between truth and power, including Hobbes, Locke, Kant, Brecht, Leo Strauss, Foucault, Chomsky, Waldron, Zizek, and Xu Zhongrun.  
WR, HU

* HIST 237Jb / MGRK 222b, History of Modern Greece  
Paris Aslanidis
This seminar studies the history of modern Greece since the early 19th century. Greece’s contested position between East and West, both geopolitically and symbolically, functions as the ideational backdrop for the study of the country’s historical trajectory and the development of its main institutions. Discussion of the future of the Greek state vis-à-vis the ongoing sociopolitical crisis it has been facing since its near bankruptcy in 2010 is also considered.  
HU

* HIST 240Ja / RSEE 241a, Government, Law, and Society in Modern Russia, 1853–1953  
Sergei Antonov
Russian political culture from the Crimean War to the death of Stalin. Special attention to continuities, as well as changes, across the revolutionary divide of 1917, and to comparing official policies with daily experiences of ordinary Russians. Changing ideologies and ruling styles of tsars and early Soviet leaders (esp. Lenin, Trotsky, and Stalin) and relations with aristocratic and bureaucratic elites; political dissent and protest, including popular and state-imposed violence; the problem of legality and the rule of law. All discussions and readings in English.  
WR, HU
HIST 242Jb / CLCV 319b / MGRK 300b / WGSS 293b, The Olympic Games, Ancient and Modern  George Syrimis
Introduction to the history of the Olympic Games from antiquity to the present. The mythology of athletic events in ancient Greece and the ritual, political, and social ramifications of the actual competitions. The revival of the modern Olympic movement in 1896, the political investment of the Greek state at the time, and specific games as they illustrate the convergence of athletic cultures and sociopolitical transformations in the twentieth century. HU

HIST 244a / HSHM 321a, Cultures of Western Medicine  Staff
A survey of Western medicine and its global encounters, encompassing medical theory, practice, institutions, and healers from antiquity to the present. Changing concepts of health, disease, and the body in Europe and America explored in their social, cultural, economic, scientific, technological, and ethical contexts. HU  o Course cr

HIST 245Ja / GLBL 289a / PLSC 431a, War and Peace in Northern Ireland  Bonnie Weir
Examination of theoretical and empirical literature in response to questions about the insurgency and uneasy peace in Northern Ireland following the peace agreement of 1998 which formally ended the three-decade long civil conflict known widely as The Troubles and was often lauded as the most successful of its kind in modern history. Consideration of how both the conflict and the peace have been messier and arguably more divisive than most outside observers realize. SO

HIST 246b / EVST 189b, The History of Food  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  o Course cr

HIST 247a, The Making of Modern Ukraine  Staff
Study of the Ukraine from the Cossack rebellions of 1648 to the democratic revolution of 2004. Topics include the decadence of the Polish-Lithuanian Republic, Russian and Austrian imperial rule, the collapse of traditional Jewish and Polish social life, the attraction of Russian culture, the emergence of a Ukrainian national movement, civil war, modernization, terror, the consequences of Nazi occupation (including genocide and ethnic cleansing), problems of democratic reform, and European integration since 1991. WR, HU  o Course cr

HIST 248Jb / JDST 293b / RLST 214b, Introduction to Modern Jewish Thought  Elli Stern
An overview of Jewish philosophical trends, movements, and thinkers from the seventeenth century to the twenty-first. Topics include enlightenment, historicism, socialism, secularism, religious radicalism, and Zionism. HU

HIST 249a / JDST 346a, Making European Culture Jewish: Five Media, 1780-1930  Staff
This course studies the ways in which Jewish writers and artists turned European culture into Jewish culture, that is, how a minority group fashioned its own version of the majority culture. As European Jews encountered European culture and society,
they had to grapple with a host of fundamental questions. What was Judaism and who were the Jews: a religion, a history, a culture, a nation? We examine the way in which writers and artists struggled with these issues in five media: memoir, theology, history, fiction, and painting, thereby creating Jewish versions first of Enlightenment, Romanticism, and realism (1780-1870) and then of nationalism, positivism, and modernism (1870-1930).  

* HIST 256jb / HUMS 264b, Imagining the Body Politic: Constitutional Art and Theory from Antiquity to the Present  
William Klein
Do visual representations of social and political principles have a peculiar power to produce, reproduce, and disturb social and political relations? To what extent do some works of political theory seem to presuppose an imaginative construct, in particular one based on human bodies and their parts? Can we identify the birth of the modern state through an examination of key images of the body politic? Have the machine or network or program taken over the function of the body metaphor in more recent times? Does visualizing the principles and orders of society and politics elicit new critical awareness and reaction, or blindness and obedience? Does republican art differ fundamentally in this regard from monarchical—or fascist or communist or anarchist or neoliberal—art?  

HU

HIST 260a / HUMS 255a / LITR 253a / RSEE 312a / RUSS 312a, Tolstoy's War and Peace  
Staff
The course is a semester-long study of the quintessential big Russian novel, Leo Tolstoy's War and Peace, about Napoleon's failed 1812 war against Russia. War and Peace (1865-1869) is a sweeping panorama of nineteenth-century Russian society, a novel of profound philosophical questions, and an unforgettable gallery of artfully drawn characters. Reading the novel closely, we pose the following questions. In what ways is this patriotic war epic also an imperial novel? What myths does it destroy and construct? How does it combine fiction and history? What forces drive history, as it unfolds in the present? What are the limits of individual agency, and how much do emperors and generals control the fates of nations and armies? Finally, a question that is never too broad for Tolstoy: what is a meaningful, well-lived life? We explore these questions while refining our tools of literary analysis and situating the novel in its historical context and in our contemporary world. Secondary materials include Tolstoy's letters, contemporary reviews, maps, and historical sources, as well as readings in political theory, philosophy, international relations, and literary criticism. All readings and class discussions in English. No prerequisites required. Both WR and non-WR sections are offered.  

* HIST 260Ja / HSHM 468a, Sex, Life, and Generation  
Ivano Dal Prete
Theories and practices of life, sex, and generation in Western civilization. Politics and policies of conception and birth; social control of abortion and infanticide in premodern societies; theories of life and gender; the changing status of the embryo; the lure of artificial life.  

WR, HU

HIST 264b / ER&M 263b / RSEE 268b, 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.  

**HIST 265a / RSEE 266a, Soviet Russia 1917-1991**  
Staff  
Overview of the rise and fall of the Soviet Union. Topics include political culture and ideology of the Bolshevik/Communist Party; social and economic changes; foreign policy and the role of WWII; major artistic and cultural movements. Paper assignments involve close readings of memoir and oral history accounts.  

**HIST 265Ja / HUMS 193a, Screening the Past**  
Stuart Semmel  
An interdisciplinary study of cinematic representations of the historical past. Films that treat historical events realistically; others that deliberately present history as it did not happen. Standards that can be applied to judge history on the screen; lessons for evaluating history on the page.  

**HIST 268Jb / JDST 351b / PLSC 466b / RLST 324b, The Global Right: From the French Revolution to the American Insurrection**  
Elli Stern  
This seminar explores the history of right-wing political thought from the late eighteenth century to the present, with an emphasis on the role played by religious and pagan traditions. This course seeks to answer the question, what constitutes the right? What are the central philosophical, religious, and pagan, principles of those groups associated with this designation? How have the core ideas of the right changed over time? We do this by examining primary tracts written by theologians, political philosophers, and social theorists as well as secondary literature written by scholars interrogating movements associated with the right in America, Europe, Middle East and Asia. Though touching on specific national political parties, institutions, and think tanks, its focus is on mapping the intellectual overlap and differences between various right-wing ideologies. While the course is limited to the modern period, it adopts a global perspective to better understand the full scope of right-wing politics.  

**HIST 269Ja, History and Holocaust Testimony**  
Carolyn Dean  
The history and memoirs of Holocaust testimony. How victims' experiences are narrated and assessed by historians. Questions regarding memory and history.  

**HIST 271a / HUMS 339a / RSEE 271a, European Intellectual History since Nietzsche**  
Staff  
Major currents in European intellectual history from the late nineteenth century through the twentieth. Topics include Marxism-Leninism, psychoanalysis, expressionism, structuralism, phenomenology, existentialism, antipolitics, and deconstruction.  

**HIST 276a, France since 1871**  
Staff  
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.  

**HIST 280a / ITAL 315a / RLST 160a, The Catholic Intellectual Tradition**  
Staff  
Introductory survey of the interaction between Catholicism and Western culture from the first century to the present, with a focus on pivotal moments and crucial
developments that defined both traditions. Key beliefs, rites, and customs of the Roman Catholic Church, and the ways in which they have found expression; interaction between Catholics and the institution of the Church; Catholicism in its cultural and sociopolitical matrices. Close reading of primary sources.

* HIST 280Jb, Nazi Germany  Jennifer Allen
Both the ideology and practices of Nazi Germany rank among the most insidious the world has ever seen. For this reason, this historical era has generated, simultaneously, immense revulsion and immense fascination among scholars. They have attempted to explain how such a regime could emerge, how its citizens could come to support it, how it could carry out atrocities with such scale and brutality, and how Germany could rebuild itself after such physical and ideological violence. In this course, we join these scholars in trying to understand Nazi Germany. Together, we chart the rise and fall of National Socialism in Germany from the early twentieth century through the decades after the end of the Second World War. Via a collection of both primary and secondary source literature, we confront some of the most contentious debates in this field of study: what made Nazism so popular among ordinary Germans? How do we interpret Hitler’s role in its development? Was German violence toward Jews and other groups slated for murder a product of deep-seated antisemitism and xenophobia or did it evolve organically over the course of the Nazi period? Did the Holocaust form from the top down as the product of a small collection of people driven by the demands of the Führer, or from the bottom up as a function of shifting circumstances like the trajectory of the Second World War? How can we understand the emergence of camps and killing fields? How do we make sense of the complicated registers of German guilt for the events of the Nazi period? Is it useful (or appropriate) to compare the Holocaust to other genocides? This course exposes students to the range of answers that responsible and meticulous historical research has offered to these questions. There are, however, mountains of literature that have been written on the rise, lifespan, and fall of National Socialism. This course can only begin to chip away modestly at that mass. Nevertheless, the goal is that, by the end of the semester, students develop a sense of the outlines of the major historiographical debates about this period and give thought to the ways that those debates remain relevant to our contemporary world.

WR, HU

HIST 281b / RLST 268b, 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

* HIST 289Jb / HSAR 390b / HSHM 407b / HUMS 220b, Collecting Before the Museum  Paola Bertucci
A history of museums before the emergence of the modern museum. Focus on: cabinets of curiosities and Wunderkammern, anatomical theaters and apothecaries’ shops, alchemical workshops and theaters of machines, collections of monsters, rarities, and exotic specimens.

WR, HU

HIST 290a / RSEE 225a, Russia from the Ninth Century to 1801  Staff
The mainstream of Russian history from the Kievan state to 1801. Political, social, and economic institutions and the transition from Eastern Orthodoxy to the Enlightenment.

HU  o Course cr
* HIST 292Ja / HUMS 279a / PLSC 286a, Democracy and the French Revolution
Isaac Nakhimovsky
The French Revolution of 1789 and its legacies, as viewed through the late-eighteenth-century debates about democracy, equality, representative government, and historical change that shaped an enduring agenda for historical and political thought in Europe and around the world.  wr, hu

* HIST 294Ja / MGRK 305a, The Age of Revolution  
Paris Aslanidis
The course is a comparative examination of the international dimensions of several revolutions from 1776 to 1848. It aims to explore mechanisms of diffusion, shared themes, and common visions between the revolutionary upheavals in the United States, France, Haiti, South America, Greece, and Italy. How similar and how different were these episodes? Did they emerge against a common structural and societal backdrop? Did they equally serve their ideals and liberate their people against tyranny? What was the role of women and the position of ethnic minorities in the fledgling nation-states? As the year 2021 marks the bicentennial of the Greek Revolution of 1821, special attention is given to the intricate links forged between Greek revolutionary intellectuals and their peers in Europe and other continents  hu

* HIST 302Jb, Korea and the Japanese Empire in Critical Contexts  
Hannah Shepherd
This course addresses critical moments of contact, conflict, and connection in the modern histories of Korea and Japan. Each week our discussion and readings focus on a specific event, before looking at the wider contexts involved and historical debates they have produced. This is not a comparative study of the histories of the different countries, but a chance to focus on themes—nationalism, colonial oppression, collaboration, war, identity—which continue to shape both relations between Japan, South Korea and North Korea, and the work of historians today.  wr, hu

HIST 305a / LAST 100a, Introduction to Latin American Studies: History, Culture and Society  
Maria Aguilar
What is Latin America? The large area we refer to as Latin America is not unified by a single language, history, religion, or type of government. Nor is it unified by a shared geography or by the prevalence of a common language or ethnic group. Yet Latin America does, obviously, exist. It is a region forged from the merging of diverse cultures, historical experiences, and processes of resistance. This course provides an overview of Latin America and the Caribbean from the 16th century up to the present. While the class aims to provide students with an understanding of the region, due to time constraints, it focuses primarily on the experiences and histories of selected countries. The course introduces students to some of the most important debates about the region’s history, politics, society, and culture. The course follows a chronological structure while also highlighting thematic questions. Drawing on academic readings, films, music, art, literature, testimony, oral histories, and writings from local voices the class explores the political transformation of the region, as well as topics related to ethnic and racial identity, revolution, social movements, religion, violence, military rule, democracy, transition to democracy, and migration.  hu 0 Course cr

HIST 307b / EAST 301b, 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.  

* HIST 310Jb / LAST 370b, Continuities and Discontinuities of Violence in Latin America  
  Maria Aguilar  
  During the second half of the twentieth century, many Latin American countries experienced intense political conflict and waves of repression at the hands of government forces. This course introduces students to the histories of Latin American countries that experienced dictatorships and authoritarian regimes during the Cold War and traces their development into the democratic transitions and current attempts to come to terms with the legacies of violence. The first part of the course explores the factors that led to the seizing of power by military forces, the period of violence, and human rights violations that characterized these regimes. The second part examines the factors that led to democratic transitions and the legacies of authoritarian regimes. The course examines the experiences of countries in South and Central America, with special attention to Argentina, Chile, El Salvador, and Guatemala.  

HIST 321a / EAST 220a, China from Present to Past  
  Staff  
  Underlying causes of current issues facing China traced back to their origins in the premodern period. Topics include economic development, corruption, environmental crises, gender, and Pacific island disputes. Selected primary-source readings in English, images, videos, and Web resources.  

HIST 335b / AFST 335b / ER&M 325b, A History of South Africa  
  Daniel Magaziner  
  An introduction to the history of southern Africa, especially South Africa. Indigenous communities; early colonial contact; the legacies of colonial rule; postcolonial mismanagement; the vagaries of the environment; the mineral revolution; segregationist regimes; persistent inequality and crime since the end of apartheid; the specter of AIDS; postcolonial challenges in Zimbabwe, Angola, and Mozambique.  

HIST 340b / AFST 340b, 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.  

* HIST 341Ja / ENGL 368a / SAST 474a, The Novel and the Nation: Reading India in Vikram Seth's A Suitable Boy  
  Priyasha Mukhopadhyay and Rohit De  
  This course pairs two interconnected phenomena: the rise of the Indian Republic and the birth of the postcolonial novel. Over the course of the semester, we read a single primary text: Vikram Seth's *A Suitable Boy* (1993). Set in the 1950s in the aftermath of India's Independence and Partition, Seth's encyclopaedic novel is the story of four families brought together by a mother's search for a “suitable boy” for her daughter to marry. In the process, it builds a microcosm of an Indian society coming to terms with postcolonial statehood and weighing the aftereffects of British colonialism. Entwined in its plot about marriage, love, and relationships are some of the most urgent cultural and political concerns facing the new nation: legislative changes and land reforms, the violent aftermath of the Partition, secularism tainted by communal tensions, the disintegration of courtly forms of sociality, the reconstruction of city life, and the fate of the English novel in the postcolonial classroom. We read *A Suitable Boy* as literary critics and historians, pairing close readings of language and literary form with
historical scholarship. Over the course of our discussions, we address the following questions: what is the relationship between the nation, the novel, and identity in the postcolonial world? How do we read narratives of “nation building” as literary and cultural constructions? What do we make of “literature” and “history” as disciplinary categories and formations? The seminar introduces students to methods of literary criticism and textual studies, and teaches them how to read a range of primary sources, from legislative debates, bureaucratic reports, newspapers, poetry, cinema, and radio.

* HIST 344a / AFST 344a, African Independence: A Cup of Plenty or a Poisoned Chalice?  Staff
In every African colony after World War Two there emerged nationalist movements which no longer called for civil rights as in the pre-war years but demanded self-determination. While many of them got it easy, some had to fight long and bloody wars for it. By the 1960s the colonial edifice had crumbled except for the few settler colonies in southern Africa. But even here the winds of change could not be stopped. But what did decolonization and independence mean to Africa? Did Africans get what they wanted? Was independence a cup of plenty or a poisoned chalice? In addressing these questions, this course charts the economic, political, and cultural transformations of postcolonial Africa from the 1960s to the present. The argument is this: there can be no understanding of Africa’s challenges today without an inquiry into the nature of what the continent got from the departing colonial powers.  

HU o Course cr

HIST 345b / JDST 265b / MMES 148b / RLST 202b, Jews in Muslim Lands from the Seventh to the Sixteenth Centuries  Ivan Marcus
Jewish culture and society in Muslim lands from the time of the Prophet Muhammad to that of Suleiman the Magnificent. Topics include Islam and Judaism; Jerusalem as a holy site; rabbinic leadership and literature in Baghdad; Jewish courtiers, poets, and philosophers in Muslim Spain; and the Jews in the Ottoman Empire.  

* HIST 352Jb / AKKD 350, Culture and Politics in Lusophone Africa, 1885-1992  Benedito Machava
The peculiar nature of Portugal as a colonial power produced a very distinct history in the five Portuguese-speaking African countries, namely Angola, Guiné-Bissau (Guinea-Bissau), Moçambique (Mozambique), and the Atlantic islands of Cabo-Verde (Cape Verde) and São Tomé e Príncipe. Lusophone Africa is a lose term that refers to the world created by Portugal’s colonialism in Africa. This course explores this distinct history through the lens of culture and politics. Focusing on the long twentieth-century, we consider Lusophone Africa as a study unit, dissecting its disparate societies, cultures, and political trajectories, while remaining anchored in the general context of Africa. Military conquest, colonial rule, race/luzotropicalism, nationalism, and liberation struggle are some of the core themes of the course. We begin with a brief assessment of Portugal’s efforts to retain its colonial enclaves amid the voracious expansion of British, French, Belgian, and German presence in Africa in the late 19th century. But our focus is on the twentieth-century, from the establishment of the colonial administration in the early 1900s to the fall of the Portuguese empire in 1974. We dedicate a good portion of the term to exploring the multiple ways (cultural and political) in which Africans responded to Portugal’s encroachment and how they navigated the color bar that came to dictate their social mobility under colonial rule. We end with the multifaceted longings for self-determination that led to the longest and bloodiest liberation wars
in Africa. Our readings include scholarly essays (old and recent), primary sources, literary works (novels, poetry and short stories), photographs, music and films. We become acquainted with Portuguese-speaking African voices, faces, and places. Luís Bernardo Honwana's collection of short stories in We Killed Mangy Dog and Other Stories (1964) and Zézé Gamboa's film The Great Kilapy (2012) carry us through the important theme of race and race relations. While cautious in situating the discussion of race in its historical context, these and other materials challenge us to think about race relations and emancipation in our time.

HIST 353a, 20th Century Japan: Empire & Aftermath  Staff
In 1905, in a victory which shocked the world, Japan defeated Imperial Russia in a regional conflict over control of Korea. To many in Asia and the non-Western world, Japan looked like a new model of anti-Western, anti-imperial modernity. However, the ensuing decades would see this image contested. The expansion of Japan's political and economic power into East Asia over the first half of the twentieth century has shaped the region in ways still visible today. This course is split into three parts, each covering roughly two decades. First, we look at the legacies of Japan's Meiji Restoration and the development of what has been called an “Imperial Democracy” in early 20th century Japan. Next, we look at the crises which rocked Japan in the 1930s and marked a new era. Finally, we deal with the aftermath of empire—both in the immediate “postwar” era for Japan, and in the debates over imperial legacies and history which still reverberate in Japan and many of its former colonies today.

* HIST 353Ja / RLST 387 / SLAV 230a, The Slavic World Between Christendom East and West  John Mikitish
The Orthodox Church figures large in both Western and Russian accounts of Putin's Russia; church politics and inter-Christian conflicts play a major role in the politics of contemporary Ukraine. In many ways, these are just the latest chapters in an ongoing process of religious encounter, conflict, and exchange on the Slavic borderlands of Eastern and Western Christendom. Drawing on the disciplinary tools and conclusions of literary studies, history, and religious studies, this course proposes to explore this continuing story through texts, images, and other media.

HIST 355a / LAST 355a, Colonial Latin America  Staff
A survey of the conquest and colonization of Latin America from pre-Columbian civilizations through the movements for independence. Emphasis on social and economic themes and the formation of identities in the context of multiracial societies.

* HIST 362Jb, The Economic History of India  Sunil Amrith
India has more billionaires than almost anywhere in the world, behind only the US and China; India is also home to more of the world's poorest people than any other country on earth. How do we explain these contrasts? How far are India's economic opportunities and its challenges rooted in its history? What were the economic consequences of colonialism? How have Indians, in the past and in the present, negotiated the economic obstacles and opportunities they face in their daily lives? This research seminar assumes no prior knowledge of Indian history. We approach economic history from the broadest possible standpoint, reading novels as much as statistics, photographs and movies as much as political documents. We cover the period from the nineteenth to the twenty-first centuries. Topics include: the economic impact of colonialism, the changing nature of poverty in India, the role of the state in India's
economic development, and the historical roots of India’s recent economic growth. We also consider connections and comparisons between India and its South and Southeast Asian neighbors. There is emphasis on understanding the roots of inequality in modern India, in particular gender and caste inequality. All students write a final research paper based on primary sources, and are encouraged to draw on material in the Yale collections, including the Beinecke and the Yale Center for British Art. WR, HU

* HIST 366Ja / AFST 368a / EVST 369a, Commodities of Colonialism in Africa
  Robert Harms
  This course examines historical case studies of several significant global commodities produced in Africa to explore interactions between world market forces and African resources and societies. Through the lens of four specific commodities—ivory, rubber, cotton, and diamonds—this course evaluates diverse industries and their historical trajectories in sub-Saharan Africa within a global context from ~1870-1990s. Students become acquainted with the historical method by developing their own research paper on a commodity using both primary and secondary sources. WR, HU

* HIST 368Ja / AFST 324a / EP&E 317a / PLSC 324a, Nelson and Winnie Mandela
  Jonny Steinberg
  A study of Nelson and Winnie Mandela’s marriage and public careers and the political and philosophical questions the marriage raises. Students examine the Mandelas’ conflicting ideas on race and on the colonial experience and compare them to those of Mohandas Gandhi and Franz Fanon. Students also read recent philosophical work on forgiveness and on violence in order critically to assess the politics of reconciliation that so divided the Mandelas. The course examines the politics of global celebrity and the portrayal of men and women in public media.

* HIST 372Ja / ER&M 342a / LAST 372a, Revolutionary Change and Cold War in Latin America
  Greg Grandin
  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 374Ja / AFST 486a / HSHM 486a, African Systems of Thought
  Nana Osei Quarshie
  This seminar explores the effects of colonialism and post-colonial power relations on the production of scientific, medical, and embodied knowledge about Africa. The course focuses on three broad themes covered across four units. First, we read debates over the nature and definition of science and tradition. How have colonialism and post-colonial power relations defined the tasks of an African science? What does it mean to decolonize African thought or culture? Second, we examine the nature of rationality. Is reason singular or plural? Culturally-bound or universal? To what extent are witchcraft, African healing practices, and ancestor veneration rational practices? Is there a “traditional” rationality? Third, we explore the relationship between scientific representations, social practices, and local culture. What relationship exists between social practices and culturally shared categories of knowledge? Lastly, we examine the intersection of capital and medical expertise. How have shifting conceptions of value and capital, reshaped scientific and medical authority in Africa? WR, HU
HIST 391Ja / AFST 385a / EP&E 350a / HLTH 385a / PLSC 429a, Pandemics in Africa: From the Spanish Influenza to Covid-19  Jonny Steinberg

The overarching aim of the course is to understand the unfolding Covid-19 pandemic in Africa in the context of a century of pandemics, their political and administrative management, the responses of ordinary people, and the lasting changes they wrought. The first eight meetings examine some of the best social science-literature on 20th-century African pandemics before Covid-19. From the Spanish Influenza to cholera to AIDS, to the misdiagnosis of yaws as syphilis, and tuberculosis as hereditary, the social-science literature can be assembled to ask a host of vital questions in political theory: on the limits of coercion, on the connection between political power and scientific expertise, between pandemic disease and political legitimacy, and pervasively, across all modern African epidemics, between infection and the politics of race. The remaining four meetings look at Covid-19. We chronicle the evolving responses of policymakers, scholars, religious leaders, opposition figures, and, to the extent that we can, ordinary people. The idea is to assemble sufficient information to facilitate a real-time study of thinking and deciding in times of radical uncertainty and to examine, too, the consequences of decisions on the course of events. There are of course so many moving parts: health systems, international political economy, finance, policing, and more. We also bring guests into the classroom, among them frontline actors in the current pandemic as well as veterans of previous pandemics well placed to share provisional comparative thinking. This last dimension is especially emphasized: the current period, studied in the light of a century of epidemic disease, affording us the opportunity to see path dependencies and novelties, the old and the new.

HIST 396a / SAST 224a, India and Pakistan since 1947  Staff

Introduction to the history of the Indian subcontinent from 1947 to the present. Focus on the emergence of modern forms of life and thought, the impact of the partition on state and society, and the challenges of democracy and development. Transformations of society, economy, and culture; state building; economic policy.

HIST 396Jb / AFST 396b, Revolutions and Socialist Experiments in Africa  Benedito Machava

This seminar explores the contours of Africa’s embrace and engagement with the most influential ideology of the twentieth-century. Why, and through which channels, were Africans attracted to socialism? Did particular forms of colonialism and decolonization push African political actors towards revolution and socialist experiments? Is it legitimate, as some scholars have suggested, to speak of genuinely African socialisms? If so, what was the nature of these socialisms and how did they differ from the versions of socialism around the world? What political, social, economic, and cultural ends did socialism serve in Africa? And what were the consequences and legacies of African socialist experiments? The seminar addresses these questions. Our goal is to place Africa in the mainstream of conversations about socialism. We begin with the assumption that, like any doctrine, socialism was the object of multiple interpretations, modification, and appropriation from its inception. In so doing, we challenge orthodox understandings of socialism, which hold the European versions as the pure models and the rest as diluted if not populist façades of the ‘true’ doctrine. We begin with theoretical readings that help us situate the major debates about socialism in general and socialism in Africa. We then proceed to examine the overall historical context in which African nationalists adopted socialism. We differentiate the first branch
of “African Socialism” from the second wave of “Afro-Marxism.” We also pay close attention to issues of decolonization and political imagination; ideas and experiments of development; gender, morality, and social engineering. **WR, HU**

* **HIST 403Jb / HSHM 473b, Vaccination in Historical Perspective**  Jason Schwartz
  For over two centuries, vaccination has been a prominent, effective, and at times controversial component of public health activities in the United States and around the world. Despite the novelty of many aspects of contemporary vaccines and vaccination programs, they reflect a rich and often contested history that combines questions of science, medicine, public health, global health, economics, law, and ethics, among other topics. This course examines the history of vaccines and vaccination programs, with a particular focus on the 20th and 21st centuries and on the historical roots of contemporary issues in U.S. and global vaccination policy. Students gain a thorough, historically grounded understanding of the scope and design of vaccination efforts, past and present, and the interconnected social, cultural, and political issues that vaccination has raised throughout its history and continues to raise today.  **HU**

**HIST 417a / AFST 220a / HSHM 220a, Histories of Confinement: From Atlantic Slavery to Social Distancing**  Staff
This course looks closely at the history of asylums, hospitals, prisons, and schools. It seeks to understand their workings and the interplay between bureaucratic forms, spatial and material organization, and modes of discipline, control, and remediation. It asks, how is institutional power organized, displayed, deployed, and disputed, and what are the limits and contradictions inherent in these efforts? Our readings draw from a range of contexts and disciplines to consider the relationship between the built environment and institutional life.  **HU, Course cr**

**HIST 418a, The History of Money**  Staff
This is a lecture course on the history of money, ca. 900 to the present. The geographical focus lies on developments in Europe and North America, with occasional forays into Latin America, China, and various overseas empires. Students acquire an understanding of the evolution of money in its different forms. The course shows that our understanding of money today, and the forms in which money comes, are extremely recent developments and that for vast stretches of history, people used very different moneys. The course can therefore help us understand that anything we today might assume to be natural or inevitable about money and monetary politics, might in fact not be so given money’s colorful and mixed history.  **HU**

* **HIST 421Jb, Piracy in Global History**  Lauren Benton
This seminar examines piracy as an economic, cultural, and legal phenomenon. Major themes include piracy and the law; pirates as members of political communities; and piracy in relation to processes of imperial and global ordering. Some attention is given to piracy in the ancient world and in the twentieth century, but the emphasis is on European empires and piracy from the sixteenth century to the nineteenth century in the Atlantic, Pacific, and Indian Ocean worlds.  **WR, HU**

* **HIST 426Ja / GLBL 398a, Yale and the World: Global Power, Local History**  David Engerman
This course uses moments in the history of Yale University to shed light on the forms, functions, and trajectory of U.S. global power from the late 19th century through the early 21st century. Key episodes include missionary work in East Asia,
scientific expeditions in South America, mobilization for war and Cold War, and the internationalization of the student body. Students investigate these episodes by reading scholarly work as well as archival sources, and through discussions with Yale faculty and staff. HU

* HIST 429Jb / HSHM 412b, Laboratory Life  Chitra Ramalingam
The laboratory is the iconic space of modern science, where unruly nature is tamed and controlled, and scientific facts are made. Through historical, ethnographic, and sociological approaches to lab science, this course explores how an obscure, secretive site for managing alchemical labor in medieval Europe became the globally dominant mode of producing universal experimental knowledge across the modern sciences. We consider issues of labor, skill and class; gender and race; pedagogy and the politics of profession; state, industrial, and corporate laboratories; secrecy and openness; place and geography; and the implication of labs in geopolitical webs of power, inequality, and exploitation. Undergraduate enrollment limited to juniors and seniors. WR, HU

* HIST 447Jb / HSHM 467b, History of the Body  Ziv Eisenberg
What does it mean to have a “bad hair day?” How should you care for your skin? What happens when you eat a burger and drink wine? How are babies made? What happens when you die? The answers depend not only on who provides them, but also on where and when. This seminar examines historical production of systems of corporeal knowledge and power, as well as the norms, practices, meanings, and power structures they have created, displaced, and maintained. Structured thematically, the course familiarizes students with major topics in the history of the body, health, and medicine, with a particular focus on US history. WR, HU

* HIST 449Jb / EVST 349b / HSHM 449b / URBN 382b, Critical Data Visualization: History, Theory, and Practice  Bill Rankin
Critical analysis of the creation, use, and cultural meanings of data visualization, with emphasis on both the theory and the politics of visual communication. Seminar discussions include close readings of historical data graphics since the late eighteenth century and conceptual engagement with graphic semiology, ideals of objectivity and honesty, and recent approaches of feminist and participatory data design. Course assignments focus on the research, production, and workshopping of students’ own data graphics; topics include both historical and contemporary material. No prior software experience is required; tutorials are integrated into weekly meetings. Basic proficiency in standard graphics software is expected by the end of the term, with optional support for more advanced programming and mapping software. HU

* HIST 458Jb, Environmentalism from the Global South  Sunil Amrith
Most histories of the environmental movement still privilege the American and European experience. This research seminar examines the diverse forms of environmental thought and activism that have emerged from the global South – drawing examples from Asia, Africa, the Middle East, and Latin America – since the early twentieth century. The course examines: the environmental legacies of colonialism, the role of ecology in anticolonial movements, early articulations of environmental justice in the 1970s, the role of violence and repression in state responses to environmental activism, the rise of increasingly networked environmental movements from the Global South that made themselves heard at the Rio Earth Summit of 1992 – which took place 30 years ago, and the moral and political histories that underpin the negotiating stance of countries of the Global South in climate change
negotiations. This class makes extensive use of primary sources, including material from the Yale collections and it straddles the boundaries between environmental, intellectual, and political history.  wr, HU

HIST 479b / AFAM 170b / HSHM 241b / WGSS 270b, Sickness and Health in African American History  Carolyn Roberts
A history of American medicine through the African American experience covering the period of slavery through #BlackLivesMatter. Oriented around the complex dynamics of medical abuse and medical resistance, key themes include medicine and slavery; gender and reproduction; medical experimentation and ethics; the rise of racial science; lynching and vigilante violence; segregation and public health; African-descended approaches to health and healing; the rise of the African American medical profession; and black health activism from slavery to #BlackLivesMatter. HU

* HIST 483Ja or b / GLBL 344a or b / PLSC 161a or b, Studies in Grand Strategy II  Michael Brenes
The study of grand strategy, of how individuals and groups can accomplish large ends with limited means. During the fall term, students put into action the ideas studied in the spring term by applying concepts of grand strategy to present day issues. Admission is by application only; the cycle for the current year is closed. This course does not fulfill the history seminar requirement, but may count toward geographical distributional credit within the History major for any region studied, upon application to the director of undergraduate studies. Prerequisite: PLSC 321. Previous study courses in political science, history, global affairs, or subjects with broad interdisciplinary relevance encouraged. SO

* HIST 490Jb / HSHM 429b, Decolonizing the Mind  Nana Osei Quarshie
This seminar explores the effects of colonialism and post-colonial power relations on the production of scientific, medical, and embodied knowledge about psychiatry. First, we read debates over the geographies of power and distrust in medicine. How have colonialism and post-colonial power relations defined the tasks of non-European psychiatry? What does it mean to decolonize psychiatric practice or culture? Second, we examine the nature of rationality. Is reason singular, plural, or culturally bound or universal? To what extent is spirit possession a rational experience? Third, we explore the relationship between scientific representations, social practices, and local culture. What relationship exists between social practices and culturally shared categories of knowledge? Is psychiatry universalizable? Students learn to analyze and debate these questions by drawing on films, letters, photography, and monographs produced in and about Algeria, Argentina, Brazil, China, Cuba, Indonesia, and Vietnam. WR, HU, SO

* HIST 494a or b, Individual Writing Tutorial  Daniel Magaziner
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 a member of the History department 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 HIST 496a or b, The Senior Essay  

David Sorkin

All senior History majors should attend the mandatory senior essay meeting in early September at a time and location to be announced in the online Senior Essay Handbook. The senior essay is a required one- or two-term independent research project conducted under the guidance of a faculty adviser. As a significant work of primary-source research, it serves as the capstone project of the History major. Students writing the one-term senior essay enroll in HIST 497 (see description), not HIST 495 and 496. The two-term essay takes the form of a substantial article, not longer than 12,500 words (approximately forty to fifty double-spaced typewritten pages). This is a maximum limit; there is no minimum requirement. Length will vary according to the topic and the historical techniques employed. Students writing the two-term senior essay who expect to graduate in May enroll in HIST 495 during the fall term and complete their essays in HIST 496 in the spring term. December graduates enroll in HIST 495 in the spring term and complete their essays in HIST 496 during the following fall term; students planning to begin their essay in the spring term should notify the senior essay director by early December. 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 History Department Undergraduate Registrar by the dates indicated in the Senior Essay Handbook. Blank statement forms are available from the History Undergraduate Registrar and in the Senior Essay handbook. Students enrolled in HIST 495 submit to the administrator in 237 HGS a two-to-three-page analysis of a single primary source, a draft bibliographic essay, and at least ten pages of the essay by the deadlines listed in the Senior Essay Handbook. Those who meet these requirements receive a temporary grade of SAT for the fall term, 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 the dates indicated in the Senior Essay Handbook. 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.

* HIST 497a or b, One-Term Senior Essay  

David Sorkin

All senior History majors should attend the mandatory senior essay meeting in early September at a time and location to be announced in the online Senior Essay Handbook. The senior essay is a required one- or two-term independent research project conducted under the guidance of a faculty adviser. As a significant work of primary-source research, it serves as the capstone project of the History major. Seniors writing a two-term senior essay do not register for HIST 497; instead, they register for HIST 495 and HIST 496 (see description). History majors may choose to write a one-term independent senior essay in the first term of their senior year and register for HIST 497; however, students who choose the one-term senior essay option are not eligible for Distinction in the Major. The one-term essay must include a substantial research paper of no more than 6,250 words (approximately twenty-five pages) based
on primary sources, along with a bibliographic essay and bibliography. Seniors enroll during the fall term of senior year; only History majors graduating in December may enroll during the spring term (or seventh term of enrollment). In rare circumstances, with the permission of the adviser and the Senior Essay Director, a student enrolled in HIST 497 during the fall term may withdraw from the course according to Yale College regulations on course withdrawal and enroll in the spring term. Each student enrolled in HIST 497 must present a completed Statement of Intention, signed by a department member who has agreed to serve as adviser, to the History Department Undergraduate Registrar by the dates indicated in the Senior Essay Handbook. Blank statement forms are available from the History Undergraduate Registrar and in the Senior Essay Handbook, available on the History department Web site. Additional details about the senior essay, including the submission deadlines are included in the Senior Essay Handbook. Essays submitted after 5 p.m. on the due date 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. 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. Permission of the departmental Senior Essay Director and of the student’s faculty adviser is required for enrollment.

History of Art (HSAR)

* HSAR 002a / AMST 007a, Furniture and American Life  Edward Cooke
In-depth study and interpretation of American furniture from the past four centuries. Hands-on experience with furniture in the collection of the Yale University Art Gallery to explore such topics as materials, techniques, styles, use, and meaning. Enrollment limited to first-year students. Preregistration required; see under First-Year Seminar Program.  WR, HU

HSAR 119a / EAST 119a, Introduction to the History of Art: Asian Art and Culture  Quincy Ngan
This introductory course explores the art of India, China, Japan, and Korea from prehistory to the present. We consider major works and monuments from all four regions. Themes include the representation of nature and the body, the intersection of art with spirituality and politics, and everything from elite to consumer culture. All students welcome, including those who have no previous experience with either art history or the study of Asian art. This class makes frequent visits to Yale University Art Gallery.  HU 0 Course cr

HSAR 219a / AMST 197a / ARCH 280a / URBN 280a, American Architecture and Urbanism  Elishu Rubin
Introduction to the study of buildings, architects, architectural styles, and urban landscapes, viewed in their economic, political, social, and cultural contexts, from precolonial times to the present. Topics include: public and private investment in the built environment; the history of housing in America; the organization of architectural practice; race, gender, ethnicity and the right to the city; the social and political nature of city building; and the transnational nature of American architecture.  HU
HSAR 223a / AFAM 122a, Art Collectives: Protest, Entrepreneurship, and Praxis
Andrianna Campbell
A crowd formed at the Whitney Museum, as San Francisco artists occupied the institution to protest Laura Owens’s solo exhibition opening. The gathering was in successive date order to Patrick Bright’s protest of Dana Schultz’s Emmet Till painting. It came a few years after the HowDoYouSayYaminAfrican? (YAMs collective) protest of Joe Scalan’s Donelle Woolford performance artwork. The protest also foreshadowed the Black Women Artists for Black Lives Matter (BWABLM) series of protests across the country. From the Sackler family to Warren Kanders, those who peddle in rue and misfortune are now being asked to resign from art boards as multiple allegations force them out of planning positions, and remove their names from wings and museum buildings. Hive-like sit-ins and stand-ins are the actions of political organizers to make the democratic body heard in the public sphere. Today, these ethical shifts in art communities criticize and disrupt the planned temple-like meditative space of the museum. Between the cynical mole hill aims of a few of those San Franciscan artists who capitulated after the Whitney offered them an exhibition, to the effective efforts of BWABLM, we explore where the art object functions in relation to political discourse and performative disruption as art practice. HU

HSAR 240a, London Art Capital: Black Death to Brexit  Staff
Today London is a great art city—a cosmopolitan center for the making, display, and collecting of works of art. How did that come to be? This course answers the question through an intense engagement with the rich collections of the Yale Center for British Art, offering an introduction to British Art across six centuries and to the lively debates it generates. The course links the development of art and the art market with the origins and progression of capitalism. It traces London’s artistic and architectural development from medieval origins through the courtly spectacle of Tudor and Stuart eras to the emergence of a recognizably modern economy and society around 1750, the time of William Hogarth. After 1800, Londoners William Blake and JMW Turner, and their Victorian successors, vividly chronicled the transformation of the industrial and imperial city. From 1910 British art entered a complex relationship with European modernism epitomized in the work of sculptor Barbara Hepworth. London was shattered by bombing during the Blitz: from the ruins emerged Pop Art, followed by Op-Art, led by Bridget Riley. By the 1990s the prominence of artists of color such as Yinka Shonibare prefigured the dynamic and cosmopolitan art scene of the present day. After Brexit, after Covid, what is the future for British art and for London? HU o Course cr

HSAR 247a / ARCG 161a / CLCV 161a, Art and Myth in Greek Antiquity  Staff
Visual exploration of Greek mythology through the study of ancient Greek art and architecture. Greek gods, heroes, and mythological scenes foundational to Western culture; the complex nature of Greek mythology; how art and architecture rendered myths ever present in ancient Greek daily experience; ways in which visual representations can articulate stories. Use of collections in the Yale University Art Gallery. HU o Course cr

* HSAR 251a / FREN 366a, Writers and Artists in Paris, 1780–1914  Marie Girard
Ways in which the transformation of Paris shaped the representation of artists who lived and worked in the French capital from the end of the Old Regime until the eve of World War I. The emergence of Paris as a cultural marker; the role played by the
image of the bohemian or the *artiste maudit*. Authors and artists include David, Balzac, Delacroix, Baudelaire, Manet, Mallarmé, impressionist painters, and Picasso.  L5, HU

**HSAR 273a, Art of Gothic Cathedrals**  Jacqueline Jung
European Gothic churches (1140–1400) explored as multimedia architectural environments in which stained glass, sculpture, textiles, and liturgical furnishings are integral aspects of design and meaning. Buildings considered for their formal and material qualities and as sites of ritual performance and signs of political and social power. Recommended preparation: HSAR 112.  HU

**HSAR 275a, The Body in Indian Art**  Subhashini Kaligotla
How did artists in South Asia represent and view the body? And what do such representations reveal about the values of the time and place that produced them? This introductory lecture course explores these questions across time and through a range of figures that cut across gender and social group. We consider the representation of divine figures such as the Buddha, Hindu gods and goddesses, Jain saviors, and Muslim mystics; portraits of kings, queens, ministers, and courtly figures; and images of saints, yogis, ascetics, mendicants, and other renunciants. We also see how a range of non-human figures from birds and animals to powerful mythical beings such as demons, tree spirits, and snake demi-gods were depicted. Course materials include textual sources and visual media such as painting, sculpture, architecture, and more. Together they help us examine the imagination of their makers as well as the cultures, politics, and religions of the Indian subcontinent that gave rise to them.  HU

**HSAR 285a / ITAL 343a, Italian Renaissance Art**  Morgan Ng
This course surveys the art of Renaissance Italy (c. 1420–1550) in its full breadth, including architecture, sculpture, and painting. Lectures situate artworks within broad cultural themes, while sections include the first-hand study of objects in the Yale University Art Gallery. Topics include the display of art in civic space; the influence of Roman antiquity on monumental architecture; the conception of nature in paintings and gardens; the representation of the human body in portraiture and heroic sculpture; the rise of women artists and patrons. The course scrutinizes acknowledged masterworks by Michelangelo, Leonardo da Vinci, and Raphael, in the artistic centers of Florence, Rome, and Venice. At the same time, it considers lesser known yet no less vibrant artistic sites, such as those in Southern Italy. It also draws map connections beyond Europe, revealing rich cultural exchanges with the Ottoman empire and the Americas.  HU  o Course cr

**HSAR 326a / ARCH 260a, History of Architecture to 1750**  Kyle Dugdale
Introduction to the history of architecture from antiquity to the dawn of the Enlightenment, focusing on narratives that continue to inform the present. The course begins in Africa and Mesopotamia, follows routes from the Mediterranean into Asia and back to Rome, Byzantium, and the Middle East, and then circulates back to mediaeval Europe, before juxtaposing the indigenous structures of Africa and America with the increasingly global fabrications of the Renaissance and Baroque. Emphasis on challenging preconceptions, developing visual intelligence, and learning to read architecture as a story that can both register and transcend place and time, embodying ideas within material structures that survive across the centuries in often unexpected ways.  HU  o Course cr
HSAR 374b / FREN 375b, Icons in French Art  Marie Girard
The purpose of the course is to focus on the emergence of some of the visual myths, which the large diffusion of pictures through all kind of media (prints, lithographs, photographs, ads) along the 19th century made possible. Based on a selection of works painted between Renaissance and 20th century, which have long been part of the French collections and belong for the most of them to the Musée du Louvre and the Musée d’Orsay, the course focuses on both the genesis of these pictures and the emotional, social, and political response they gained form the public audience when they appeared. Putting them in context and reading some of the main critical texts by Gautier, Baudelaire, Zola and Foucault among others, helps to understand what made Delacroix’s Liberté or Millet’s Angelus survive as emblems of the period and keys to French culture. That illuminates how artists shaped French history and sensibility through emblematic works which are still at the center of the visual culture today and how collective myths can grow. Prerequisite: French L5. L5, HU

* HSAR 399b / HIST 289Jb / HSHM 407b / HUMS 220b, Collecting Before the Museum  Paola Bertucci
A history of museums before the emergence of the modern museum. Focus on: cabinets of curiosities and Wunderkammern, anatomical theaters and apothecaries’ shops, alchemical workshops and theaters of machines, collections of monsters, rarities, and exotic specimens. WR, HU

* HSAR 401a, Critical Approaches to Art History  Carol Armstrong
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. WR, HU

* HSAR 407a, In, Out, and Back: African Art Collection, Exhibition, and Restitution  Cecile Fromont
This seminar investigates the role and place of material and immaterial objects of African expressive culture in their original contexts of production and display on the continent, the circumstances of their displacement to the European galleries and museum where they have featured since the early modern period, and the accelerating restitution movement aiming to bring them back to African communities and states. Collection visits, guest speakers, readings, and student research address topics such as the scientific and artistic project of early modern cabinets of curiosities; the birth of ethnology and the advent of the museum; art, race, violence; the entanglements between collection, commerce, and colonialism; and contemporary trends in museum decolonization and restitution. HU, SO

* HSAR 427a / EAST 427a, Chinese Skin Problems  Quincy Ngan
This seminar uses artwork as a means of understanding the various skin problems faced by contemporary Chinese people. Divided into four modules, this seminar first traces how the “ideal skin” as a complex trope of desire, superficiality, and deception has evolved over time through the ghost story, Painted Skin (Huapi), and its countless spin-offs. Second, the course explores how artists have overcome a variety of social distances and barriers through touch; we look at artworks that highlight the healing power and erotic associations of cleansing, massaging, and moisturizing the skin. Third, we explore the relationship between feminism and gender stereotypes through artworks and performances that involve skincare, makeup and plastic surgery. Fourth, the course investigates the dynamics between “Chineseness,” colorism, and racial tensions through
the artworks produced by Chinese-American and diasporic artists. Each module is
comprised of one meeting focusing on theoretical frameworks and two meetings
focusing on individual artists and close analysis of artworks. Readings include Cathy
Park Hong’s *Minor Feelings*, Nikki Khanna’s *Whiter*, and Leta Hong Fincher’s *Leftover
Women*. HU

* HSAR 437a / ARCH 380a / MMES 382a, The Global Museum  Kishwar Rizvi
When the Carters (Jay-Z and Beyoncé) chose the Louvre Paris as the backdrop to
their 2018 hit single, they were tapping into the cultural capital of the museum. Like
its counterparts across the world, the Louvre has evolved from a princely collection
to a national symbol and, today, to a global brand, with a franchise in Abu Dhabi
which opened in 2017. This seminar analyzes how museums are utilized for a variety
purposes, from the local to the transnational, and the relationship between their
architectural design and their economic, social and urban impact. The class meets
with curators and designers and takes a field trip to the Smithsonian museums in
Washington, DC. WR, HU

* HSAR 440a, Issues in Nineteenth-Century Sculpture  Christina Ferando
Survey of nineteenth-century European and American sculpture using concrete
visual examples from Italy, France, England, and the United States to examine the
formal structure of sculpture and contextualize the social and political circumstances
of its production and reception. Focus on representation of the human figure and
examination of issues of idealism and naturalism, as well controversies surrounding
the use of color and gender/class signifiers. Use of collections in the Yale University Art
Gallery and the Yale Center for British Art. Some familiarity with art history is helpful.
HU

* HSAR 448a, The Long 1960s: Art, Revolution, Politics  Pamela Lee
Consideration of the art and visual culture of the “Long 1960s,” treating the art of
this pivotal decade against the backdrop of the global Cold War. We consider the
most significant art movements of the period (Pop, minimal art, conceptual art etc.)
alongside debates on the relationship between art, revolution, and politics both within
the United States and abroad. Topics include the rise of media culture and its impact
on art; the global reception of Pop; Black Power and the Black Arts Movement; art and
activism of the New Left; the counterculture and new media; the aesthetics of Third
Worldism and the anti-war movement; 1968 and the Society of the Spectacle; and gay
liberation at Stonewall. Mandatory weekend field trip to Washington DC. Some art
history recommended, but not required. Enrollment is restricted and by application.
Contact instructor for details. HU

* HSAR 460a / ENGL 419a / HUMS 185a, Writing about Contemporary Figurative
Art  Margaret Spillane
A workshop on journalistic strategies for looking at and writing about contemporary
paintings of the human figure. Practitioners and theorists of figurative painting;
controversies, partisans, and opponents. Includes field trips to museums and galleries
in New York City. Formerly ENGL 247. WR, HU
History of Science, Medicine, and Public Health (HSHM)

* HSHM 006b, Making Climate Knowledge  Deborah Coen
This is a course about how scientists have come to know what they know about our impacts on the earth's climate and our vulnerability to climate change. At what point in history did humans become the first species to consciously alter the conditions of life on earth? What evidence did their knowledge rest on? Did scientists bear responsibility to warn of these consequences? These historical questions are pivotal to thinking today about who bears moral responsibility for the climate crisis and about future courses of action. Knowledge of the causes and impacts of climate change hinges on a range of disciplines, from ecology to agriculture to public health. In this course, we attend to the multiplicity of ways of knowing climate, as well as to the challenges of integrating them. We also track the historical entanglements of climate knowledge with imperialism, racism, and extractive capitalism. The course includes visits to the Yale Farm, the Peabody Museum's collections, and the Yale Center for British Art, and a trip to the New York Botanical Garden in the Bronx. Enrollment limited to first-year students. Preregistration required; see under First-Year Seminar Program.  WR, HU

HSHM 206a / HIST 114a, History of Reproductive Health and Medicine in the U.S.  Staff
This course surveys the history of reproductive health and medicine in the United States from the late eighteenth century to the present. The course emphasizes the cultural and historical contexts of reproductive health; the significance of reproduction within the broader social, cultural, and political history of the United States; and the entanglements of reproductive medicine with social and political categories of race, gender, disability, nation, and kinship. Topics include the management of reproduction in U.S. slavery and empire, reproductive medicine and concepts of race, practitioners and professional authority over childbearing and pregnancy, eugenics and sterilization, movements for reproductive rights and healthcare, reproductive biotechnology, and present-day disparities in access to and quality of reproductive care.  HU  o Course cr

HSHM 220a / AFST 220a / HIST 417a, Histories of Confinement: From Atlantic Slavery to Social Distancing  Staff
This course looks closely at the history of asylums, hospitals, prisons, and schools. It seeks to understand their workings and the interplay between bureaucratic forms, spatial and material organization, and modes of discipline, control, and remediation. It asks, how is institutional power organized, displayed, deployed, and disputed, and what are the limits and contradictions inherent in these efforts? Our readings draw from a range of contexts and disciplines to consider the relationship between the built environment and institutional life.  HU  o Course cr

HSHM 226b / HIST 236b, The Age of the Scientific Revolution  Ivano Dal Prete
The material, political, cultural, and social transformations that underpinned the rise of modern science between the 14th and 18th century, considered in global context. Topics include artisanal practices and the empirical exploration of nature; global networks of knowledge and trade; figurative arts and the emersion of a visual language of anatomy, astronomy, and natural history.  HU  o Course cr
HSHM 241b / AFAM 170b / HIST 479b / WGSS 270b, Sickness and Health in African American History  Carolyn Roberts
A history of American medicine through the African American experience covering the period of slavery through #BlackLivesMatter. Oriented around the complex dynamics of medical abuse and medical resistance, key themes include medicine and slavery; gender and reproduction; medical experimentation and ethics; the rise of racial science; lynching and vigilante violence; segregation and public health; African-descended approaches to health and healing; the rise of the African American medical profession; and black health activism from slavery to #BlackLivesMatter.  HU

HSHM 321a / HIST 244a, Cultures of Western Medicine  Staff
A survey of Western medicine and its global encounters, encompassing medical theory, practice, institutions, and healers from antiquity to the present. Changing concepts of health, disease, and the body in Europe and America explored in their social, cultural, economic, scientific, technological, and ethical contexts.  HU  o Course cr

* HSHM 406a / HIST 150Ja, Healthcare for the Urban Poor  Sakena Abedin
Exploration of the institutions, movements, and policies that have attempted to provide healthcare for the urban poor in America from the late nineteenth century to the present, with emphasis on the ideas (about health, cities, neighborhoods, poverty, race, gender, difference, etc) that shaped them. Topics include hospitals, health centers, public health programs, the medical civil rights movement, the women's health movement, and national healthcare policies such as Medicare and Medicaid.  WR, HU

* HSHM 407b / HIST 289Jb / HSAR 399b / HUMS 220b, Collecting Before the Museum  Paola Bertucci
A history of museums before the emergence of the modern museum. Focus on: cabinets of curiosities and Wunderkammern, anatomical theaters and apothecaries' shops, alchemical workshops and theaters of machines, collections of monsters, rarities, and exotic specimens.  WR, HU

* HSHM 409b / HIST 197Jb, Marriage and Medicine in Modern America  Kelly O'Donnell
This seminar explores histories of health, gender, and sexuality, by focusing on the intertwining of two institutions that have fundamentally shaped our culture: medicine and marriage. It uses marriage as a lens for viewing the historical and social transformations of the American medical profession, as well as to examine the medicalization of intimate relationships in the broader society. Weekly readings cover topics such as: eugenics, LGBTQ marriage and adoption, disability rights, sexuality and reproduction, sex education, health activism, the changing gender composition of the health professions, and the reform of medical education and training. Students also analyze a variety of primary sources, ranging from scientific studies and medical advice literature to popular magazines and romantic comedy films.  WR, HU

* HSHM 410a / RLST 195a / WGSS 195a, Meanings of Life  Evan Goldstein
What are the meanings of life? That is, what are we talking about when we talk about life, and how did we come to talk about it in this way? Is life religious or secular? What does Christianity (still) have to do with the politics of life and death? This course takes up these questions, among others. We trace the history of life as a concept in Western thought, with a particular emphasis on the afterlife of the Christian tradition in secular modernity. Beginning with the theories of biopolitics developed by Hannah
Arendt and Michel Foucault, we explore the implications of life’s centrality for modern formations of race, sexuality, and death. This course is not a survey of how different religious traditions define life; rather, by engaging with thinkers from Religious Studies, Black Studies, queer theory, science and technology studies, among other fields, we explore the theological and political dimension of life in modern Western societies. After spending several weeks covering some of the canonical theorists of biopolitics, we take on a series of more recent case studies and thinkers who have addressed some of the urgent issues of our time through a critical scrutiny of the meanings of life. Topics include secularization and sovereignty, the biopolitics of race and sexuality, the precarious status of life in pandemic times, and death. Readings are primarily composed of twentieth-century theorists, including Giorgio Agamben, Donna Haraway, Lauren Berlant, and Talal Asad, as well as relevant historical precursors and examples. No prior experience is presumed, and all texts will be read in translation.

HU

* HSHM 412b / HIST 429Jb, Laboratory Life  Chitra Ramalingam
The laboratory is the iconic space of modern science, where unruly nature is tamed and controlled, and scientific facts are made. Through historical, ethnographic, and sociological approaches to lab science, this course explores how an obscure, secretive site for managing alchemical labor in medieval Europe became the globally dominant mode of producing universal experimental knowledge across the modern sciences. We consider issues of labor, skill and class; gender and race; pedagogy and the politics of profession; state, industrial, and corporate laboratories; secrecy and openness; place and geography; and the implication of labs in geopolitical webs of power, inequality, and exploitation. Undergraduate enrollment limited to juniors and seniors. WR, HU

* HSHM 417a, Before the Anthropocene: Global Environment in the Preindustrial World  Ivano Dal Prete
This seminar explores the cultural history of climate change, environmental catastrophes, and human agency over nature in the pre-industrial world. Students discuss scientific theories, religious beliefs, economic imperatives, and ideological and gender prisms that paved the way for an era of unprecedented exploitation of the Earth’s resources and environment. Special emphasis is placed on the study of visual and material primary sources at the Beinecke and other venues on campus. WR, HU

* HSHM 419a / HIST 163Ja, Madness and Decolonization  Marco Ramos
This seminar traces the history of psychiatry through its encounters and entanglements with colonial and postcolonial power. We begin with a discussion of how psychiatry has been used as an imperial tool of control in the 18th and 19th centuries. We pay particular attention to colonial scientific encounters with Indigenous and enslaved people, and how the psychiatric pathologization of Indigeneity and Blackness informed the construction of settler European whiteness. Then, we move to decolonization in the twentieth century to explore the emergence of international mental health, as former colonies transitioned to independent states. We discuss the attempts of African and Latin American thinkers, such as Frantz Fanon and Ignacio Martín-Baro, to use psychiatry for the liberation of oppressed groups in emerging postcolonial spaces. The seminar finishes with a discussion of the recent emergence of the global mental health movement and calls from former patients, BIPOC and disability activists, and others to “decolonize mental health” so that it serves—rather than harms—those traditionally marginalized by Western psychiatry. Throughout the course, students learn to trace
the contours of psychiatry and decolonization through a variety of sources, including movies, music, photography, and monographs.  WR, HU

* HSHM 429b / HIST 490Jb, Decolonizing the Mind  Nana Osei Quarshie
This seminar explores the effects of colonialism and post-colonial power relations on the production of scientific, medical, and embodied knowledge about psychiatry. First, we read debates over the geographies of power and distrust in medicine. How have colonialism and post-colonial power relations defined the tasks of non-European psychiatry? What does it mean to decolonize psychiatric practice or culture? Second, we examine the nature of rationality. Is reason singular, plural, or culturally bound or universal? To what extent is spirit possession a rational experience? Third, we explore the relationship between scientific representations, social practices, and local culture. What relationship exists between social practices and culturally shared categories of knowledge? Is psychiatry universalizable? Students learn to analyze and debate these questions by drawing on films, letters, photography, and monographs produced in and about Algeria, Argentina, Brazil, China, Cuba, Indonesia, and Vietnam.  WR, HU, SO

* HSHM 432a / ER&M 360a / HLTH 370a / SOCY 390a / WGSS 390a, Politics of Reproduction  Rene Almeling
Reproduction as a process that is simultaneously biological and social, involving male and female bodies, family formation, and powerful social institutions such as medicine, law, and the marketplace. Sociological research on reproductive topics such as pregnancy, birth, abortion, contraception, infertility, reproductive technology, and aging. Core sociological concepts used to examine how the politics of reproduction are shaped by the intersecting inequalities of gender, race, class, and sexuality.  WR, SO

* HSHM 448a / HIST 177Ja / WGSS 448a, 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 449b / EVST 349b / HIST 449Jb / URBN 382b, Critical Data Visualization: History, Theory, and Practice  Bill Rankin
Critical analysis of the creation, use, and cultural meanings of data visualization, with emphasis on both the theory and the politics of visual communication. Seminar discussions include close readings of historical data graphics since the late eighteenth century and conceptual engagement with graphic semiology, ideals of objectivity and honesty, and recent approaches of feminist and participatory data design. Course assignments focus on the research, production, and workshopping of students’ own data graphics; topics include both historical and contemporary data design. Basic proficiency in standard graphic software is expected by the end of the term, with optional support for more advanced programming and mapping software.  HU

* HSHM 453a / E&EB 336a / HUMS 336a, Culture and Human Evolution  Gary Tomlinson
Examination of the origins of human modernity in the light of evolutionary and archaeological evidence. Understanding, through a merger of evolutionary reasoning
with humanistic theory, the impact of human culture on natural selection across the last 250,000 years. HU, SC

* HSHM 467b / HIST 447Jb, History of the Body  Ziv Eisenberg
What does it mean to have a “bad hair day?” How should you care for your skin? What happens when you eat a burger and drink wine? How are babies made? What happens when you die? The answers depend not only on who provides them, but also on where and when. This seminar examines historical production of systems of corporeal knowledge and power, as well as the norms, practices, meanings, and power structures they have created, displaced, and maintained. Structured thematically, the course familiarizes students with major topics in the history of the body, health, and medicine, with a particular focus on US history. WR, HU

* HSHM 468a / HIST 260Ja, Sex, Life, and Generation  Ivano Dal Prete
Theories and practices of life, sex, and generation in Western civilization. Politics and policies of conception and birth; social control of abortion and infanticide in premodern societies; theories of life and gender; the changing status of the embryo; the lure of artificial life. WR, HU

HSHM 470a or b, Directed Reading  Staff
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 473b / HIST 403Jb, Vaccination in Historical Perspective  Jason Schwartz
For over two centuries, vaccination has been a prominent, effective, and at times controversial component of public health activities in the United States and around the world. Despite the novelty of many aspects of contemporary vaccines and vaccination programs, they reflect a rich and often contested history that combines questions of science, medicine, public health, global health, economics, law, and ethics, among other topics. This course examines the history of vaccines and vaccination programs, with a particular focus on the 20th and 21st centuries and on the historical roots of contemporary issues in U.S. and global vaccination policy. Students gain a thorough, historically grounded understanding of the scope and design of vaccination efforts, past and present, and the interconnected social, cultural, and political issues that vaccination has raised throughout its history and continues to raise today. HU

* HSHM 475b / HIST 128Jb, Race and Disease in American Medicine  Sakena Abedin
An exploration of the history of race and disease in American medicine from the late 19th century to the present, focusing on clinical practice and clinical research. We discuss cancer, psychiatric disease, sickle cell disease, and infectious diseases including tuberculosis and HIV. We examine the role of race in the construction of disease and the role of disease in generating and supporting racial hierarchies, with special attention to the role of visibility and the visual in these processes. We also consider the history of race and clinical research, and the implications of racialized disease construction for the production of medical knowledge. WR, HU

* HSHM 476a / ENGL 248a / HUMS 430a / LITR 483a / PHIL 361a, Thought Experiments: Connecting Literature, Philosophy and the Natural Sciences  Paul Grimstad
The course looks closely at the intersection of literature, philosophy and natural science through the lens of the thought experiment. Do thought experiments
yield new knowledge about the world? What role does narrative or scene setting play in thought experiments? Can works of literary fiction or films function as thought experiments? Readings take up topics such as personal identity, artificial intelligence, meaning and intentionality, free will, time travel, the riddle of induction, “trolley problems” in ethics and the hard problem of consciousness. Authors may include Mary Shelley, Plato, Albert Einstein, Franz Kafka, H.G. Wells, Rene Descartes, Kazuo Ishiguro, Rivka Galchen, Alan Turing, Hilary Putnam, as well as films (The Imitation Game) and television shows (Black Mirror). Students should have taken at least one course involving close analysis of works of literature or philosophy.  WR, HU

* HSHM 486a / AFST 486a / HIST 374Ja, African Systems of Thought  Nana Osei Quarshie
This seminar explores the effects of colonialism and post-colonial power relations on the production of scientific, medical, and embodied knowledge about Africa. The course focuses on three broad themes covered across four units. First, we read debates over the nature and definition of science and tradition. How have colonialism and post-colonial power relations defined the tasks of an African science? What does it mean to decolonize African thought or culture? Second, we examine the nature of rationality. Is reason singular or plural? Culturally-bound or universal? To what extent are witchcraft, African healing practices, and ancestor veneration rational practices? Is there a “traditional” rationality? Third, we explore the relationship between scientific representations, social practices, and local culture. What relationship exists between social practices and culturally shared categories of knowledge? Lastly, we examine the intersection of capital and medical expertise. How have shifting conceptions of value and capital, reshaped scientific and medical authority in Africa?  WR, HU

* HSHM 489b / HIST 109Jb, Activism and Advocacy in the History of American Health Care  Kelly O’Donnell
Is health care a human right? Can health advocacy shape health policy? What does it mean to be a health “activist” and to demand change of medicine? Health care in America has always been political. In this seminar students explore the rich history of health activism and health advocacy in the modern United States, focusing primarily on the postwar period through the present day. Each week we encounter new varieties of grassroots organizing, individual activists, and advocacy organizations that have made political claims about health care and pushed for its reform. We examine how health activism shapes broader cultural conversations about health and the practice of medicine itself. This course does not aim to provide a comprehensive history of health activism in modern America, but rather takes a case study approach, for critical analysis of themes and tactics. For each session, students read a selection of essays, book chapters, or primary source materials about a particular variety of health activism. Through these readings, we discuss how the critiques of activists and the responses by medical practitioners reveal the significant impact of race, gender, class, and sexuality on the provision of health care in this country. We also consider how historians have approached this subject, both as scholars and participant-observers. Students become adept at primary source analysis and able to engage in scholarly conversations with secondary sources.  WR, HU
* HSHM 490a or b and HSHM 491a or b, Yearlong Senior Project  Staff  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 spring term should notify the senior project director by the last day of classes in the fall term. 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 6, 2018, in the spring term, or no later than 5 p.m. on December 1, 2017, 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. Credit for HSHM 490 only on completion of HSHM 491.

* HSHM 492a or b, One-Term Senior Project  Staff  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 project director by the last day of classes in the fall term. 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 no later than September 9, 2019 (HSHM 492a), or January 17, 2020 (HSHM 492b). Blank statement forms are available in the HSHM Senior Project Handbook on the HSHM website. Students enrolled in HSHM 492 must submit a completed senior project to the HSHM administrator no later than 5 p.m. on December 2, 2019, in the fall term, or no later than 5 p.m. on April 6, 2020, 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.

* HSHM 496b / HIST 110Jb, Childbirth in America, 1650-2000  Rebecca Tannenbaum  This course considers the ways childbirth has been conducted in the United states over three centuries. Topics include the connections between childbirth and historical constructions of gender, race, and motherhood, as well as changes in the medical understanding and management of childbirth.  WR, HU
* HSHM 497a / HIST 190Ja, Technology in American Medicine from Leeches to Surgical Robots  Kelly O'Donnell
From leeches to robot-assisted surgery, technology has both driven and served as a marker of change in the history of medicine. Using technology as our primary frame of analysis, this course focuses on developments in modern medicine and healing practices in the United States, from the nineteenth century through the present day. How have technologies, tools, and techniques altered medical practice? Are medical technologies necessarily “advances?” How are technologies used to “medicalize” certain aspects of the human experience? In this class we focus on this material culture of medicine, particularly emphasizing themes of consumerism, expertise, professional authority, and gender relations.  WR, HU

Human Rights Studies (HMRT)

Humanities (HUMS)

* HUMS 027a / LITR 027a / WGSS 027a, Six Pretty Good Selves  Marta Figlerowicz and Ayesha Ramachandran
Through the prism of thinking about the self, this course provides first-year students with an intensive introduction to studying the humanities at Yale. The course is anchored around six trans-historical models of thinking about selfhood: the ideal self, the lover, the revolutionary, the convert, the solipsist, and the social climber. We range widely across genres, media, periods, and geographies: from Plato’s Symposium to Machado de Assis’s Epitaph for a Small Winner, from the ghazals of Hafez to the Kamasutra. We also make extensive use of Yale’s rich manuscript archives, historical object collections, and art galleries and devote sustained attention to improving students’ academic writing skills. Friday sessions will alternate between writing workshops and field trips to Yale collections.  Enrollment limited to first-year students. Preregistration required; see under First-Year Seminar Program.  WR, HU

1½ Course cr

* HUMS 060a, Novel Novels  Brianne Bilsky
Stream of consciousness. Metafiction. Intertextuality. Typographic experimentation. These are some of the innovative narrative techniques that authors have used to push the boundaries of fiction over time. Why does literary innovation happen? How has the development of fiction been influenced by developments in other fields such as psychology, art, philosophy, or physics? What does it mean to say that a novel is novel? This course addresses such questions by taking an interdisciplinary approach to looking closely at several innovative novels from the early twentieth century to the present. As we move from modernism to postmodernism and on to the present moment, we not only explore the ways that novels may engage creatively with other fields but also how they are in dialogue with literary history itself. Enrollment limited to first-year students. Preregistration required; see under First-Year Seminar Program.  WR, HU

* HUMS 065a / EDST 065a, Education and the Life Worth Living  Matthew Croasmun
Consideration of education and what it has to do with real life—not just any life, but a life worth living. Engagement with three visions of different traditions of imagining the good life and of imagining education: Confucianism, Christianity, and Modernism.
Students will be asked to challenge the fundamental question of the good life and to put that question at the heart of their college education. Enrollment limited to freshmen. Preregistration required; see under Freshman Seminar Program.  

* **HUMS 068b / ENGL 068b, Speculative Fiction and Film**  
  Staff  
  Study of how speculative ideas about race and gender, good and evil, and religion and culture reflect and influence changing ideas about what it means to be human, with special attention to Afrofuturist texts. Authors include Samuel Delany, N.K. Jemisin, Liu Cixin, Frank Herbert, & Ursula K. LeGuin. Major films include *Akira*, *Get Out*, *La Jetée*, and the video work of Janelle Monae. Enrollment limited to first-year students. Preregistration required; see under First-Year Seminar Program.  

* **HUMS 073a, Classical Storytelling in the Modern World**  
  Brian Price  
  In his seminal work *Poetics*, Aristotle first identified the observable patterns and recurring elements that existed in the successful tragedies and epic poems of his time, as he posed the existential query: Why do we tell stories? And his illuminating analysis and conclusions are still just as meaningful and relevant today in our contemporary dramatic narratives, our movies, plays, and Netflix binges-of-the-week. In this seminar, we examine Aristotle’s observations and conclusions and relate them to the contemporary stories we consume and enjoy today. By doing so, we identify the universal principles that all good stories share, investigate how these principles connect us all despite cultural, ethnic, and geographical differences, learn how to incorporate Aristotle’s precepts into our own creative expression and communications—and most importantly, explore the vital function of storytelling, why we tell them, what makes a good one, and how to best tell one effectively. Enrollment limited to first-year students. Preregistration required; see under First-Year Seminar Program.  

* **HUMS 075a, Mastering the Art of Watercolor**  
  Adam Van Doren  
  An introductory course on the art of watercolor as a humanistic discipline within the liberal arts tradition. Readings, discussions, and studio work emphasize critical, creative thinking through a tactile, “learning by doing” study of the watercolor medium. Students analyze and imitate the classic techniques of J. M.W. Turner, John Singer Sargent, Georgia O’Keeffe, and Edward Hopper, among others. Studio components include painting *en plein air* to understand color, form, perspective, composition, and shade and shadow. Basic drawing skills recommended. Enrollment limited to first-year students.  

* **HUMS 093a, Collecting History: "Treasures" of Yale**  
  Anna Franz  
  This course considers the concept of “treasure” by visiting nearly all of Yale’s galleries, museums, and library special collections. We explore questions around how these objects and materials were created, how they came to be at Yale, and the considerations and compromises that make up collections of cultural heritage materials. We learn what these objects say about themselves, their creators, their users, and their collectors. Enrollment limited to first-year students. Preregistration required; see under First-Year Seminar Program.  

**HUMS 115a / LITR 101a, Purposes of College Education**  
  Staff  
  College is a crucial institution in which our society works through its expectations for young people. The first half of this course explores some of the purposes that have been ascribed to college, including development of personal character, participation in a community, preparation for citizenship, and conversation with others on intellectual
matters. The second half touches on the social and economic contexts of college education, including the history of the curriculum, the role of social class, the cost of higher education, and career preparation. We read Plato’s Republic, a key text for the philosophy of education, in its entirety. Other readings from Aristotle, Confucius, Bhagavad-Gita, Virginia Woolf, Martin Luther King, Max Weber. Lectures are designed for interactive conversation. Preference for first-year and sophomore students, but all students are welcome. HU  Course cr

* HUMS 127a or b / ENGL 129a or b / LITR 168a or b / THST 129a or b, Tragedy in the European Literary Tradition  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 might include Aristotle’s Poetics or Homer’s Iliad and plays by Aeschylus, Sophocles, Euripides, Seneca, Hrotsvitha, Shakespeare, Lope de Vega, Calderon, Racine, Büchner, Ibsen, Strindberg, Chekhov, Wedekind, Synge, Lorca, Brecht, Beckett, Soyinka, Tarell Alvin McCraney, and Lynn Nottage. Focus on textual analysis and on developing the craft of persuasive argument through writing. WR, HU

* HUMS 128a / NELC 128a, From Gilgamesh to Persepolis: Introduction to Near Eastern Literatures  Samuel Hodgkin
This lecture course is an introduction to Near Eastern civilization through its rich and diverse literary cultures. We read and discuss ancient works, such as the Epic of Gilgamesh, Genesis, and “The Song of Songs,” medieval works, such as A Thousand and One Nights, selections from the Qur’an, and Shah-nama: The Book of Kings, and modern works of Israeli, Turkish, and Iranian novelists and Palestinian poets. Students complement classroom studies with visits to the Yale Babylonian Collection and the Beinecke Rare Book and Manuscript Library, as well as with film screenings and guest speakers. Students also learn fundamentals of Near Eastern writing systems, and consider questions of tradition, transmission, and translation. All readings are in translation. Permission from the instructor required. WR, HU

* HUMS 130b / LITR 130b, How to Read  Rudiger Campe and Hannan Hever
Introduction to techniques, strategies, and practices of reading through study of lyric poems, narrative texts, plays and performances, films, new and old, from a range of times and places. Emphasis on practical strategies of discerning and making meaning, as well as theories of literature, and contextualizing particular readings. Topics include form and genre, literary voice and the book as a material object, evaluating translations, and how literary strategies can be extended to read film, mass media, and popular culture. Junior seminar; preference given to juniors and majors. HU

HUMS 133b / JDST 110b / RLST 145b, The Bible  Christine Hayes
The writings common to both Jewish and Christian scripture examined as diverse and often conflicting expressions of the religious life and thought of ancient Israel. The works’ cultural and historical setting in the ancient Near East; the interpretive history of selected passages influential in Western culture. Introduction to a wide range of critical and literary approaches to biblical studies. Students view course lectures, which survey the entire Bible, on line; class time focuses on specific biblical passages and their subsequent interpretation in Jewish and Christian culture. HU
* HUMS 139a / MUSI 137a, Western Philosophy in Four Operas 1600-1900  Gary Tomlinson
This course intensively studies four operas central to the western repertory, spanning the years from the early 17th to the late 19th century: Monteverdi’s *Orfeo*, Mozart’s *Don Giovanni*, Wagner’s *Die Walküre* (from *The Ring of the Nibelungs*), and Verdi’s *Simon Boccanegra*. The course explores the expression in these works of philosophical stances of their times on the human subject and human society, bringing to bear writings contemporary to them as well as from more recent times. Readings include works of Ficino, Descartes, Rousseau, Wollstonecraft, Schopenhauer, Kierkegaard, Douglass, Marx, Nietzsche, Freud, and Adorno. We discover that the expression of changing philosophical stances can be found not only in dramatic themes and the words sung, but in the changing natures of the musical styles deployed.  HU

* HUMS 140b / NELC 121b, 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

* HUMS 162b / FREN 388b, Feminine Voices in French Literature  R Howard Bloch and Pierre Saint-Amand
An exploration of women’s voices in French literature from the Middle Ages to the mid-twentieth century. The specificity of the feminine voice, the plurality of feminine voices, love and sexuality, and social and professional identity. Authors include Marie de France, Marguerite de Navarre, Francoise de Graffigny, Maryse Condé, and Marguerite Duras.  Readings and discussion in English.  WR, HU

HUMS 180a / ITAL 310a / LITR 183a, Dante in Translation  Staff
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. No knowledge of Italian required. Course conducted in English.  HU  o Course cr

* HUMS 184b / AMST 184b / ENGL 437b, Writing and Reading Biography  Karin Roffman
The art of biography explored through groundbreaking examples, with particular emphasis on contemporary texts that explore the lives and work of artists. Topics on biographical theory and practice include: the balance of life and work; the relationship between biographer and subject; creative approaches to archives and research; and imaginative narrative strategies. Some classes take place at the Beinecke Library and there are some visits by working biographers. Students must complete an original biographical project by the end of the semester.  HU

* HUMS 185a / ENGL 419a / HSAR 460a, Writing about Contemporary Figurative Art  Margaret Spillane
A workshop on journalistic strategies for looking at and writing about contemporary paintings of the human figure. Practitioners and theorists of figurative painting; controversies, partisans, and opponents. Includes field trips to museums and galleries in New York City. Formerly ENGL 247.  WR, HU

* HUMS 189b / MUSI 189b, Music & Jane Austen  Jessica Peritz
This course takes Jane Austen as a guide to the world of early nineteenth-century music culture in Britain, exploring through her novels the relationships between music,
gender, and class in the decades around 1800. We approach this period of music history by delving into how “regular people”—especially women—consumed, curated, and created music in their everyday lives. Austen, an accomplished musician herself, wove music into her novels in ways that reveal much about contemporary practices of (and prejudices against) musicking. We focus on three of Austen’s novels (*Pride & Prejudice*, *Sense & Sensibility*, *Emma*) and excerpts from her music manuscript collections, alongside recent scholarship and modern film adaptations, which taken together raise a series of interdisciplinary questions. By learning about Austen’s musical milieu, we open up the musical lives of Regency-era women and the “middling sort,” while becoming more attuned to the social critiques embedded in Austen’s representations of music, ultimately enriching our engagement with the novels themselves. The ability to read musical notation is not required, but will be helpful.  

* HUMS 193a / HIST 265Ja, Screening the Past  
Stuart Semmel  
An interdisciplinary study of cinematic representations of the historical past. Films that treat historical events realistically; others that deliberately present history as it did not happen. Standards that can be applied to judge history on the screen; lessons for evaluating history on the page.  

* HUMS 200b / ENGL 205b / LITR 195b / MUSI 462b, Medieval Songlines  
Ardis Butterfield  
Introduction to medieval song in England via modern poetic theory, material culture, affect theory, and sound studies. Song is studied through foregrounding music as well as words, words as well as music.  

* HUMS 211a / LITR 386a / RLST 265a, Fate and Chance in Art and Experience  
Noreen Khawaja  
This seminar is co-taught with Sheila Heti. It discusses shifts in how the unchosen is conceived and how it is valued, across a range of contemporary fields and historical models—from Greek tragedy to contemporary performance art, from Protestant aesthetics of fate and grace to the *I Jing* and its interpreters, from mathematical and physical approaches to chance to the rise of astrology. Students consider when and where we ourselves operate with a belief in something like fate. The goal to explore whether and how a contemporary concept of fate may come into focus.  

* HUMS 218b / ENGL 208b, Neoplatonism Across Time and Faith  
Feisal Mohamed  
Engaging in questions of Platonic influence may seem to support a traditional, unitary view of Western culture unified by its roots in ancient Greece. This course poses a strong challenge to that narrative. By focusing on the Platonism of late antiquity, we in fact engage in a profound re-mapping of cultural and intellectual traditions—classical, medieval, early modern, and modern—less centered on Athens and Rome and taking into its ken Alexandria, Damascus, and Baghdad. The course also explores engagements of the Neoplatonic tradition across all three Abrahamic faiths.  

* HUMS 220b / HIST 289Jb / HSAR 399b / HSHM 407b, Collecting Before the Museum  
Paola Bertucci  
A history of museums before the emergence of the modern museum. Focus on: cabinets of curiosities and Wunderkammern, anatomical theaters and apothecaries’ shops, alchemical workshops and theaters of machines, collections of monsters, rarities, and exotic specimens.  

**HU**
* HUMS 224b / HIST 210Jb, Hobbes and Galileo: Materialism and the Emergence of Modernity  William Klein

Hobbes considered himself a disciple of Galileo, but as a systematic philosopher and ideologue during a period of civil unrest in England, he no doubt produced something that Galileo, a Tuscan astrophysicist and impassioned literary critic, was not entirely responsible for: an absolutist theory of the modern state situated within an eschatological time frame. In this course we will reflect on the relation between Galileo’s anti-Aristotelian physics and Hobbes’ system by reading key texts by Galileo and Hobbes along with an array of interpretations and criticisms of Hobbes that will serve to situate Hobbes in early modern currents of thought in science, religion and politics, while at the same time situating us in contemporary ideological debates about the origins of modernity.  

* HUMS 229a / LAST 431a / LITR 431a / SPAN 431a, Latin American Languages of Liberation: The Long Sixties  Staff

This is a multi-media seminar that studies the Latin American cultural and political discourses of liberation throughout the sixties, with an eye at assessing their legacy today. While the language that characterized the foundation of the nation-states in the 19th century was emancipation, in the second part of the twentieth century, and particularly around 1968, Latin America embraced the world discourse of liberation. This seminar examines languages of liberation in an array of disciplines and artistic practices from South and Central America as well as the Caribbean. We explore regional debates that were also inserted in the larger discourse of the anti-colonial struggles of the global South. Topics include Philosophy of liberation (Dussel), Theology of liberation (the 1968 Council of Bishops in Medellin, Colombia), Theater of the oppressed (Boal), Pedagogy of the oppressed (Freire), Cinema of liberation (manifestos of Third Cinema), the New Song protest movements across the region (both Spanish and Portuguese American music), anti-colonialism in the Caribbean (Césaire, Fanon), anti-neocolonialism (dependency theory, internal colonialism), Indigenous liberation (from the Barbados declarations to the Lacandon jungle declarations), experimental “boom” literature (Cortázar) etc.  

* HUMS 233a / LITR 178a / MMES 201a / NELC 156a, Classics of the Arabic-Islamic World  Shawkat Toorawa

Survey of the literary tradition of the Arabic-Islamic world (West Asia, North Africa, and Muslim Spain), a textual conversation among diverse authors from late antiquity to the Mamluk period. Prose and poetry from the Qur’an to the Arabian Nights; attention to the interdependence of the works and their cultural setting, the agendas authors pursued, and the characters they portrayed.  

* HUMS 237a / ENGL 292a, Modernities: Past and Present in Fiction since 1789  Katja Lindskog

Drawing on English-language literature, art, and history-writing since 1800, this class explores how the past can illuminate and complicate the ways we perceive the present. We begin with the geopolitical and social revolutions of the 1800s as seen through essays and fictions by George Eliot, Thomas Babington Macaulay, and Thomas Carlyle, and end with the memoir-as-history of Hazel Carby’s Imperial Intimacies (2019). Along the way, we explore a variety of approaches to making the past come alive in the present; through the “what if” posed by alternate history speculations, through didactic history in fact and fiction imagined for children, the use of the past as a site of
romance, and through visual media like paintings and cinema. Throughout the course, we address questions like: how does fiction work to interpret the past? How does our interpretation of the past reflect and help us process present day concerns? Is the past best imagined as a foreign country full of exotic difference to the present, as a mirror to ourselves? HU TR

* HUMS 244a, Love, Marriage, Family: A Psychological Study through the Arts
  Ellen Handler Spitz and R Howard Bloch
A psychological study of love, marriage, and family through literature, visual arts, and music, from the ancient world to mid-century America. An over-arching theme is the protean human potential for adaptation, innovation, and creativity by which couples and families struggle to thrive in the face of opposing forces, both internal and external. In this seminar, we study these themes not only as they have been treated in different parts of the world at different times, but also the means offered by each of the arts for their portrayal. HU

* HUMS 245a / AMST 241a / ENGL 256a, Poets and their Papers
  Karin Roffman
This Beinecke-intensive course considers the published works of living poets alongside the processes they used to create them: drafts, letters, journals, fragments, objects and other artworks that were directly or indirectly part of their artistic development. The course includes the participation of some of the poets themselves, a generation of writers who grew up with an acute awareness that their papers would someday be in a library. That long-term recognition of a public future for often seemingly private thoughts and ideas gives these papers particularly vital value and interest. The kinds of casual phrases and inclusions that were a crucial part of postwar American poetry one sees being worked out in poets’ attitudes of curiosity and attention toward works-in-progress, collaborative experiments and correspondence. Like the poets themselves, this course takes the Beinecke archives as primary not secondary to the production of late 20th and early 21st century poetry. An aspect of the course is the opportunity to talk with multiple generations of poets about their processes of creation, collection and organization and to capture their vision of archives as distinct from (and not merely preparatory to) publication. WR, HU

* HUMS 247a or b / SOCY 352a or b, Material Culture and Iconic Consciousness
  Jeffrey Alexander
How and why contemporary societies continue to symbolize sacred and profane meanings, investing these meanings with materiality and shaping them aesthetically. Exploration of "iconic consciousness" in theoretical terms (philosophy, sociology, semiotics) and further exploration of compelling empirical studies about food and bodies, nature, fashion, celebrities, popular culture, art, architecture, branding, and politics. HU, SO

* HUMS 248b / GMAN 277b / LITR 447b / THST 277b, I and Thou – Dialogue and Miscommunication in Theory and Literature
  Shira Miron
Dialogue constitutes an integral part of human experience and culture ever since antiquity. Whether as a rhetorical or a dramatic device, written or oral, fictional or not – dialogue substantiates the core of any intersubjective communication, building bridges between the self and the Other while maintaining them as two separate entities. This seminar explores the form and function of dialogue through a wide range of theoretical and literary texts, focusing on a set of social, hermeneutical, poetical, and political questions. Specific attention is given to literary cases of failed dialogues
and miscomprehension, aiming at the unique ability of the literary text to draw our attention beyond the limits of human communication and language. Readings include texts by Plato, Schlegel, Novalis, Bachtin, Levinas, Buber, Gadamer, Parsons, Kleist, Beckett, Melville, Schnitzler, Celan, Bachmann, and others.

* HUMS 254a / ENGL 268a / LITR 463a / PHIL 227a, Literature and Philosophy, Revolution to Romanticism  Jonathan Kramnick
This is a course on the interrelations between philosophical and literary writing beginning with the English Revolution and ending with the beginnings of Romanticism. We read major works in empiricism, political philosophy, and ethics alongside poetry and fiction in several genres. Topics include the mind/body problem, political ideology, subjectivity and gender, and aesthetic experience as they take philosophical and literary form during a long moment of historical change. WR, HU

HUMS 255a / HIST 260a / LITR 253a / RSEE 312a / RUSS 312a, Tolstoy's War and Peace  TR  Staff
The course is a semester-long study of the quintessential big Russian novel, Leo Tolstoy's War and Peace, about Napoleon's failed 1812 war against Russia. War and Peace (1865-1869) is a sweeping panorama of nineteenth-century Russian society, a novel of profound philosophical questions, and an unforgettable gallery of artfully drawn characters. Reading the novel closely, we pose the following questions. In what ways is this patriotic war epic also an imperial novel? What myths does it destroy and construct? How does it combine fiction and history? What forces drive history, as it unfolds in the present? What are the limits of individual agency, and how much do emperors and generals control the fates of nations and armies? Finally, a question that is never too broad for Tolstoy: what is a meaningful, well-lived life? We explore these questions while refining our tools of literary analysis and situating the novel in its historical context and in our contemporary world. Secondary materials include Tolstoy's letters, contemporary reviews, maps, and historical sources, as well as readings in political theory, philosophy, international relations, and literary criticism. All readings and class discussions in English. No prerequisites required. Both WR and non-WR sections are offered. WR, HU TR 0 Course cr

* HUMS 264b / HIST 256Jb, Imagining the Body Politic: Constitutional Art and Theory from Antiquity to the Present  William Klein
Do visual representations of social and political principles have a peculiar power to produce, reproduce, and disturb social and political relations? To what extent do some works of political theory seem to presuppose an imaginative construct, in particular one based on human bodies and their parts? Can we identify the birth of the modern state through an examination of key images of the body politic? Have the machine or network or program taken over the function of the body metaphor in more recent times? Does visualizing the principles and orders of society and politics elicit new critical awareness and reaction, or blindness and obedience? Does republican art differ fundamentally in this regard from monarchical—or fascist or communist or anarchist or neoliberal—art? HU

HUMS 270a / CHNS 200a / EALL 200a / EAST 240a, The Chinese Tradition  Staff
An introduction to the literature, culture, and thought of premodern China, from the beginnings of the written record to the turn of the twentieth century. Close study of textual and visual primary sources, with attention to their historical and cultural backdrops. Students enrolled in CHNS 200 join a weekly Mandarin-language
discussion section. No knowledge of Chinese required for students enrolled in EALL 200. Students enrolled in CHNS 200 must have L5 proficiency in Mandarin or permission of the course instructor.  

**HUMS 272b / EALL 256b / EAST 358b / GLBL 251b / LITR 265b, China in the World**  
Jing Tsu  
Recent headlines about China in the world, deciphered in both modern and historical contexts. Interpretation of new events and diverse texts through transnational connections. Topics include China and Africa, Mandarinization, Chinese America, science and technology, science fiction, and entrepreneurship culture. Readings and discussion in English.  

* HUMS 274a / LITR 388a / NELC 325a, *The Education of Princes: Medieval Advice Literature of Rulership and Counsel*  
Shawkat Toorawa  
In this course we read “mirrors for princes,” a type of political writing by courtiers and advisors. The genre flourished in the courts of medieval Europe and the Islamic world. We learn about the ethical and moral considerations that guided (or were meant to guide) rulers in their conduct, in the formulation of their policies, and about theories of rule and rulership. The works we read are from several cultural, religious, and political traditions, and include: Christine de Pizan, *A Medieval Woman’s Mirror of Honor*; Einhard, *Life of Charlemagne*; Erasmus, *Education of a Christian Prince*; Ibn al-Muqaffa’, *Kalilah and Dimnah*, John of Salisbury, *Policraticus: Book of the Statesman*; Machiavelli, *The Prince*; Nizam al-Mulk, *The Book of Government*. All texts are in English translation. Instructor permission is required.  

**HUMS 277b / HIST 231b, What was Enlightenment?**  
Isaac Nakhimovsky  
A survey of eighteenth-century European intellectual life, considered in its social and cultural contexts and with attention to its historical legacies, focusing on responses to emerging global networks of trade, finance, and empire.  

* HUMS 279a / HIST 292Ja / PLSC 286a, *Democracy and the French Revolution*  
Isaac Nakhimovsky  
The French Revolution of 1789 and its legacies, as viewed through the late-eighteenth-century debates about democracy, equality, representative government, and historical change that shaped an enduring agenda for historical and political thought in Europe and around the world.  

* HUMS 295b / JDST 223b / PLSC 307b, *Trials of Uncertainty*  
Norma Thompson  
Is the demise of the trial at hand? The trial as cultural achievement, considered as the epitome of humanistic inquiry, where all is brought to bear on a crucial matter in an uncertain context. Truth may be hammered out or remain elusive, but the expectation in the court case has been that the adversarial mode works best for sorting out evidentiary conundrums. Inquiries into issues of meaning of the trial, its impartiality, and challenges to its endurance. The role of character, doubt, and diagnosis explored in Sophocles, Plato, Cicero, Burke, Jane Austen, Tocqueville, and Kafka, as well as in twentieth-century trials, films, documentaries, and twenty-first-century medical narratives.  

* HUMS 313b / HIST 212Jb, *Philosophy of Dissent in Central and Eastern Europe*  
Marci Shore  
This is a seminar in the field of European intellectual history, based on primary sources. It focuses on how philosophers, novelists, sociologists, and other thinkers developed
and articulated a philosophy of dissent under communism. More specific topics include
the relationships between temporality and subjectivity and between truth and lies, and
the role that existentialism played in formulating philosophical critiques of repression.
Readings consist of a mixture of philosophical and literary works from the Soviet
Union, East Germany and the lands in-between. Potential authors include Merab
Mamardashvili, Danilo Kiš, Józef Tischner, Adam Michnik, Jacek Kuron, Ladislav
Hejdanek, Václav Havel, Jan Patočka, Leszek Kołakowski, Gajo Petrović, Norman
Manea, Lev Kopelev, Igor Pomerantsev, Tomas Venclova.  HU

* HUMS 323a / HIST 236Ja, Truth and Sedition  William Klein
The truth can set you free, but of course it can also get you into trouble. How do the
constraints on the pursuit and expression of “truth” change with the nature of the
censoring regime, from the family to the church to the modern nation-state? What
causes regimes to protect perceived vulnerabilities in the systems of knowledge they
privilege? What happens when conflict between regimes implicates modes of knowing?
Are there types of truth that any regime would—or should—find dangerous? What
are the possible motives and pathways for self-censorship? We begin with the revolt
of the Hebrews against polytheistic Egypt and the Socratic questioning of democracy,
and end with various contemporary cases of censorship within and between regimes.
We consider these events and texts, and their reverberations and reversals in history,
in relation to select analyses of the relations between truth and power, including
Hobbes, Locke, Kant, Brecht, Leo Strauss, Foucault, Chomsky, Waldron, Zizek, and Xu
Zhongrun.  WR, HU

* HUMS 327a / ENGL 263a, The Victorian Political Novel  Stefanie Markovits
The engagement of the Victorian novel with the world of politics. Emphasis on how
systems interact with individual agents to make stories and how methods such as
realism, romance, and the courtship plot portray the mechanics of government. Units
on revolution and riot (Dickens and Gaskell), reform (Eliot and Trollope), and anarchy
(James and Conrad).  WR, HU

* HUMS 330b / GMAN 227b / LITR 330b / PHIL 402b, Heidegger’s Being and Time
Martin Hagglund
Systematic, chapter by chapter study of Heidegger’s Being and Time, arguably the most
important work of philosophy in the twentieth-century. All major themes addressed in
detail, with particular emphasis on care, time, death, and the meaning of being.  HU

* HUMS 336a / E&EB 336a / HSHM 453a, Culture and Human Evolution  Gary
Tomlinson
Examination of the origins of human modernity in the light of evolutionary and
archaeological evidence. Understanding, through a merger of evolutionary reasoning
with humanistic theory, the impact of human culture on natural selection across the last
250,000 years.  HU, SC

HUMS 339a / HIST 271a / RSEE 271a, European Intellectual History since Nietzsche
Staff
Major currents in European intellectual history from the late nineteenth century
through the twentieth. Topics include Marxism-Leninism, psychoanalysis,
extpressionism, structuralism, phenomenology, existentialism, antipolitics, and
deconstruction.  HU  o Course cr
* HUMS 355b / FREN 350b, Baudelaire  Thomas Connolly
An undergraduate seminar on the life and work of one the greatest poets of all time, and founder of modernity, Charles Baudelaire (1821-1867). Readings include œuvre de jeunesse, his collection of poems in verse, Les fleurs du mal, his collection of poems in prose, Le spleen de Paris, as well as his writings on fashion, contemporary culture, drugs, the arts, especially painting, his translations from English and American including Edgar Allan Poe, his private journals, the infamous late writings on Belgium and the Belgians, as well as his rare attempts at theater. His afterlives in literature, painting, music, dance, film, translation, and philosophy. Secondary materials including but not limited to Benjamin, Bonnefoy, Derrida, Fondane, Sartre. Readings in French, discussions in English. Ability to read in French is necessary. WR, HU

* HUMS 356a, Interpretations: Emily Dickinson  Riley Soles
“I’m Nobody!” chants the poet who would not publish or seek literary fame in her lifetime. Now hardly nobody, Emily Dickinson is widely recognized as one of the most original and difficult poets ever to write poetry. This seminar explores a variety of methodological approaches to her work. We close-read a wide range of her poems, seeking to understand important tensions that run throughout her oeuvre, between feeling and intellect, chaos and control, power and passivity, things hidden and revealed, ecstasy and despair, life and death. We also locate Dickinson in her historical moment and personal community, and in the context of important precursors and sources of literary influence (and agon), including the Bible, English Romantic poetry, and the essays of Ralph Waldo Emerson. Attention is paid to Dickinson’s identity as a woman writing within and against an inherited tradition of male poets and thinkers, as well as to Dickinson’s relation to other important women writers whom she read, such as George Eliot, the Brontës, and Elizabeth Barrett Browning. Attention is also paid to the unique materiality and process of Dickinson’s poetic craft. Considerations of these features of her poems, of her innovations in syntax and punctuation, and of the complex history of editing and publishing her work, allows us to question more deeply certain assumed or uncontested categories in the study of poetry, such as lyric, and even “poem” itself. Previous coursework in literature and poetry specifically is helpful, but not necessary. HU

* HUMS 358a / FREN 363 / RUSS 305a, Modernist Paris and Moscow  Katerina Clark
This interdisciplinary, comparative course unsettles the notion of Moscow’s marginality and Paris’s centrality from the viewpoint of early 20th century literature, visual art, film, performance, and architecture. The course demonstrates the ways in which Modernist movements in Moscow and Paris were intimately connected and mutually influenced through decades of artistic exchange and competition. Paradigm-shifting artists, writers, and cultural figures like Natalia Goncharova, Mikhail Larionov, Paul Robeson, Vladimir Mayakovsky, Le Corbusier, Langston Hughes, Marina Tsvetaeva, W.E.B. Du Bois, and Walter Benjamin are only a few points of contact between these two epicenters of European modernism. Both Moscow and Paris, sometimes at odds and at other times in collaboration, confronted political and aesthetic questions related to imperial conquest and exoticism, revolution and abstraction in art and language, liberations from race and gender, the march of war and technology, new conceptions of the body, urban imaginaries, and life lived as art. In this course, we explore these very topics in modernism through close reading and visual analysis of works by and/
or related to Paul Gauguin, Pablo Picasso, Charles Baudelaire, Symbolists, Walter Benjamin, Futurists, Kazimir Malevich, Meyerhold, the Ballets Russes, Josephine Baker, Jane and Paulette Nardal, Constructivists, Alexander Rodchenko, Surrealists, Aimé Césaire, Négritude, Alexandra Kollontai, Sonia Delaunay, and Varvara Stepanova, among others. No knowledge of Russian is required.

* HUMS 380b / ENGL 395b / LITR 154b, The Bible as a 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. WR, HU RP

HUMS 381a / MUSI 380a, Jazz in America 1900-1960  Brian Kane
A course on key moments in the history of jazz in America until 1960 with special focus on the role of jazz within broader streams of American cultural life; improvisation; jazz as popular music and as art music; the racial politics of jazz; and its artistic achievements.

* HUMS 411b, Life Worth Living  Staff
Comparative exploration of the shape of the life advocated by several of the world’s normative traditions, both religious and nonreligious. Concrete instantiations of these traditions explored through contemporary exemplars drawn from outside the professional religious or philosophical spheres. Readings from the founding texts of Buddhism, Judaism, Christianity, Islam, Marxism, and utilitarianism. HU

* HUMS 427b / ENGL 456b / JDST 316b / LITR 348b, The Practice of Literary Translation  Robyn Creswell
This course combines a seminar on the history and theory of translation (Tuesdays) with a hands-on workshop (Thursdays). The readings lead us through a series of case studies comparing, on the one hand, multiple translations of given literary works and, on the other, classic statements about translation—by translators themselves and prominent theorists. We consider both poetry and prose from the Bible, selections from Chinese, Greek, and Latin verse, classical Arabic and Persian literature, prose by Cervantes, Borges, and others, and modern European poetry (including Pushkin, Baudelaire, and Rilke). Students are expected to prepare short class presentations, participate in a weekly workshop, try their hand at a series of translation exercises, and undertake an intensive, semester-long translation project. Proficiency in a foreign language is required. HU

* HUMS 428b / ENGL 483b / JDST 343b / LITR 305b, Advanced Literary Translation  Robyn Creswell
A sequel to LITR 348, The Practice of Literary Translation. Students apply to this workshop with a project in mind that they have been developing, either on their own or for a senior thesis, and they present this work during the class on a regular basis. Practical translation is supplemented by readings in the history of translation practice and theory, and by the reflections of practitioners on their art. These readings are selected jointly by the instructor and members of the class. Topics include the history of literary translation—Western and Eastern; comparative approaches to translating a single work; the political dimension of translation; and translation in the context of religion and theology. Class time is divided into student presentations of short passages of their own work, including related key readings; background readings in the history
of the field; and close examination of relevant translations by accomplished translators. Students receive intensive scrutiny by the group and instructor. Prerequisite: LITR 348.

* HUMS 430a / ENGL 248a / HSHM 476a / LITR 483a / PHIL 361a, Thought Experiments: Connecting Literature, Philosophy and the Natural Sciences  Paul Grimstad
The course looks closely at the intersection of literature, philosophy and natural science through the lens of the thought experiment. Do thought experiments yield new knowledge about the world? What role does narrative or scene setting play in thought experiments? Can works of literary fiction or films function as thought experiments? Readings take up topics such as personal identity, artificial intelligence, meaning and intentionality, free will, time travel, the riddle of induction, “trolley problems” in ethics and the hard problem of consciousness. Authors may include Mary Shelley, Plato, Albert Einstein, Franz Kafka, H.G. Wells, Rene Descartes, Kazuo Ishiguro, Rivka Galchen, Alan Turing, Hilary Putnam, as well as films (The Imitation Game) and television shows (Black Mirror). Students should have taken at least one course involving close analysis of works of literature or philosophy. WR, HU

* HUMS 443a / HIST 232Ja / JDST 270a / MMES 342a / RLST 201a, Medieval Jews, Christians, and Muslims In Conversation  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. Counts toward either European or Middle Eastern distributional credit within the History major, upon application to the director of undergraduate studies. WR, HU

* HUMS 480a / GMAN 288a / LITR 482a / PHIL 469a, The Mortality of the Soul: From Aristotle to Heidegger  Martin Hagglund
This course explores fundamental philosophical questions of the relation between matter and form, life and spirit, necessity and freedom, by proceeding from Aristotle’s analysis of the soul in De Anima and his notion of practical agency in the Nicomachean Ethics. We study Aristotle in conjunction with seminal works by contemporary neo-Aristotelian philosophers (Korsgaard, Nussbaum, Brague, and McDowell). We in turn pursue the implications of Aristotle’s notion of life by engaging with contemporary philosophical discussions of death that take their point of departure in Epicurus (Nagel, Williams, Scheffler). We conclude by analyzing Heidegger’s notion of constitutive mortality, in order to make explicit what is implicit in the form of the soul in Aristotle. HU

Hungarian (HGRN)

Indonesian (INDN)

INDN 110a, Elementary Indonesian  Indriyo Sukmono
An introductory course in standard Indonesian with emphasis on developing communicative skills through a systematic survey of grammar and graded exercises. Enrollment limited to 15 per section. L1 1½ Course cr
INDN 120b, 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, Intermediate Indonesian I  Dinny Aletheiani
Continued practice in colloquial Indonesian conversation and reading and discussion of texts. After INDN 120 or equivalent. Limited enrollment.  L3  1½ Course cr

* INDN 140b, Intermediate Indonesian II  Dinny Aletheiani
Continuation of INDN 130. After INDN 130 or equivalent. Limited enrollment.  L4  1½ Course cr

* INDN 150a, Advanced Indonesian I  Indriyo Sukmono
Development of advanced fluency through discussion of original Indonesian sociohistorical, political, and literary texts and audiovisual sources. Extension of cultural understanding of Indonesia. Prerequisite: INDN 140 or equivalent. May not be taken after INDN 153.  L5

* INDN 170a, Advanced Indonesian: Special Topics  Dinny Aletheiani
Continuation of INDN 160. Students advance their communicative competence in listening, speaking, reading, and writing. Use of Indonesian book chapters, Web pages, printed and electronic articles, social networking posts, newsgroups, and letters. Prerequisite: INDN 160.

* INDN 180b, Research and Creative Project on Indonesia  Dinny Aletheiani
Continuation of INDN 170. Advancement in students' competence in listening, speaking, reading, and writing. Reading materials include book chapters, Web sites, print and electronic articles, e-mail messages, blogs, and social networking posts. Prerequisite: INDN 170.

* INDN 470a and INDN 471b, Independent Tutorial  Dinny Aletheiani
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. After INDN 160. Permission to enroll requires submission of a detailed project proposal and its approval by the program adviser.

Italian Studies (ITAL)

* ITAL 110a, Elementary Italian I  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.  L1  1½ Course cr

* ITAL 130a, Intermediate Italian I  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. ITAL 120 or equivalent.  L3  1½ Course cr
* ITAL 159a, History and Culture of Naples  Anna Iacovella
Historical phenomena and literary and cultural movements that have shaped the city of Naples, Italy, from antiquity to the present. The linguistic richness and diversity that characterizes Naples; political, social, and cultural change; differences between standard Italian and the Neapolitan dialect in literature, film, and everyday life. Prerequisite: ITAL 140 or equivalent. L5, HU

* ITAL 162a, Introduction to Italian Literature: From the Duecento to the Renaissance  Simona Lorenzini
This is the first course in a sequence studying Italian Literature. The course aims to provide an introduction and a broad overview of Italian literature and culture from the Duecento to the Renaissance, specifically focusing on authors such as Dante, Petrarch, Boccaccio, Machiavelli, Ariosto, and literary and artistic movements such as Humanism and Renaissance. These authors and their masterpieces are introduced through readings, works of art, listening materials, videos, and films. Great space is left for in-class discussion and suggestions from students who may take an interest in specific authors or subjects. This course is interactive and open, and the authors mentioned here are only indicative of the path that we follow. At the end of the course, students are able to analyze and critique literary works of different genres and time periods. The course is conducted in Italian. Prerequisite: ITAL 140 or equivalent. L5, HU

* ITAL 306a / FILM 366a, Spotlight on Sicily in Literature and Film  Millicent Marcus
Sicily has always occupied a privileged place in the Italian imagination. The course focuses on a series of fictional works and films—from the early 20th century until today—which reveal how this island has served as a vital space for cinematic experimentation and artistic self-discovery. Topics range from unification history, the Mafia, the migrant crisis, environmental issues, gender, and social/sexual mores. The course is taught in English, but those who wish to enroll for credit towards the certificate in Italian, or the major, can make arrangements to do so. WR, HU

ITAL 310a / HUMS 180a / LITR 183a, Dante in Translation  Staff
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. No knowledge of Italian required. Course conducted in English. HU TR O Course cr

ITAL 315a / HIST 280a / RLST 160a, The Catholic Intellectual Tradition  Staff
Introductory survey of the interaction between Catholicism and Western culture from the first century to the present, with a focus on pivotal moments and crucial developments that defined both traditions. Key beliefs, rites, and customs of the Roman Catholic Church, and the ways in which they have found expression; interaction between Catholics and the institution of the Church; Catholicism in its cultural and sociopolitical matrices. Close reading of primary sources. HU O Course cr

ITAL 343a / HSAR 285a, Italian Renaissance Art  Morgan Ng
This course surveys the art of Renaissance Italy (c. 1420–1550) in its full breadth, including architecture, sculpture, and painting. Lectures situate artworks within broad cultural themes, while sections include the first-hand study of objects in the Yale University Art Gallery. Topics include the display of art in civic space; the
influence of Roman antiquity on monumental architecture; the conception of nature in paintings and gardens; the representation of the human body in portraiture and heroic sculpture; the rise of women artists and patrons. The course scrutinizes acknowledged masterworks by Michelangelo, Leonardo da Vinci, and Raphael, in the artistic centers of Florence, Rome, and Venice. At the same time, it considers lesser known yet no less vibrant artistic sites, such as those in Southern Italy. It also draws map connections beyond Europe, revealing rich cultural exchanges with the Ottoman empire and the Americas.

* ITAL 470a and ITAL 471a, Special Studies in Italian Literature  Simona Lorenzini
A series of tutorials to direct students in special interests and requirements. Students meet regularly with a faculty member.

* ITAL 491a, The Senior Essay  Simona Lorenzini
A research essay on a subject selected by the student in consultation with the faculty adviser.

Japanese (JAPN)

* JAPN 110a, Elementary Japanese I  Staff
Introductory language course for students with no previous background in Japanese. Development of proficiency in listening, speaking, reading, and writing, including 50 hiragana, 50 katakana, and 85 kanji characters. Introduction to cultural aspects such as levels of politeness and group concepts. In-class drills in pronunciation and conversation. Individual tutorial sessions improve conversational skills. L1 RP 1½ Course cr

* JAPN 120b, Elementary Japanese II  Staff
Continuation of JAPN 110, with additional materials such as excerpts from television shows, anime, and songs. Introduction of 150 additional kanji. After JAPN 110 or equivalent. L2 RP 1½ Course cr

* JAPN 130a, Intermediate Japanese I  Kumiko Nakamura
Continued development in both written and spoken Japanese. Aspects of Japanese culture, such as history, art, religion, and cuisine, explored through text, film, and animation. Online audio and visual aids facilitate listening, as well as the learning of grammar and kanji. Individual tutorial sessions improve conversational skills. After JAPN 120 or equivalent. L3 RP 1½ Course cr

* JAPN 140b, Intermediate Japanese II  Mika Yamaguchi
Continuation of JAPN 130. After JAPN 130 or equivalent. L4 RP 1½ Course cr

* JAPN 150a, Advanced Japanese I  Mari Stever
Advanced language course that further develops proficiency in reading, writing, speaking, and listening. Reading and discussion materials include works by Nobel Prize winners. Japanese anime and television dramas are used to enhance listening and to develop skills in culturally appropriate speech. Writing of essays, letters, and criticism solidifies grammar and style. Individual tutorial sessions improve conversational skills. After JAPN 140 or equivalent. L5 RP

* JAPN 151b, Advanced Japanese II  Hiroyo Nishimura
Continuation of JAPN 150. After JAPN 150 or equivalent. L5 RP
* JAPN 156a, Advanced Japanese III  Mika Yamaguchi
Close reading of modern Japanese writing on current affairs, social science, history, and literature. Development of speaking and writing skills in academic settings, including formal speeches, interviews, discussions, letters, e-mail, and expository writing. Interviews of and discussions with native speakers on current issues. Individual tutorial sessions provide speaking practice. After JAPN 151 or equivalent.  L5  RP

* JAPN 157b, Advanced Japanese IV  Kumiko Nakamura
Continuation of JAPN 156. After JAPN 156 or equivalent.  L5

Judaic Studies (JDST)

JDST 110b / HUMS 133b / RLST 145b, The Bible  Christine Hayes
The writings common to both Jewish and Christian scripture examined as diverse and often conflicting expressions of the religious life and thought of ancient Israel. The works' cultural and historical setting in the ancient Near East; the interpretive history of selected passages influential in Western culture. Introduction to a wide range of critical and literary approaches to biblical studies. Students view course lectures, which survey the entire Bible, on line; class time focuses on specific biblical passages and their subsequent interpretation in Jewish and Christian culture.  HU

JDST 200a / ER&M 219a / HIST 219a / MMES 149a / RLST 148a, Jewish History and Thought 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 non-Western distributional credit within the History major, upon application to the director of undergraduate studies.  HU  RP

JDST 201b / HIST 220b / RLST 149b, Introduction to Modern Jewish History  David Sorkin
A broad introduction to the history of Jewish culture from the late Middle Ages until the present. Emphasis on the changing interaction of Jews with the larger society as well as the transformation of Judaism in its encounter with modernity.  HU

* JDST 223b / HUMS 295b / PLSC 307b, Trials of Uncertainty  Norma Thompson
Is the demise of the trial at hand? The trial as cultural achievement, considered as the epitome of humanistic inquiry, where all is brought to bear on a crucial matter in an uncertain context. Truth may be hammered out or remain elusive, but the expectation in the court case has been that the adversarial mode works best for sorting out evidentiary conundrums. Inquiries into issues of meaning of the trial, its impartiality, and challenges to its endurability. The role of character, doubt, and diagnosis explored in Sophocles, Plato, Cicero, Burke, Jane Austen, Tocqueville, and Kafka, as well as in twentieth-century trials, films, documentaries, and twenty-first-century medical narratives.  WR, HU

JDST 265b / HIST 345b / MMES 148b / RLST 202b, Jews in Muslim Lands from the Seventh to the Sixteenth Centuries  Ivan Marcus
Jewish culture and society in Muslim lands from the time of the Prophet Muhammad to that of Suleiman the Magnificent. Topics include Islam and Judaism; Jerusalem as
a holy site; rabbinic leadership and literature in Baghdad; Jewish courtiers, poets, and philosophers in Muslim Spain; and the Jews in the Ottoman Empire.  

* JDST 270a / HIST 232Ja / HUMS 443a / MMES 342a / RLST 201a, Medieval Jews, Christians, and Muslims In Conversation  

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. Counts toward either European or Middle Eastern distributional credit within the History major, upon application to the director of undergraduate studies.  

WR, HU

* JDST 272b / PHIL 264b / PHIL 295b / RLST 295b, Al-Ghazali and Maimonides  

Frank Griffel  
The lives and thought of the philosopher theologians Al-Ghazali and Maimonides. Comparison of their lives and writings, focusing on their integration of Aristotelian philosophy into the theology of Islam and Judaism.  

HU

* JDST 293b / HIST 248Jb / RLST 214b, Introduction to Modern Jewish Thought  

Elli Stern  
An overview of Jewish philosophical trends, movements, and thinkers from the seventeenth century to the twenty-first. Topics include enlightenment, historicism, socialism, secularism, religious radicalism, and Zionism.  

HU

* JDST 305a / HEBR 158a / MMES 168a, Contemporary Israeli Society in Film  

Shiri Goren  
Examination of major themes in Israeli society through film, with emphasis on language study. Topics include migration, gender and sexuality, Jewish/Israeli identity, and private and collective memory. Readings in Hebrew and English provide a sociohistorical background and bases for class discussion. Prerequisites: HEBR 140 or permission of instructor.  

L5, HU  RP

* JDST 306b / MMES 157b / NELC 157b, Israeli Narratives  

Shiri Goren  
This course looks at contemporary representations of social, political, and domestic space in Israel through cultural production such as literature, visual work, and art. It focuses on close reading of major Israeli works in translation with attention to how their themes and forms relate to the Israeli condition. Reading and viewing include: Amos Oz's major novel A Tale of Love and Darkness, Anne Frank: The Graphic Diary, Maya Arad's novella “The Hebrew Teacher,” TV show Arab Labor and writing by Yehudah Amichai, Etgar Keret, and Sayed Kashua, among others. We discuss topics and theories of personal and collective identity formation, war and peace, ethnicity and race, migration, nationalism, and gender. No knowledge of Hebrew required.  

WR, HU  TR

* JDST 316b / ENGL 456b / HUMS 427b / LITR 348b, The Practice of Literary Translation  

Robyn Creswell  
This course combines a seminar on the history and theory of translation (Tuesdays) with a hands-on workshop (Thursdays). The readings lead us through a series of case studies comparing, on the one hand, multiple translations of given literary works and, on the other, classic statements about translation – by translators themselves and prominent theorists. We consider both poetry and prose from the Bible, selections
from Chinese, Greek, and Latin verse, classical Arabic and Persian literature, prose by Cervantes, Borges, and others, and modern European poetry (including Pushkin, Baudelaire, and Rilke). Students are expected to prepare short class presentations, participate in a weekly workshop, try their hand at a series of translation exercises, and undertake an intensive, semester-long translation project. Proficiency in a foreign language is required.  

* JDST 319b / HEBR 162b / MMES 161b, Israel in Ideology and Practice  
  Dina Roginsky  
  An advanced Hebrew class focusing on changing ideology and politics in Israel. Topics include right and left wing political discourse, elections, State-Religion dynamics, the Jewish-Arab divide, and demographic changes. Materials include newspapers, publications, on-line resources, speeches of different political and religious groups, and contemporary and archival footage. Comparisons to American political and ideological discourse. Prerequisite: HEBR 140 or permission of instructor.  

* JDST 326a / LITR 317a, Marxist Theory of Literature  
  Hannan Hever  
  The role of Marxist thought in understanding literary institutions and texts in the twentieth century. Marx's theory of ideology; Lukacs's theory of literature as the basis for development of Marxist literary theory; the Frankfurt and materialistic schools. Readings include works by Raymond Williams, Catherine Belsey, Walter Benjamin, Pierre Macherey, and Frederic Jameson.  

* JDST 339a / LITR 418a / MMES 418a / RLST 203a, The Classics of Modern Hebrew Literature  
  Hannan Hever  
  Overview of the Poetics, Culture, History, and Political dynamics of Modern Hebrew Literature as national literature over the last 300 years. The course traces the literary development of its diasporic condition in Europe through the Hebrew Literature that is created in the Israeli Jewish sovereignty. The course is taught in Hebrew and the readings of literary texts are also in Hebrew. No background in Jewish literature, Hebrew literature, or Jewish culture is required.  

* JDST 343b / ENGL 483b / HUMS 428b / LITR 305b, Advanced Literary Translation  
  Robyn Creswell  
  A sequel to LITR 348, The Practice of Literary Translation. Students apply to this workshop with a project in mind that they have been developing, either on their own or for a senior thesis, and they present this work during the class on a regular basis. Practical translation is supplemented by readings in the history of translation practice and theory, and by the reflections of practitioners on their art. These readings are selected jointly by the instructor and members of the class. Topics include the history of literary translation—Western and Eastern; comparative approaches to translating a single work; the political dimension of translation; and translation in the context of religion and theology. Class time is divided into student presentations of short passages of their own work, including related key readings; background readings in the history of the field; and close examination of relevant translations by accomplished translators. Students receive intensive scrutiny by the group and instructor. Prerequisite: LITR 348.  

* JDST 346a / HIST 249a, Making European Culture Jewish: Five Media, 1780-1930  
  Staff  
  This course studies the ways in which Jewish writers and artists turned European culture into Jewish culture, that is, how a minority group fashioned its own version
of the majority culture. As European Jews encountered European culture and society, they had to grapple with a host of fundamental questions. What was Judaism and who were the Jews: a religion, a history, a culture, a nation? We examine the way in which writers and artists struggled with these issues in five media: memoir, theology, history, fiction, and painting, thereby creating Jewish versions first of Enlightenment, Romanticism, and realism (1780-1870) and then of nationalism, positivism, and modernism (1870-1930).    

* JDST 348a / GMAN 329a / PHIL 466a, German Idealism and Religion  Paul Franks  
The philosophies of Kant and his German Idealist successors address a number of central questions in the philosophy of religion and also presuppose a religious background in their approaches to questions of general metaphysics, epistemology and ethics. In this course, we explore the relevant religious context—both in works of Erasmus and Luther and also in the writings of the kabbalists of Safed, Christian kabbalah, and Jakob Boehme. We then read major works by Kant, Hegel and Schelling against that background. Other authors include Conway, Herrera, Jacobi, Kierkegaard, Lessing and Mendelssohn. Issues considered include freedom of the will and determinism, pantheism and panentheism, infinity and finitude, knowledge and faith, love and law, commandment and antinomianism, love of God and love of neighbor. Some prior study of Kant and German Idealism is recommended.    

* JDST 351b / HIST 268Jb / PLSC 466b / RLST 324b, The Global Right: From the French Revolution to the American Insurrection  Elli Stern  
This seminar explores the history of right-wing political thought from the late eighteenth century to the present, with an emphasis on the role played by religious and pagan traditions. This course seeks to answer the question, what constitutes the right? What are the central philosophical, religious, and pagan, principles of those groups associated with this designation? How have the core ideas of the right changed over time? We do this by examining primary tracts written by theologians, political philosophers, and social theorists as well as secondary literature written by scholars interrogating movements associated with the right in America, Europe, Middle East and Asia. Though touching on specific national political parties, institutions, and think tanks, its focus is on mapping the intellectual overlap and differences between various right-wing ideologies. While the course is limited to the modern period, it adopts a global perspective to better understand the full scope of right-wing politics.    

* JDST 353b / ER&M 306b / LITR 308b / MMES 308b, Literature at the Limit from Palestine and Israel  Hannan Hever  
Readings and films from post-1948 Palestine and Israel, with special attention given to historical and political contexts. Consideration of the limit, in the geographical sense of borders and checkpoints, as well as in the existential sense of extremity and trauma.    

* JDST 370b / HIST 226Jb / RLST 231b, Jews and Christians in the Formation of Europe, 500-1500  Ivan Marcus  
Students study how Jews and Christians interacted on a daily basis as medieval Europe became more restrictive and antisemitic, a contributing factor to the Holocaust. In this writing seminar, students discuss a variety of primary sources in class—laws, stories, chronicles, images—while researching and writing their own seminar paper structured by sessions on topics, bibliographies, and outlines.
* JDST 401b / HEBR 152b, 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; special concentration on the development of accuracy and fluency. Prerequisite: HEBR 150 or permission of instructor. Conducted in Hebrew. L5 RP

* JDST 405b / HEBR 156b / MMES 216b, 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

JDST 407a / HEBR 161a / MMES 156a, 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

* JDST 409a / HEBR 159a / MMES 159a, 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

JDST 648a / PHIL 666a, German Idealism and Religion  
Paul Franks
The philosophies of Kant and his German Idealist successors address a number of questions in the philosophy of religion, and also presuppose a religious background when addressing questions of general metaphysics, epistemology, and ethics. In this course, we explore the relevant religious context—both in works of Erasmus and Luther and also in the writings of the kabbalists of Safed, Christian kabbalah, and Jakob Boehme. We then read major works by Kant, Hegel, and Schelling against that background. Other authors include Conway, Herrera, Jacobi, Kierkegaard, Lessing, Mendelssohn, and Rosenzweig. Issues considered include freedom of the will and determinism, pantheism and panentheism, infinity and finitude, knowledge and faith, love and law, antinomianism, love of God and love of neighbor. Some prior study of Kant and German Idealism is recommended.

JDST 677a / CPLT 574a, Marxist Theory of Literature  
Hannan Hever
Marxist thought has played a major role in the understanding of literary institutions, as well as literary texts. Within Marxist thought, literature always had a unique function in the processes of ideology, class struggles, and the constitution of the subject; material Marxism, cultural Marxism, European Marxism, and neo-Marxism all studied the work of literature as an institution and as both reflection and construction of reality, and of its perception. The aim of this seminar is to acquaint ourselves with Marxist theories of
literature in the twentieth century. We start with the very basics of Marxism, focusing especially on the theory of ideology. We then study Lukács’s theory of literature as the basis of the development of Marxist literary theory, followed by the literary theories developed by the Frankfurt School, the materialistic school of Louis Althusser, Antonio Gramsci, E.P. Thompson, Raymond Williams, Stuart Hall, Terry Eagleton, Catherine Belsey, Fredric Jameson, and others. Open to undergraduates. All texts are in English, and no previous knowledge is required.

JDST 761a / HIST 596a / MDVL 596a / RLST 773a, Jewish History and Thought 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.

JDST 764b / HIST 590b / MDVL 590b / RLST 777b, Jews in Muslim Lands from the Seventh through the Sixteenth Century  Ivan Marcus
Introduction to Jewish culture and society in Muslim lands from the Prophet Muhammad to Suleiman the Magnificent. Topics include Islam and Judaism; Jerusalem as a holy site; rabbinic leadership and literature in Baghdad; Jewish courtiers, poets, and philosophers in Muslim Spain; and the Jews in the Ottoman Empire.

JDST 799b / AMST 692b / HSAR 730b / RLST 788b, Religion and the Performance of Space  Sally Promey and Margaret Olin
This interdisciplinary seminar explores categories, interpretations, and strategic articulations of space in a range of religious traditions. In conversation with the work of major theorists of space, this seminar examines spatial practices of religion in the United States during the modern era, including the conception, construction, and enactment of religious spaces. It is structured around theoretical issues, including historical deployments of secularity as a framing mechanism, ideas about space and place, geography and gender, and relations between property and spirituality. Examples of case studies treated in class include the enactment of rituals within museums, the marking of religious boundaries such as the Jewish “eruv,” and the assignment of “spiritual” ownership in Hawai’i Volcanoes National Park. Prerequisite: permission of the instructors; qualified undergraduates are welcome.

JDST 806b / HIST 603b / MDVL 603b / RLST 616b, Jews and Christians in the Formation of Europe, 500–1500  Ivan Marcus
This seminar explores how medieval Jews and Christians interacted as religious societies between 500 and 1500.

JDST 835b / HEBR 519b, Israel in Ideology and Practice  Dina Roginsky
An advanced Hebrew class that focuses on changing ideology and politics in Israel. Topics include right- and left-wing political discourse, elections, state-religion dynamics, the Jewish-Arab divide, and demographic changes. Materials include newspapers, publications, online resources, speeches of different political and religious groups, and contemporary and archival footage. Also, this course draws comparisons to American political and ideological discourse. Prerequisite: HEBR 502 or equivalent.
JDST 844a / HIST 595a / RLST 692a, Introduction to Modern European Jewish History  David Sorkin
This course introduces students to European Jewish history since approximately 1648. It teaches the major historiographical traditions as well as the major themes of European Jewish history. Its audience is students specializing in Jewish history but also other historians who wish to add an understanding of Jewish history to their understanding of Europe.

Khmer (KHMR)

* KHMR 110a, Elementary Khmer I  Staff
Basic structures of modern standard Cambodian introduced through the integration of communicative practice, reading, writing, and listening comprehension. Introduction to Khmer society and culture. Course taught through distance learning using videoconferencing technology from Cornell University. Enrollment limited; interested students should e-mail minjin.hashbat@yale.edu for more information.  L1
1½ Course cr

* KHMR 120b, Elementary Khmer II  Staff
Basic structures of modern standard Cambodian introduced through the integration of communicative practice, reading, writing, and listening comprehension. Introduction to Khmer society and culture. Prerequisite: KHMR 110. Course taught through distance learning using videoconferencing technology from Cornell University. Enrollment limited; interested students should e-mail minjin.hashbat@yale.edu for more information.  L2
1½ Course cr

KHMR 130a, Intermediate Khmer I  Staff
This course focuses on learning Khmer (the national language of Cambodia). Students communicate in day-to-day conversation using complex questions and answers. The course focuses on reading, writing, speaking, and listening to Khmer words, long sentences, and texts. The course also emphasizes grammar, sentence structure and using words correctly. Course taught through distance learning using videoconferencing technology from Cornell University. Enrollment limited; interested students should e-mail minjin.hashbat@yale.edu for more information. Prerequisite: KHMR 120 or equivalent.  L3 RP 1½ Course cr

KHMR 140b, Intermediate Khmer II  Staff
This course focuses on learning Khmer (the national language of Cambodia). Students communicate in every day conversation using complex questions/answers. The course focuses on reading, writing, speaking, and listening to Khmer words, long sentences, and texts. The course also emphasizes grammar, sentence structure and using words correctly. Course taught through distance learning using videoconferencing technology from Cornell University. Enrollment limited; interested students should e-mail minjin.hashbat@yale.edu for more information. Prerequisite: KHMR 130 or equivalent.  L4 RP 1½ Course cr
Kiswahili (SWAH)

**SWAH 110a, Beginning Kiswahili I**  
John 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.  
1½ Course cr

**SWAH 120b, Beginning Kiswahili II**  
John 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.  
1½ Course cr

**SWAH 130a, Intermediate Kiswahili I**  
Veronica Waweru  
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.  
1½ Course cr

**SWAH 140b, Intermediate Kiswahili II**  
John Wa’Njogu  
Continuation of SWAH 130. After SWAH 130.  
1½ Course cr

**SWAH 150a, Advanced Kiswahili I**  
John 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.  
1½ Course cr

**SWAH 160b, Advanced Kiswahili II**  
John Wa’Njogu  
Continuation of SWAH 150. After SWAH 150.  
1½ Course cr

**SWAH 170a, Topics in Kiswahili Literature**  
John Wa’Njogu  
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.  
1½, HU

Korean (KREN)

* **KREN 110a, Elementary Korean I**  
Staff  
A beginning course in modern Korean. Pronunciation, lectures on grammar, conversation practice, and introduction to the writing system (Hankul).  
1½ Course cr

* **KREN 120b, Elementary Korean II**  
Staff  
Continuation of KREN 110. After KREN 110 or equivalent.  
1½ Course cr

* **KREN 130a, Intermediate Korean I**  
Staff  
Continued development of skills in modern Korean, spoken and written, leading to intermediate-level proficiency. After KREN 120 or equivalent.  
1½ Course cr

* **KREN 132a, Intermediate Korean for Advanced Learners I**  
Seungja Choi  
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.  
1½ Course cr
* KREN 140b, Intermediate Korean II  Hyunsung Lim  
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: Korean Language and Culture through K-Pop Music  Angela Lee-Smith  
An advanced language course with emphasis on developing vocabulary and grammar, practice reading comprehension, speaking on a variety of topics, and writing in both formal and informal styles. Use storytelling, discussion, peer group activities, audio and written journals, oral presentations, and supplemental audiovisual materials and texts in class. Intended for nonheritage speakers. After KREN 140 or equivalent.  L5

KREN 151b, Advanced Korean II: Language and Culture through Media  Angela Lee-Smith  
This course is content and project-based to further develop integrated language skills—spoken and written, including grammar and vocabulary, as well as intercultural competence through Korean media. Through a variety of media, such as print media, publishing, digital media, cinema, broadcasting (radio, television, podcasting), and advertising, students explore and reflect on a wide range of topics and perspectives in Korean culture and society. The course learning activities include interactive, interpretive, and presentational communication; critical analysis; creative and authentic language applications in formal/informal contexts. After KREN 150 or equivalent.  L5

* KREN 152a, Advanced Korean for Advanced Learners  Staff  
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

* KREN 154b, Advanced Korean III  Staff  
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 152 or equivalent.  L5

Latin (LATN)

LATN 110a, Beginning Latin: The Elements of Latin Grammar  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 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 411a, Early Rome from Aeneas to Romulus  Joseph Solodow  
Investigation of how the Romans imagined the founding of their nation and their city, events to which they attached the highest importance yet about which they had little
information. Careful reading of both prose and verse by Vergil, Livy, Ovid, and others. A bridge course between L4 and other L5 courses.  L5, HU

* LATN 421a, Vergil's *Aeneid*  Kirk Freudenburg
An in-depth study of Vergil's *Aeneid* within its political context.  L5

**Latin American Studies (LAST)**

**LAST 100a / HIST 305a, Introduction to Latin American Studies: History, Culture and Society**  Maria Aguilar
What is Latin America? The large area we refer to as Latin America is not unified by a single language, history, religion, or type of government. Nor is it unified by a shared geography or by the prevalence of a common language or ethnic group. Yet Latin America does, obviously, exist. It is a region forged from the merging of diverse cultures, historical experiences, and processes of resistance. This course provides an overview of Latin America and the Caribbean from the 16th century up to the present. While the class aims to provide students with an understanding of the region, due to time constraints, it focuses primarily on the experiences and histories of selected countries. The course introduces students to some of the most important debates about the region's history, politics, society, and culture. The course follows a chronological structure while also highlighting thematic questions. Drawing on academic readings, films, music, art, literature, testimony, oral histories, and writings from local voices the class explores the political transformation of the region, as well as topics related to ethnic and racial identity, revolution, social movements, religion, violence, military rule, democracy, transition to democracy, and migration.  HU 0 Course cr

**LAST 214a / AFAM 186a / PLSC 378a / SOCY 170a, Contesting Injustice**  Staff
Exploration of why, when, and how people organize collectively to challenge political, social, and economic injustice. Cross-national comparison of the extent, causes, and consequences of inequality. Analysis of mobilizations for social justice in both U.S. and international settings. Intended primarily for freshmen and sophomores.  SO 0 Course cr

* LAST 222a / SPAN 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. Enrollment limited to 18. A maximum of one course in the 200-230 range may count as an elective toward the Spanish major.  L5

* LAST 223a or b / SPAN 223a or b, Spanish in Film: An Introduction to the New Latin American Cinema  Margherita Tortora
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. Enrollment limited to 18.  L5
* LAST 225b / SPAN 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. Enrollment limited to 18.  1.5

* LAST 227b / SPAN 227b, Creative Writing  Maria Jordan
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. Enrollment limited to 18. A maximum of one course in the 200–230 range may count as an elective toward the Spanish major.  1.5

* LAST 228a / SPAN 228a, Borders & Globalization in Hispanophone Cultures  Luna Najera
The borders that constitute the geographical divisions of the world are contingent, but they can have enormous ordering power in the lives of people and other beings. Human-made borders can both allow and disallow the flow of people and resources. Like geographical borders, social borders such as race, caste, class, and gender can form and perpetuate privileged categories of humans that restrict access of excluded persons to natural resources, education, security, and social mobility. Thus, bordering can differentially value human lives. Working with the premise that borders are sites of power, in this course we study bordering and debordering practices in the Hispanic cultures of Iberia, Latin America, and North America, from the 1490s to the present. Through analyses of a wide range of texts students will investigate the multiple ways in which social, cultural, and spatial borders are initiated, expressed, materialized, and contested. Some of the questions that will guide our conversations are: What are social borders and what are the processes through which they perdure? How do the effects of local practices that transcend borders (e.g., environmental pollution, deforestation) change our understanding of borders? How does globalization change discourse about borders? (To be conducted in Spanish.) Prerequisite: SPAN 140 or 145, or in accordance with placement results. A maximum of one course in the 200–230 range may count as an elective toward the Spanish major. Permission is managed through the YCS registration system.  1.5

LAST 232a / ANTH 232a / ARCG 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.  5

* LAST 243a or b / SPAN 243a or b, Advanced Spanish Grammar  Staff
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. Enrollment limited to 18.  1.5

LAST 244a or b / SPAN 244a or b, Writing in Spanish  Margherita Tortora
Intensive instruction and practice in writing as a means of developing critical thinking. Recommended for students considering courses in literature. Analysis of fiction and nonfiction forms, techniques, and styles. Classes conducted in a workshop format.  1.5
LAST 247a / SPAN 247a, Introduction to the Cultures of Latin America
Aníbal González-Pérez

A chronological study of Latin American cultures through their expressions in literature and the arts, beginning in the pre-Columbian period and focusing on the period from the nineteenth century to the present. Emphasis on crucial historical moments and on distinctive rituals such as fiestas. Open to students who have placed into L5 courses or who have successfully completed an L4 course in Spanish. Counts toward the major in Spanish. L5, HU

* LAST 251a / EP&E 257a / PLSC 399a, Political Power and Inequality in Latin America
Ana De La O

Overview and analysis of politics in Latin America. The emergence of democracy and the forces that led to the unprecedented increase in inequality in the twentieth century. Topics include institutional design, historical legacies, corruption, clientelism, and violence. SO

* LAST 252a / LITR 259a / PORT 356a, Concrete Poetry in Brazil & Portugal: Verbivocovisual Poetics in Theory and Practice
Kenneth David Jackson

Brazilian concrete poetry in international perspective; production and theory of concrete poetry, translation, and criticism during the second half of the twentieth century. Brazilian concrete poets were among the leaders of an international neo-vanguard movement in mid-twentieth century related to geometrical abstraction in painting. In the journals Noigandres and Invenção, and the Theory of Concrete Poetry the Brazilians link their poetics to Pound, Mallarmé, cummings and other inventive figures in world poetry, while relating poetry to graphic arts through reference to painting and to semiotics, including Fenollosa's essay on use of the Chinese character. The exhibit in S. Paulo's Museum of Modern Art in December 1956 was the beginning of the public exhibition of concrete poetry, now the topic of anthologies, websites, criticism, and museum retrospectives. Concrete poetics dominated the production of poetry in Brazil for half a century with a major effect on cultural and intellectual life. Prerequisite: PORT 140 or equivalent. HU TR

LAST 261a / SPAN 261a, Studies in Spanish Literature I
Staff

An introduction to Spanish prose, drama, and lyric poetry from their medieval multicultural origins through the Golden Age in the seventeenth century. Readings include El Cid, La Celestina, Conde Lucanor, and works by Miguel de Cervantes and Calderón de la Barca. Open to students who have placed into L5 courses or who have successfully completed an L4 course in Spanish. Counts toward the major in Spanish. L5, HU

* LAST 262b / SPAN 262b, Studies in Spanish Literature II
Staff

An introduction to Spanish prose, drama, and lyric poetry from the eighteenth century to the present, centered on the conflict between modernity and tradition and on the quest for national identity. Texts by Gustavo Adolfo Bécquer, Emilia Pardo Bazán, Antonio Machado, Federico García Lorca, Ramón Sender, and Ana María Matute, among others. Open to students who have placed into L5 courses or who have successfully completed an L4 course in Spanish. L5, HU
* LAST 266a / SPAN 266a, Studies in Latin American Literature I  Staff
Cultural encounters in the New World as interpreted by authors of native American (Aztec and Inca) cultural traditions, the Spanish conquistadors and friars who encountered them and their heirs, and the Mexican creole nun (the now-world-famous Sor Juana Inés de la Cruz) who gave voice to some of their traditions as she created a space for her own writing in the literary world. Their resonance and legacy today.  15, HU

LAST 355a / HIST 355a, Colonial Latin America  Staff
A survey of the conquest and colonization of Latin America from pre-Columbian civilizations through the movements for independence. Emphasis on social and economic themes and the formation of identities in the context of multiracial societies. HU 0 Course cr

* LAST 370b / HIST 310Jb, Continuities and Discontinuities of Violence in Latin America  Maria Aguilar
During the second half of the twentieth century, many Latin American countries experienced intense political conflict and waves of repression at the hands of government forces. This course introduces students to the histories of Latin American countries that experienced dictatorships and authoritarian regimes during the Cold War and traces their development into the democratic transitions and current attempts to come to terms with the legacies of violence. The first part of the course explores the factors that led to the seizing of power by military forces, the period of violence, and human rights violations that characterized these regimes. The second part examines the factors that led to democratic transitions and the legacies of authoritarian regimes. The course examines the experiences of countries in South and Central America, with special attention to Argentina, Chile, El Salvador, and Guatemala. HU, SO

* LAST 372a / ER&M 342a / HIST 372Ja, Revolutionary Change and Cold War in Latin America  Greg Grandin
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

* LAST 386a / GLBL 215a / MGRK 237a / PLSC 375a / SOCY 389a, Populism  Paris Aslanidis
Investigation of the populist phenomenon in party systems and the social movement arena. Conceptual, historical, and methodological analyses are supported by comparative assessments of various empirical instances in the US and around the world, from populist politicians such as Donald Trump and Bernie Sanders, to populist social movements such as the Tea Party and Occupy Wall Street. SO

* LAST 431a / HUMS 229a / LITR 431a / SPAN 431a, Latin American Languages of Liberation: The Long Sixties  Staff
This is a multi-media seminar that studies the Latin American cultural and political discourses of liberation throughout the sixties, with an eye at assessing their legacy today. While the language that characterized the foundation of the nation-states in the 19th century was emancipation, in the second part of the twentieth century, and particularly around 1968, Latin America embraced the world discourse of liberation. This seminar examines languages of liberation in an array of disciplines and artistic
practices from South and Central America as well as the Caribbean. We explore regional debates that were also inserted in the larger discourse of the anti-colonial struggles of the global South. Topics include Philosophy of liberation (Dussel), Theology of liberation (the 1968 Council of Bishops in Medellin, Colombia), Theater of the oppressed (Boal), Pedagogy of the oppressed (Freire), Cinema of liberation (manifestos of Third Cinema), the New Song protest movements across the region (both Spanish and Portuguese American music), anti-colonialism in the Caribbean (Césaire, Fanon), anti-neocolonialism (dependency theory, internal colonialism), Indigenous liberation (from the Barbados declarations to the Lacandon jungle declarations), experimental “boom” literature (Cortázar) etc.

*LAST 491a, The Senior Essay*  
Staff  
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.

**Linguistics (LING)**

*LING 106b, Illusions of Language*  
Staff  
Introduction to linguistics, with special emphasis on sociolinguistics and psycholinguistics. Study of grammatical illusions: expressions the parser mistakenly accepts as grammatical despite making little sense and grammatical sentences which the parser has difficulty processing. Emphasis also on illusions and misconceptions about language, such as the belief that women speak more than men, that “vocal fry” can harm your voice, and that double negation is illogical.

*LING 109b / ENGL 149b, History of the English Language*  
Staff  
The evolution of English from its beginnings nearly 1500 years ago to the language of *Beowulf*, Chaucer, Shakespeare, Milton, Jane Austen, Melville, Twain, Langston Hughes, Bernie Sanders, Maya Angelou, and Cardi B. An overview of the 'Englishes' that populate our globe, including a look at the ways that technology affects language.

*LING 110a, Language: Introduction to Linguistics*  
Jason Shaw  
This is a course about language as a window into the human mind and language as glue in human society. Nature, nurture, or both? Linguistics is a science that addresses this puzzle for human language. Language is one of the most complex of human behaviors, but it comes to us without effort. Language is common to all societies and is typically acquired without explicit instruction. Human languages vary within highly specific parameters. The conventions of speech communities exhibit variation and change over time within the confines of universal grammar, part of our biological endowment.
The properties of universal grammar are discovered through the careful study of the structures of individual languages and comparison across languages. This course introduces analytical methods that are used to understand this fundamental aspect of human knowledge. In this introductory course students learn about the principles that underlie all human languages, and what makes language special. We study language sounds, how words are formed, how humans compute meaning, as well as language in society, language change, and linguistic diversity.

**LING 112b, Historical Linguistics**  Staff
Introduction to language change and language history. How do people use language, and how does that lead to language change 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 (doing archaeology with language).  

*LING 115a / SKRT 110a, Introductory Sanskrit I*  Aleksandar Uskokov
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.  

**LING 116b / CGSC 216b / PSYC 116b, Cognitive Science of Language**  Staff
The study of language from the perspective of cognitive science. Exploration of mental structures that underlie the human 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 to which language shapes perceptions of color, number, space, and gender.  

**LING 138a / SKRT 130a, Intermediate Sanskrit I**  Aleksandar Uskokov
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.  

*LING 150a / ENGL 150a, Old English*  Emily Thornbury
An introduction to the language, 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, which are read in the original Old English.  

*LING 200a, Experimentation in Linguistics*  Maria Pinango
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.  

*LING 211b, Grammatical Diversity in U.S. English*  Staff
Language as a system of mental rules, governing the sound, form, and meaning system. The (impossible) distinction between language and dialect. The scientific study of standard and non-standard varieties. Social attitudes toward prestige and other
varieties; linguistic prejudice. Focus on morpho-syntactic variation in North-American English: alternative passives (“The car needs washed”), personal datives (“I need me a new printer”), negative inversion (“Don’t nobody want to ride the bus”), ”drama SO” (“I am SO not going to study tonight”).

* LING 212a, Linguistic Change Claire Bowern
How languages change, how we study change, and how language relates to other areas of society. This seminar is taught through readings chosen by instructor and students, on topics of interest. Prerequisite: LING 112 or equivalent.

LING 217a / EDST 237a / PSYC 317a, Language and Mind Maria Pinango
The structure of linguistic knowledge and how it is used during communication. The principles that guide the acquisition of this system by children learning their first language, by children learning language in unusual circumstances (heritage speakers, sign languages) and adults learning a second language, bilingual speakers. The processing of language in real-time. Psychological traits that impact language learning and language use.

LING 220a / PSYC 318a, Phonetics I Jason Shaw
Each spoken language composes words using a relatively small number of speech sounds, a subset of the much larger set of possible human speech sounds. This course introduces tools to describe the complete set of speech sounds found in the world’s spoken languages. It covers the articulatory organs involved in speech production and the acoustic structure of the resulting sounds. Students learn how to transcribe sounds using the International Phonetic Alphabet, including different varieties of English and languages around the world. The course also introduces sociophonetics, how variation in sound patterns can convey social meaning within a community, speech perception, and sound change.

LING 227b / PSYC 327b, Language and Computation I Staff
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.

LING 231b / PSYC 331b, Neurolinguistics Staff
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. At least one class that introduces students to linguistic theory and linguistic argumentation from at least one perspective, including any of the following: (1) LING 217 Language and Mind, (2) LING 110 Intro to linguistics, (3) LING 253 Syntax 1, (4) LING 112 Historical Linguistics, (5) LING 232 Phonology 1, (6) LING 220 General Phonetics, or (7) Instructor permission.

* LING 232b, Phonology I Staff
Why do languages sound distinct from one another? Partly it is because different languages use different sets of sounds (in spoken languages) or signs (in signed languages) from one another. But it is also because those sounds and signs have different distributional patterns in each language. Phonology is the study of the systematic organization and patterning of sounds and signs. Students learn to describe
the production of sounds and signs (articulatory phonetics), discuss restrictions on sound and sign distribution (morphemic alternation, phonotactics), and develop a model of the phonological grammar in terms of rules and representations. Throughout the course, we utilize datasets taken from a variety of the world’s languages.

* **LING 235a, Phonology II**  Natalie Weber  
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 the 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.  

* **LING 241b, Field Methods**  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. Discussion of ethics, linguistic diversity, and endangerment. Open to majors and graduate students in Linguistics, and to others with permission of instructor. Students should have taken LING 232 or LING 220 and one other linguistics class.

**LING 253a, Syntax I**  Raffaella Zanuttini  
If you knew all the words of a language, would you be able to speak that language? No, because you’d still need to know how to put the words together to form all and only the grammatical sentences of that language. This course focuses on the principles of our mental grammar that determine how words are put together to form sentences. Some of these principles are shared by all languages, some differ from language to language. The interplay of the principles that are shared and those that are distinct allows us to understand how languages can be very similar and yet also very different at the same time. This course is mainly an introduction to syntactic theory: it introduces the questions that the field asks, the methodology it employs, some of the main generalizations that have been drawn and results that have been achieved. Secondarily, this course is also an introduction to scientific theorizing: what it means to construct a scientific theory, how to test it, and how to choose among competing theories.

**LING 254b, Syntax II**  Staff  
This course continues the development of the "principles and parameters" approach to grammatical theory in Government-Binding theory and the Minimalist Program. We begin with a brief review of the architecture of syntactic theory, move on to an extended exploration of the mechanisms of dependency formation in syntax (including displacement, agreement, control, scope and anaphora), and conclude with a discussion of the nature of syntactic representation (constituency in double object constructions, the mapping between structure and thematic relations, the role of functional categories). Throughout, a major goal of the course is to engage in foundational issues by reading primary literature in syntax and applying theoretical concepts to novel data. Prerequisite: LING 253.

* **LING 261a, Current Trends in Syntax**  Staff  
A detailed survey of one or more topics in current syntactic theory, drawn from topics including selected minimalist analyses that use the notion of phase and the agree
operation, a discussion of the "cartographic approach" to syntactic structure, the
distribution of adverbs and adjectives, and the internal structure of prepositional
phrases. Prerequisite: LING 253 Syntax I or equivalent experience.  so

**LING 263a, Semantics I**  Venecita Dayal
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  o Course cr

* LING 264b, Semantics II  Staff
The model-theoretic approach to semantics and its treatment of core linguistic
phenomena. Topics include quantification; tense, aspect, and modality; context and
interpretation; and the semantics-pragmatics interface. Prerequisite: LING 263 or
permission of instructor.  so

* LING 280a, Morphology  Staff
What is a word? Do the things we put spaces around when we write correspond to
anything in our mental grammars? How does morphology relate to phonology, and to
other areas of grammar, such as syntax and semantics? To what extent do the principles
governing the structures and forms of words need to be boxed off from other areas
of grammar, and to what extent are they symptomatic of deeper principles which
hold of the language faculty as a whole? This course aims to answer these and other
questions by examining morphological phenomena from across the world's languages,
including English and languages which are (at least superficially) very different from it
Prerequisites: LING 232 (Phonology I) and 253 (Syntax I), or permission of instructor.
so

* LING 343a, Topics in Phonology: Models of Phonological Variation  Natalie Weber
Exploration of variable phonological phenomena and how they are best modeled, both
within and across lexical items. Topics include gradient phonotactic knowledge and
the nature of phonological grammar as well as the larger cognitive system in which it is
situated. LING 235 (Phonological Theory) or permission of instructor.  so

* LING 375b / CGSC 375b, Linguistic Meaning and Conceptual Structure  Staff
The meaning of a word or sentence is something in the human mind that has
specific properties: it can be expressed (written/signed/spoken forms); it can be
combined with other meanings; its expression is not language dependent; it connects
with the world; it serves as a vehicle for inference; and it is hidden from awareness.
The course explores these properties in some detail and, in the process, provides
the students with technical vocabulary and analytical tools to further investigate
them. The course is thus intended for those students interested in undertaking a
research project on the structure of meaning, the nature of lexico-conceptual structure,
that is, the structure of concepts which we refer to as "word meanings", and how
they may be combined through linguistic and non-linguistic means. Its ultimate
objective is to bridge models of conceptual structure and models of linguistic semantic
composition, identify their respective strengths and weaknesses and explore some
of the fundamental questions that any theory of linguistic meaning composition
must answer. Evidence discussed will emerge from naturalistic, introspectional, and
experimental methodologies. Prerequisites: LING 110, CGSC 110, LING 217, or LING
263.  so
* LING 376b / PHIL 445b, Implicature and Pragmatic Theory  
Staff  
This seminar explores theoretical and experimental approaches to conversational and conventional implicature. We examine the role that pragmatic inference plays in the determination of what is said and of truth-conditional content in neo-Gricean pragmatics and relevance theory as well as considering arguments for and against the grammatical view of scalar implicature. Our investigations draw on evidence from linguistic diagnostics, corpora, and a range of experimental studies on the acquisition, processing, and patterning of scalar implicature, negative strengthening, and exhaustivity in focus constructions. Finally, we review current work on the effects of discourse context, politeness considerations, and lexical semantics in constraining when and how pragmatic inferences are drawn. Prerequisite: At least one course in semantics, pragmatics, or philosophy of language; or permission of instructor.  

* LING 392a / LING 792a, From Morpho-Syntax to Meaning: Definiteness, Indefiniteness, Genericity  
Veneeta Dayal  
This course explores how individual languages encode the notions of definiteness, indefiniteness and genericity, and whether it is possible to predict such meanings when overt morpho-syntactic cues are absent. Languages with and without definite/indefinite articles provide critical test cases. Students read primary semantic literature on each of these three topics to get a solid grounding in the theoretical issues surrounding them. They also evaluate how empirical discoveries from different languages have shaped our understanding of the connection between morpho-syntax and semantics. The broader question considered here is the possibility of a restrictive theory of cross-linguistic variation in the interpretation of nominals. Prerequisite: LING 263 or permission of instructor.  

* LING 394b / LING 794b, Asserting, Asking, Answering  
Staff  
This course introduces students to some of the current debates in the literature on questions. It articulates the relationship between declarative/interrogative structures and the speech acts of asserting and asking. It also probes the status of an assertion as an answer to a question. Some of the main approaches to the semantics of questions are introduced, with special attention on linguistic phenomena. These include pair-list answers, quantificational variability effects, scope marking, alternative questions and polar question particles. The left periphery of interrogative clauses is explored by studying the behavior of interrogatives under different embedding predicates, and by locating the points at which direct question intonation and pragmatic bias in questioning can enter the derivation. Prerequisite: LING 263 or permission of instructor.  

* LING 490a, Research Methods in Linguistics  
Raffaella Zanuttini  
Development of skills in linguistics research, writing, and presentation. Choosing a research area, identifying good research questions, developing hypotheses, and presenting ideas clearly and effectively, both orally and in writing; methodological issues; the balance between building on existing literature and making a novel contribution. Prepares for the writing of the senior essay.  

* LING 491a or b, The Senior Essay  
Staff  
Research and writing of the senior essay under the guidance of a faculty adviser. Students present research related to their essays in a weekly colloquium. Prerequisite: LING 490.
Mathematics (MATH)

* MATH 107b, Mathematics in the Real World  Meghan Anderson
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. Permission of instructor required. Enrollment limited to 25 students who have not previously taken a high school or college calculus course.  QR

MATH 108a, Estimation and Error  Staff
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. Permission of instructor required. Enrollment limited to 25 students who have not previously taken a high school or college calculus course.  QR

* MATH 110a, Introduction to Functions and Calculus I  Su Ji Hong
Comprehensive review of precalculus, limits, differentiation and the evaluation of definite integrals, with applications. Precalculus and calculus topics are integrated. Emphasis on conceptual understanding and problem solving. Successful completion of MATH 110 and 111 is equivalent to MATH 112. No prior acquaintance with calculus is assumed; some knowledge of algebra and precalculus mathematics is helpful. Placement into MATH 110 on the Mathematics placement exam is required. Enrollment in MATH 110 is through preference selection, except during April registration (where sections are open to everyone who has placement in the course).  QR

* MATH 110b, Introduction to Functions and Calculus II  Su Ji Hong
Continuation of MATH 110. Comprehensive review of precalculus, limits, differentiation and evaluation of definite integrals, with applications. Precalculus and calculus topics are integrated. Emphasis on conceptual understanding and problem solving. Successful completion of both MATH 110 and 111 is equivalent to MATH 112. Prerequisite: MATH 110. Enrollment in MATH 111 is through preference selection.  QR

* MATH 112a or b, Calculus of Functions of One Variable I  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. Placement into MATH 112 on the Mathematics placement exam is required. No prior acquaintance with calculus or computing assumed. May not be taken after MATH 111. Enrollment in MATH 112 is through preference selection, except during April registration (where sections are open to everyone who has placement in the course).  QR

* MATH 115a or b, Calculus of Functions of One Variable II  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. Prerequisite: MATH 111 or MATH 112, or placement into MATH 115 on the Mathematics placement exam. May not be taken after MATH
Enrollment in MATH 115 is through preference selection, except during April registration (where sections are open to everyone who has placement in the course).

* MATH 116a, Mathematical Models in the Biosciences I: Calculus Techniques  
Staff  
Techniques and applications of integration, approximation of functions by polynomials, modeling by differential equations. 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. Prerequisite: MATH 112, or placement into MATH 115/116 on the Mathematics placement exam. May not be taken after MATH 115.  

* MATH 118a or b, Introduction to Functions of Several Variables  
Staff  
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.

* MATH 120a or b, Calculus of Functions of Several Variables  
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. Prerequisite: MATH 115 or 116, or placement into MATH 120 on the Mathematics placement exam. May not be taken after MATH 121. Enrollment in MATH 120 is through preference selection, except during April registration (where sections are open to everyone who has placement in the course).

* MATH 121b, Mathematical Models in the Biosciences II: Advanced Techniques  
John Hall  
Mathematical modeling for the biosciences, with a strong focus on multivariable calculus techniques. Applications may include epidemiological models, mathematical foundations of virus and antiviral dynamics, ion channel models and cardiac arrhythmias, and evolutionary models of disease. Prerequisite: MATH 115 or 116, or placement into MATH 120/121 on the Mathematics placement exam. May not be taken after MATH 120.

MATH 160b / AMTH 160b / S&DS 160b, The Structure of Networks  
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.

MATH 222a or b / AMTH 222a or b, Linear Algebra with Applications  
Staff  
Determinants. Eigenvalues and eigenvectors. Diagonalization. Difference equations and matrix differential equations. Symmetric and Hermitian matrices. Orthogonal and unitary transformations; similarity transformations. Students who plan to continue with upper level math courses should instead consider MATH 225 or 226. After MATH 115 or equivalent. May not be taken after MATH 225 or 226. QR

MATH 225a or b, Linear Algebra  Staff
An introduction to the theory of vector spaces, matrix theory and linear transformations, determinants, eigenvalues, inner product spaces, spectral theorem. The course focuses on conceptual understanding and serves as an introduction to writing mathematical proofs. For an approach focused on applications rather than proofs, consider MATH 222. Students with a strong mathematical background or interest are encouraged to consider MATH 226. Prerequisite: MATH 115 or equivalent. May not be taken after MATH 222, 226, or 231. QR

* MATH 226a, Linear Algebra (Intensive)  Ebru Toprak
A fast-paced introduction to the theory of vector spaces, matrix theory and linear transformations, determinants, eigenvalues, inner product spaces, spectral theorem. Topics are covered at a deeper level than in MATH 225, and additional topics may be covered, for example canonical forms or the classical groups. The course focuses on conceptual understanding. Familiarity with writing mathematical proofs is recommended. For a less intensive course, consider MATH 225. For an approach focused on applications, consider MATH 222. Prerequisite: MATH 115 or equivalent. May not be taken after MATH 222, 225, or 231. QR

MATH 240b, Advanced Linear Algebra  Yakov Kononov
The course continues the study of linear algebra from MATH 225 or MATH 230/231. It discusses several aspects of linear algebra that are of crucial importance for the subject and its applications to abstract algebra, geometry and number theory. Topics include generalized eigenspaces and Jordan normal form theorem, dual vector spaces, bilinear and hermitian forms, symmetric and hermitian operators, Hom spaces and tensor products. After MATH 225 or 226 or 231.

MATH 241a / S&DS 241a, Probability Theory  Yihong Wu
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

MATH 242b / S&DS 242b, Theory of Statistics  Zhou Fan
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 S&DS 241 and concurrently with or after MATH 222 or 225, or equivalents. QR

MATH 244a or b / AMTH 244a or b, Discrete Mathematics  Staff
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  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 226 or equivalent.  QR

MATH 247b / AMTH 247b, Intro to Partial Differential Equations  Erik Hiltunen
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 or 226, MATH 246
or ENAS 194 or equivalents.  QR

MATH 251b / EENG 434b / S&DS 351b, Stochastic Processes  Amin Karbasi
Introduction to the study of random processes including linear prediction and Kalman
filtering, Poison counting process and renewal processes, Markov chains, branching
processes, birth-death processes, Markov random fields, martingales, and random
walks. Applications chosen from communications, networking, image reconstruction,
Bayesian statistics, finance, probabilistic analysis of algorithms, and genetics and
evolution. Prerequisite: S&DS 241 or equivalent.  QR

MATH 255a or b, Analysis 1  Staff
Introduction to Analysis. Properties of real numbers, limits, convergence of sequences
and series. Power series, Taylor series, and the classical functions. Differentiation
and Integration. Metric spaces. The course focuses on conceptual understanding and
serves as an introduction to writing mathematical proofs. Prerequisite: MATH 115 or
equivalent, and MATH 225 or 226. May not be taken after MATH 256, 300, or 301.  QR

*MATH 256b, Analysis 1 (Intensive)  Charles Smart
Fast-paced introduction to Analysis. Properties of real numbers, limits, convergence
of sequences and series. Power series, Taylor series, and the classical functions.
Differentiation and Integration. Metric spaces. The course focuses on conceptual
understanding. Familiarity with writing mathematical proofs is assumed, and is further
developed in the course. Prerequisite: MATH 115 or equivalent, and MATH 225 or 226. May not be taken after MATH 255, 300, or 301.  QR

MATH 260b / AMTH 260b, 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 or 226.  QR

MATH 270a, Set Theory  James Barnes
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 302a, Vector Analysis and Integration on Manifolds  Andrew Neitzke
A rigorous treatment of the modern toolkit of multivariable calculus. Differentiation
and integration in R^n. Inverse function theorem. Fubini’s theorem. Multilinear
algebra and differential forms. Manifolds in R^n. Generalized Stokes’ Theorem. The
course focuses on conceptual structure and proofs, and serves as a gateway to more
advanced courses which use the language of manifolds. Prerequisites: MATH 225 or
226, and MATH 255 or 256.  QR
MATH 305b, Analysis 2: Lebesgue Integration and Fourier Series  Hee Oh
The Lebesgue integral, Fourier series, applications to differential equations.
Prerequisites: MATH 225 or 226, and MATH 255 or 256 or 301. With permission of
instructor, may be taken after MATH 225 or 226, and MATH 231 or 250.  QR

MATH 310a, Introduction to Complex Analysis  John Schotland
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. Prerequisites: MATH 225
or 226 or 231, and MATH 255 or 256 or 230 or 250, and MATH 302 or 120.  QR

* MATH 315b, Intermediate Complex Analysis  Ebru Toprak
Continuation of MATH 310. Topics may include argument principle, Rouche’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, Measure Theory and Integration  Charles Smart
Construction and limit theorems for measures and integrals on general spaces; product
measures; Lp spaces; integral representation of linear functionals. After MATH 305 or
equivalent.  QR  RP

MATH 322a / AMTH 322a, Geometric and Topological Methods in Machine Learning
Smita Krishnaswamy and Ian Adelstein
This course provides an introduction to geometric and topological methods in data
science. Our starting point is the manifold hypothesis: that high dimensional data live
on or near a much lower dimensional smooth manifold. We introduce tools to study
the geometric and topological properties of this manifold in order to reveal relevant
features and organization of the data. Topics include: metric space structures, curvature,
geodesics, diffusion maps, eigenmaps, geometric model spaces, gradient descent,
data embeddings and projections, and topological data analysis (TDA) in the form
of persistence homology and their associated “barcodes.” We see applications of these
methods in a variety of data types. Prerequisites: MATH 225 or 226; MATH 255 or
256; MATH 302; and CPSC 112 or equivalent programming experience. Students who
completed MATH 231 or 250 may substitute another analysis course level 300 or above
in place of MATH 302.  QR, SC

* MATH 325b, Introduction to Functional Analysis  Wilhelm Schlag
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, or after MATH 305 with permission of instructor.
QR

MATH 330a / S&DS 400a, Advanced Probability  Sekhar Tatikonda
Measure theoretic probability, conditioning, laws of large numbers, convergence
in distribution, characteristic functions, central limit theorems, martingales. Some
knowledge of real analysis assumed.  QR

* MATH 345a, Modern Combinatorics  Van Vu
Recent developments and important questions in combinatorics. Relations to other
areas of mathematics such as analysis, probability, and number theory. Topics include
probabilistic method, random graphs, random matrices, pseudorandomness in graph theory and number theory, Szemerédi’s theorem and lemma, and Green-Tao’s theorem. Prerequisite: MATH 244. QR

**MATH 350a or b, Introduction to Abstract Algebra** Staff
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. Prerequisites: one term of linear algebra and two terms of proof-based mathematics courses. (For example, MATH 225 and 255, or MATH 225 and 244, or MATH 230 and 231, or MATH 225 and 250.) QR RP

**MATH 353b, Introduction to Representation Theory** Ivan Loseu
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 350.

**MATH 370b, Fields and Galois Theory** Miki 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 373a, Algebraic Number Theory** Alexander Goncharov
Structure of fields of algebraic numbers (solutions of polynomial equations with integer coefficients) and their rings of integers; prime decomposition of ideals and finiteness of the ideal class group; completions and ramification; adeles and ideles; zeta functions. Prerequisites: MATH 310 and 370. QR

**MATH 380a, Algebra** Junliang Shen
The course serves as an introduction to commutative algebra and category theory. Topics include commutative rings, their ideals and modules, Noetherian rings and modules, constructions with rings, such as localization and integral extension, connections to algebraic geometry, categories, functors and functor morphisms, tensor product and Hom functors, projective modules. Other topics may be discussed at instructor’s discretion. After MATH 350 and 370. QR

**MATH 421a / AMTH 420a, The Mathematics of Data Science** Kevin O’Neill
This course aims to be an introduction to the mathematical background that underlies modern data science. The emphasis is on the mathematics but occasional applications are discussed (in particular, no programming skills are required). Covered material may include (but is not limited to) a rigorous treatment of tail bounds in probability, concentration inequalities, the Johnson-Lindenstrauss Lemma as well as fundamentals of random matrices, and spectral graph theory. Prerequisite: MATH 305. QR SC

**MATH 430b, Introduction to Topology** Daniel Douglas
The theory of fundamental groups and covering spaces, with particular reference to two-dimensional manifolds. Prerequisites: MATH 350, and MATH 255 or 256 or 300 or 301. QR

**MATH 435b, Differential Geometry** Jiewon Park
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. Prerequisites: MATH 225 or 226 or 231, and MATH 255 or 256 or 230 or 250, and MATH 302 or permission of instructor. QR

**MATH 470a or b, Individual Studies**  Andrew Neitzke and Miki Havlickova

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 475a or b, Senior Essay**  Andrew Neitzke and Miki Havlickova

Interested students may write a senior essay 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 at least one semester in advance of the semester in which they plan to write the essay.

*M MATH 480a or b, Senior Seminar: Mathematical Topics  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 give several presentations on the chosen topic. Enrollment limited to seniors majoring in Mathematics, Economics and Mathematics, or Mathematics and Philosophy.

*M MATH 481b, Senior Seminar: Topics in Economics and Mathematics  Kevin O’Neill and Dirk Bergemann

A number of topics at the intersection of economics and mathematics are chosen each term—e.g., the theory of networks, market design and equilibrium, information economics and probability—and explored in the seminar. Students present several talks on the chosen topic. This section is devoted to topics of interest to majors in Economics or Mathematics majors, and in particular to students in the joint major Economics and Mathematics. The seminar is co-taught by a member of the Economics Department. Enrollment limited to seniors majoring in Mathematics, Economics and Mathematics, or Mathematics and Philosophy.

**Mechanical Engineering (MENG)**

*M MENG 099b / MB&B 099b / MCDB 099b / PHYS 099b / SCIE 099b, Introduction to Research Methods in Physics and Biology: Preparing for a First Research Experience  Staff

Spanning both the classroom and laboratory, this seminar course provides an immersive introduction to scientific research. Students build practical laboratory skills, computational competency, and begin to build fluency in the structures and modes of communication that define modern research. The course also facilitates identification of a laboratory mentor and devising a research proposal (with mentorship) for competitive summer research fellowship applications. This class is open to first-year students, interested in any STEM major, who have no prior research experience. This course does not count toward major requirements. Enrollment limited to first-year students. Preregistration required; see under First-Year Seminar Program.
MENG 185a or b, Mechanical Design  
Staff  
A course designed for potential majors in mechanical engineering, with units on design methodology, statics, mechanics of materials, and machining. Includes a design project. Prerequisite: physics at the level of PHYS 180, or permission of instructor.  

MENG 211a or b, Thermodynamics for Mechanical Engineers  
Staff  
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.  

MENG 280a, Mechanical Engineering I: Strength and Deformation of Mechanical Elements  
Diana Qiu  
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.  

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).  

MENG 286La or b, Solid Mechanics and Materials Science Laboratory  
Staff  
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.  

* MENG 320a / ENRG 320a / ENVE 320a, Energy, Engines, and Climate  
Alessandro Gomez  
The course aims to cover the fundamentals of a field that is central to the future of the world. The field is rapidly evolving and, although an effort will be made to keep abreast of the latest developments, the course emphasis is on timeless fundamentals, especially from a physics perspective. Topics under consideration include: key concepts of climate change as a result of global warming, which is the primary motivator of a shift in energy supply and technologies to wean humanity off fossil fuels; carbon-free energy sources, with primary focus on solar, wind and associated needs for energy storage and grid upgrade; traditional fossil-fuel power plants and engines, that are currently involved in 85% of energy conversion worldwide and we can’t “turn on a dime". Elements of thermodynamics are covered throughout the course as needed, including the definition of various forms of energy, work and heat as energy transfer, the principle of conservation of energy, first law and second law, and rudiments of heat engines. We conclude with some considerations on energy policy and with the "big picture" on how to tackle future energy needs. Designed for juniors and seniors in
science and engineering. Prerequisite: MENG 211 or permission from the instructor.

* MENG 325a, Machine Elements and Manufacturing Processes  Joran Booth
This course provides students a working knowledge of two fundamental topics related to mechanical design: machine elements and manufacturing processes. Machine elements refer one or more of a range of common design elements that transmit power and enable smooth and efficient motion in mechanical systems with moving parts. This course introduces the most common of these elements and gives students the tools to systems design with them. Topics include common linkages, gearing, bearings, springs, clutches, brakes, and common actuators such as DC motors. Manufacturing processes are necessary for the mechanical design engineer to effectively perform her or his duties; they provide an understanding of how the parts and systems that they design are fabricated, allowing “Design for Manufacturing” principles to be taken into account in the product development process. Students learn the basics of common commercial manufacturing processes for mechanical systems, including low-volume processes such as machining to high-volume processes such as casting (metal parts), molding (plastic parts), and stamping (sheet metal parts). Prerequisites: Extensive CAD experience. MENG 185 and MENG 280 recommended.

MENG 361a, Mechanical Engineering II: Fluid Mechanics  Mitchell Smooke
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 180.

* MENG 363Lb, Fluid Mechanics and Thermodynamics Laboratory  Staff
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. WR, SC RP

MENG 389b, Mechanical Engineering IV: Fluid and Thermal Energy Science  Staff
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.

MENG 390Lb, Mechatronics Laboratory  Staff
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. ½ Course cr

MENG 400a or b, Computer-Aided Engineering  Staff
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 404b / BENG 404b, Medical Device Design and Innovation  
Staff
The engineering design, project planning, prototype creation, and fabrication processes for medical devices that improve patient conditions, experiences, and outcomes. Students develop viable solutions and professional-level working prototypes to address clinical needs identified by practicing physicians. Some attention to topics such as intellectual property, the history of medical devices, documentation and reporting, and regulatory affairs. o Course cr

MENG 425b, Advanced Design and Analysis of Machines  
Staff
There are many useful, classic mechanisms that require a single actuator to operate. These include four-bar mechanisms, slider-cranks, cam-followers, and scotch-yokes. In this course, students learn to design (synthesize) classic mechanisms. They also learn how to analyze the kinematics and kinetics of important machines. While systems based on single actuators are common, the course then introduces the dynamics of multiple degree-of-freedom machines such as robotic actuators. This course focuses on planar systems and students learn to write equations of motion of robots that can roll forward with multiple articulating linkages. Students design and analyze using SolidWorks and solve equations with Matlab. A project is designed, analyzed, built, and tested utilizing a microcontroller and 3D printer. Prerequisites: ENAS 130, MENG 325.

MENG 440a / ENAS 440a, Applied Numerical Methods for Algebraic Systems, Eigensystems, and Function Approximation  
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 experience with Matlab, C++, or Fortran programming. QR

MENG 443a, Introduction to Robotics, Control, and Learning  
Ian Abraham
This course introduces fundamental concepts of robotics, optimal control, and reinforcement learning. Lectures cover topics on state representation, manipulator equations, forward/inverse kinematics/dynamics, planning and control of fully actuated and underactuated robots, operational space control, control via mathematical optimization, and reinforcement learning. The topics focus on connecting mathematical formulations to algorithmic implementation through simulated robotic systems. Coding assignments provide students experience setting up and interfacing with several simulated robotic systems, algorithmic implementation of several state-of-the-art methods, and a codebase for future use. Special topic lectures focus on recent developments in the field of robotics and highlight core research areas. A final class project takes place instead of a final exam where students leverage the codebase they have built throughout the course in a robot problem of their choosing. Experience with differential equations, linear algebra, and basic understanding of dynamics is required. Basic coding experience in e.g., python, C++, C, are also required. Juniors and seniors preferred.
* MENG 450b / APHY 450b / ENAS 450b, Advanced Synchrotron Techniques and Electron Spectroscopy of Materials  Charles Ahn
Introduction to concepts of advanced x-ray and electron-based techniques used for understanding the electronic, structural, and chemical behavior of materials. Students learn from world-leading experts on fundamentals and practical applications of various diffraction, spectroscopy, and microscopy methods. Course highlights the use of synchrotrons in practical experiments. Prerequisites: physics and quantum mechanics/physical chemistry courses for physical science and engineering majors, or by permission of instructor. QR, SC

MENG 459b / BENG 459b, Neuromuscular Biomechanics  Staff
Mechanics and control of animal movement, including skeletal muscle mechanics, systems-level neural and sensory physiology, elements of feedback control, and optimal control. Deriving equations of motion for multibody mechanical systems that are actuated by muscles or muscle-like motors; incorporating sensory feedback; analyzing system properties such as stability and energetics. Prerequisites: MENG 383 and MATH 222 or equivalents, and familiarity with MATLAB or a similar scientific computing environment. QR, RP

MENG 464b, Forces on the Nanoscale  Staff
Modern materials science often exploits the fact that atoms located at surfaces or in thin layers behave differently from bulk atoms to achieve new or greatly altered material properties. The course provides an in-depth discussion of intermolecular and surface forces, which determine the mechanical and chemical properties of surfaces. In the first part, we discuss the fundamental principles and concepts of forces between atoms and molecules. Part two generalizes these concepts to surface forces. Part three then gives a variety of examples. The course is of interest to students studying thin-film growth, surface coatings, mechanical and chemical properties of surfaces, soft matter including biomembranes, and colloidal suspensions. Some knowledge of basic physics, mathematics, chemistry, and thermodynamics is expected. SC

* MENG 469a, Aerodynamics  Juan de la Mora
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. Some basic knowledge of thermodynamics is expected. Prerequisite: MENG 361 or permission of instructor. QR, SC

* MENG 471a and MENG 472b, Special Projects I  Staff
Faculty-supervised one- or two-person projects with emphasis on research (experiment, simulation, or theory), engineering design, or tutorial study. Students are expected to consult the course instructor, director of undergraduate studies, and/or appropriate faculty members to discuss ideas and suggestions for topics. Focus on development of professional skills such as writing abstracts, prospectuses, and technical reports as well as good practices for preparing posters and delivering presentations. Permission of advisor and director of undergraduate studies is required. Students are required to attend a 75-minute section once per week.

* MENG 473a and MENG 474b, Special Projects II  Staff
Faculty-supervised one- or two-person projects with emphasis on research (experiment, simulation, or theory), engineering design, or tutorial study. Students
are expected to consult the course instructor, director of undergraduate studies, and/or appropriate faculty members to discuss ideas and suggestions for topics. These courses may be taken at any time during the student’s career and may be taken more than once. Prerequisites: MENG 471 or 472; permission of adviser and director of undergraduate studies.

MENG 487La, Mechanical Design: Process and Implementation I  Joran Booth and Amit Datye
This course is the first half of the capstone design sequence (students take MENG 488 in the spring semester of the same academic year) and is a unique opportunity to apply and demonstrate broad and detailed knowledge of engineering in a team effort to design, construct, and test a functioning engineering system. The lecture portion of the class provides guidance in planning and managing your project, as well other topics associated with engineering design. This course sequence requires quality design; analyses and experiments to support the design effort; and the fabrication and testing of the engineered system; as well as proper documentation and presentation of results to a technical audience. Prerequisites: MENG 280, MENG 325, MENG 361. MENG 185 and MENG 390 are strongly suggested.

MENG 488Lb, Mechanical Design: Process and Implementation II  Staff
This course is the second half of the capstone design sequence (students take MENG 487 in the fall semester of the same academic year) and is a unique opportunity to apply and demonstrate broad and detailed knowledge of engineering in a team effort to design, construct, and test a functioning engineering system. The lecture portion of the class provides guidance in planning and managing your project, as well other topics associated with engineering design. This course sequence requires quality design; analyses and experiments to support the design effort; and the fabrication and testing of the engineered system; as well as proper documentation and presentation of results to a technical audience. Prerequisites: MENG 487, MENG 280, and MENG 361. MENG 185 and MENG 325 are strongly suggested.

Modern Greek/Hellenic Studies (MGRK)

MGRK 110a, 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.  L1 1½ Course cr

MGRK 120b, 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.  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.  L4 1½ Course cr
* MGRK 212b / LITR 328b, Folktales and Fairy Tales  Maria Kaliambou
History of the folktale from the late seventeenth through the late twentieth centuries. Basic concepts, terminology, and interpretations of folktales, with some attention to twentieth-century theoretical approaches. Performance and audience, storytellers, and gender-related distinctions. Interconnections between oral and written traditions in narratives from western Europe and Greece.  WR, HU TR

* MGRK 216b / CLCV 216b / LITR 239b / WGSS 209b, Dionysus in Modernity  George Syrimis
Modernity’s fascination with the myth of Dionysus. Questions of agency, identity and community, and psychological integrity and the modern constitution of the self. Manifestations of Dionysus in literature, anthropology, and music; the Apollonian-Dionysiac dichotomy; twentieth-century variations of these themes in psychoanalysis, surrealism, and magical realism.  HU TR

* MGRK 222b / HIST 237Jb, History of Modern Greece  Paris Aslanidis
This seminar studies the history of modern Greece since the early 19th century. Greece’s contested position between East and West, both geopolitically and symbolically, functions as the ideational backdrop for the study of the country’s historical trajectory and the development of its main institutions. Discussion of the future of the Greek state vis-à-vis the ongoing sociopolitical crisis it has been facing since its near bankruptcy in 2010 is also considered.  HU

* MGRK 237a / GLBL 215a / LAST 386a / PLSC 375a / SOCY 389a, Populism  Paris Aslanidis
Investigation of the populist phenomenon in party systems and the social movement arena. Conceptual, historical, and methodological analyses are supported by comparative assessments of various empirical instances in the US and around the world, from populist politicians such as Donald Trump and Bernie Sanders, to populist social movements such as the Tea Party and Occupy Wall Street.  SO

* MGRK 238a / FILM 341a / WGSS 233a, Weird Greek Wave Cinema  George Syrimis
The course examines the cinematic production of Greece in the last fifteen years or so and looks critically at the popular term “weird Greek wave” applied to it. Noted for their absurd tropes, bizarre narratives, and quirky characters, the films question and disturb traditional gender and social roles, as well as international viewers’ expectations of national stereotypes of classical luminosity—the proverbial “Greek light”—Dionysian exuberance, or touristic leisure. Instead, these works frustrate not only a wholistic reading of Greece as a unified and coherent social construct, but also the physical or aesthetic pleasure of its landscape and its ‘quaint’ people with their insistence on grotesque, violent, or otherwise disturbing images or themes (incest, sexual otherness and violence, aggression, corporeality, and xenophobia). The course also pays particular attention on the economic and political climate of the Greek financial crisis during which these films are produced and consumed and to which they partake. None  HU

* MGRK 300b / CLCV 319b / HIST 242Jb / WGSS 293b, The Olympic Games, Ancient and Modern  George Syrimis
Introduction to the history of the Olympic Games from antiquity to the present. The mythology of athletic events in ancient Greece and the ritual, political, and social ramifications of the actual competitions. The revival of the modern Olympic movement in 1896, the political investment of the Greek state at the time, and specific games as
they illustrate the convergence of athletic cultures and sociopolitical transformations in
the twentieth century.  

* MGRK 304b / ER&M 376b / PLSC 376b / SOCY 307b, Extreme and Radical Right
Movements  Paris Aslanidis
Extreme and radical right movements and political parties are a recurrent phenomenon
found in most parts of the world. Discussion of their foundational values and the causes
of their continuous, even increasing, support among citizens and voters.  

* MGRK 305a / HIST 294Ja, The Age of Revolution  Paris Aslanidis
The course is a comparative examination of the international dimensions of several
revolutions from 1776 to 1848. It aims to explore mechanisms of diffusion, shared
themes, and common visions between the revolutionary upheavals in the United States,
France, Haiti, South America, Greece, and Italy. How similar and how different were
these episodes? Did they emerge against a common structural and societal backdrop?
Did they equally serve their ideals and liberate their people against tyranny? What
was the role of women and the position of ethnic minorities in the fledgling nation-
states? As the year 2021 marks the bicentennial of the Greek Revolution of 1821, special
attention is given to the intricate links forged between Greek revolutionary intellectuals
and their peers in Europe and other continents  

Modern Middle East Studies (MMES)

MMES 148b / HIST 345b / JDST 265b / RLST 202b, Jews in Muslim Lands from the
Seventh to the Sixteenth Centuries  Ivan Marcus
Jewish culture and society in Muslim lands from the time of the Prophet Muhammad
to that of Suleiman the Magnificent. Topics include Islam and Judaism; Jerusalem as
a holy site; rabbinic leadership and literature in Baghdad; Jewish courtiers, poets, and
philosophers in Muslim Spain; and the Jews in the Ottoman Empire.  

MMES 149a / ER&M 219a / HIST 219a / JDST 200a / RLST 148a, Jewish History and
Thought 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 non-Western distributional credit within the History
major, upon application to the director of undergraduate studies.  

MMES 156a / HEBR 161a / JDST 407a, 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; Mizrachi and Arab music; feminism, sexuality,
and gender; class and musical consumption; criticism, protest, and globalization.
Conducted in Hebrew. Prerequisite: HEBR 140 or equivalent.  

* MMES 157b / JDST 306b / NELC 157b, Israeli Narratives  Shiri Goren
This course looks at contemporary representations of social, political, and domestic
space in Israel through cultural production such as literature, visual work, and art. It
focuses on close reading of major Israeli works in translation with attention to how
their themes and forms relate to the Israeli condition. Reading and viewing include:
Amos Oz’s major novel *A Tale of Love and Darkness*, *Anne Frank: The Graphic Diary*, Maya Arad’s novella “The Hebrew Teacher,” TV show *Arab Labor* and writing by Yehudah Amichai, Etgar Keret, and Sayed Kashua, among others. We discuss topics and theories of personal and collective identity formation, war and peace, ethnicity and race, migration, nationalism, and gender. No knowledge of Hebrew required. WR, HU, TR

* MMES 159a / HEBR 159a / JDST 409a, 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

* MMES 161b / HEBR 162b / JDST 319b, Israel in Ideology and Practice  
  Dina Roginsky  
  An advanced Hebrew class focusing on changing ideology and politics in Israel. Topics include right and left wing political discourse, elections, State-Religion dynamics, the Jewish-Arab divide, and demographic changes. Materials include newspapers, publications, on-line resources, speeches of different political and religious groups, and contemporary and archival footage. Comparisons to American political and ideological discourse. Prerequisite: HEBR 140 or permission of instructor. L5 RP

* MMES 164b / LITR 473b, Politics and Literature in the Middle East  
  Samuel Hodgkin  
  This course considers the relationship between literature and politics in Turkey, Iran, and the Arab world since the late 19th century. We read novels, short stories, poetry, essays, play scripts, and comics, and watch movies, while situating them in their artistic and political contexts. This course considers the ways that an artwork can intervene in the political debates of its time, while taking seriously the distinctive modes of political thought that are possible only through art. Topics include gender relations, the legacies of European colonialism, modernization and modernism, revolutionary movements, the role of religion in society, experiences of violence and trauma, and the drastic changes to Middle Eastern societies wrought by the oil boom. All readings are in English translation, but if sufficient students with relevant language skills enroll, an additional biweekly session may be arranged for selected course readings in the original languages. HU

* MMES 168a / HEBR 158a / JDST 305a, Contemporary Israeli Society in Film  
  Shiri Goren  
  Examination of major themes in Israeli society through film, with emphasis on language study. Topics include migration, gender and sexuality, Jewish/Israeli identity, and private and collective memory. Readings in Hebrew and English provide a sociohistorical background and bases for class discussion. Prerequisites: HEBR 140 or permission of instructor. L5, HU RP

* MMES 176a / PERS 161a, Cinema of Iran, Past and Present  
  Farkhondeh Shayesteh  
  A thematic survey of Iranian cinema, past and present. Prominent Iranian directors such as Kiarostami, Beyzai, Panahi, Banietemad, and Farhadi are explored through discussion and in-class viewing of clips from assigned films. Students enhance their
awareness of Persian culture through Iranian films while advancing their language skills. L5 and instructor permission. L5

* MMES 201a / HUMS 233a / LITR 178a / NELC 156a, Classics of the Arabic-Islamic World  Shawkat Toorawa
Survey of the literary tradition of the Arabic-Islamic world (West Asia, North Africa, and Muslim Spain), a textual conversation among diverse authors from late antiquity to the Mamluk period. Prose and poetry from the Qur’an to the Arabian Nights; attention to the interdependence of the works and their cultural setting, the agendas authors pursued, and the characters they portrayed. HU TR

* MMES 216b / HEBR 156b / JDST 405b, 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

* MMES 308b / ER&M 306b / JDST 353b / LITR 308b, Literature at the Limit from Palestine and Israel  Hannan Hever
Readings and films from post-1948 Palestine and Israel, with special attention given to historical and political contexts. Consideration of the limit, in the geographical sense of borders and checkpoints, as well as in the existential sense of extremity and trauma. HU

* MMES 327a / NELC 327a, Introduction to the Field of Near Eastern Languages & Civilizations  Kevin van Bladel
This half-credit course is a concise introduction to the field of Near Eastern Languages & Civilizations and its cognates (Middle Eastern Studies, etc.), focusing on the history and constitution of institutional bases for the study of the Near East, the development of the terms by which it is defined, subfields like Assyriology, Egyptology, and Arabic studies, the debate over Orientalism and its aftermath, the conflation of the Near East with religions and nations, the development of Area Studies, the place of NELC knowledge in higher education and scholarship generally, the public face of Near Eastern studies, and how careers in NELC are made. Priority given to seniors and juniors with majors in the NELC department. ½ Course cr

* MMES 342a / HIST 232Ja / HUMS 443a / JDST 270a / RLST 201a, Medieval Jews, Christians, and Muslims In Conversation  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. Counts toward either European or Middle Eastern distributional credit within the History major, upon application to the director of undergraduate studies. WR, HU

* MMES 382a / ARCH 380a / HSAR 437a, The Global Museum  Kishwar Rizvi
When the Carters (Jay-Z and Beyonce) chose the Louvre Paris as the backdrop to their 2018 hit single, they were tapping into the cultural capital of the museum. Like
its counterparts across the world, the Louvre has evolved from a princely collection to a national symbol and, today, to a global brand, with a franchise in Abu Dhabi which opened in 2017. This seminar analyzes how museums are utilized for a variety purposes, from the local to the transnational, and the relationship between their architectural design and their economic, social and urban impact. The class meets with curators and designers and takes a field trip to the Smithsonian museums in Washington, DC.  

**MMES 391a / RLST 287a, Islamic Theology and Philosophy**  Staff

Historical survey of major themes in Muslim theology and philosophy, from teachings of the Qur’an up to the end of the per-modern period around 1800. The systematic character of Muslim thought and of the arguments given by thinkers; reason vs. revelation; the emergence of Sunnism and Shi’ism; falsafa, Sufism and Illuminationism as well as post-classical thought.  

*MMES 402b / AFST 443b / FREN 442b / LITR 484b, Decolonizing Memory : Africa & the Politics of Testimony*  Jill Jarvis

This seminar explores the politics and poetics of memory in a time of unfinished decolonization. It also provides students with a working introduction to anticolonial, postcolonial, and decolonial critique. Together we bring key works on the topics of state violence, trauma, and testimony into contact with literary works and films by artists of the former French and British empires in Africa. Reading literary and theoretical works together permits us to investigate archival silences and begin to chart a future for the critical study of colonial violence and its enduring effects. Literary readings may include works by Djebar, Rahmani, Ouologuem, Sebbar, Diop, Head, Krog. Films by Djebar, Leuvrey, Sembène, and Sissako. Theoretical readings may include works by Arendt, Azoulay, Césaire, Derrida, Fanon, Mbembe, Ngũgĩ, Spivak, and Trouillot.  

*MMES 418a / JDST 339a / LITR 418a / RLST 203a, The Classics of Modern Hebrew Literature*  Hannan Hever

Overview of the Poetics, Culture, History, and Political dynamics of Modern Hebrew Literature as national literature over the last 300 years. The course traces the literary development of its diasporic condition in Europe through the Hebrew Literature that is created in the Israeli Jewish sovereignty. The course is taught in Hebrew and the readings of literary texts are also in Hebrew. No background in Jewish literature, Hebrew literature, or Jewish culture is required.  

*MMES 430a / ANTH 441a / WGSS 430a, Gender and Citizenship in the Middle East*  Eda Pepi

This seminar explores the gendered and ethnic-based social processes and forms of power that citizenship, statelessness, and migration crises fuel, and are fueled by, in the Middle East and North Africa. The history of gender and citizenship in the region is imbricated in ethnosocial and orientalist colonial legacies that articulate a racialized problematic of “modernity.” Part of these legacies involve obscuring the role that women, sexual minorities, and gender, more broadly, have played in framing citizenship and statehood in the Middle East in global, regional, and local imaginations not only as border policing and legal doctrine, but as signifier — and reifier — of culture, race, and ethnicity. By examining the gendered and sexual dimensions of war, conflict, and partition, and the formation of modern citizenship in the Middle East, the seminar presents ethnographic, historical, literary and visual scholarship that theorizes the
role of kinship and citizenship in gendered and racialized narratives of the nation and political sovereignty.

* MMES 447b / ANTH 447b, Culture and Politics in the Contemporary Middle East
  Marcia Inhorn
In the decade since the 2011 Arab uprisings, the challenges facing the Middle East have been profound. They include various forms of war and displacement, political and economic instability, social upheaval and societal rupture. Indeed, by 2015, millions of Middle Eastern men, women, and children had been driven from their homes by conflict. This advanced undergraduate/graduate seminar is designed to explore some of the most important contemporary cultural and political shifts that are shaping life across the Middle East and North Africa (MENA). The course aims for broad regional coverage, with particular focus on a variety of important Middle Eastern nations (e.g., Egypt, Lebanon, Palestine, Saudi Arabia, Turkey, Iran). Students should emerge from the course with a keener sense of Middle Eastern regional histories and contemporary social issues, as described by a new generation of leading scholars in the field of Middle East Studies and particularly Middle East Anthropology. This course is thus designed for students in Anthropology, Modern Middle East Studies, and Global Affairs, but also from the disciplines of Sociology, History, Political Science, Near Eastern Languages and Cultures, and the like. The course is also intended for students in the CMES Graduate Certificate Program.

Modern Tibetan (MTBT)

View Courses

Molecular Biophysics and Biochemistry (MB&B)

* MB&B 090b, Topics in Cancer Biology  Sandy Chang
Introduction to cancer as a genetic disease, with a focus on major discoveries in cancer biology that offer mechanistic insights into the disease process. A brief history of cancer; influence of the genomic revolution on cancer diagnostics; molecular defects underlying specific cancers; current and future cancer therapeutics. Patient case studies highlight specific molecular pathways and treatment strategies. Enrollment limited to first-year students with a strong background in biology and/or chemistry, typically demonstrated by a score of 5 on Advanced Placement examinations. Preregistration required; see under First-Year Seminar Program.

* MB&B 099b / MCDB 099b / MENG 099b / PHYS 099b / SCIE 099b, Introduction to Research Methods in Physics and Biology: Preparing for a First Research Experience  Staff
Spanning both the classroom and laboratory, this seminar course provides an immersive introduction to scientific research. Students build practical laboratory skills, computational competency, and begin to build fluency in the structures and modes of communication that define modern research. The course also facilitates identification of a laboratory mentor and devising a research proposal (with mentorship) for competitive summer research fellowship applications. This class is open to first-year students, interested in any STEM major, who have no prior research experience. This course does not count toward major requirements. Enrollment limited to first-year students. Preregistration required; see under First-Year Seminar Program.
MB&B 105a or b / MCDB 105a or b, Biology, the World, and Us  Staff
Biological concepts taught in context of current societal issues, such as emerging
diseases, genetically modified organisms, green energy, and the human brain and
its disorders. Emphasis on biological literacy to enable students to evaluate scientific
arguments. sc 0 Course cr

* MB&B 200a / MCDB 300a, Biochemistry  Ronald Breaker
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. Prerequisites: BIOL 101 or equivalent performance on
the corresponding biological sciences placement examination; one term of organic
chemistry; or with permission of instructor. sc 0 Course cr

* MB&B 251La or b / MCDB 301La or b, Laboratory for Biochemistry  Aruna Pawashe
and Staff
An introduction to current experimental methods in molecular biology, biophysics, and
biochemistry. Limited enrollment. Prerequisite: BIOL 101. sc ½ Course cr

* MB&B 268b, Identity, Society, and STEM  Enrique De La Cruz and Andrew
Miranker
Matters of personal and group identity underpin the development of science as a
discipline, the lived experience of its practitioners, and the achievement of excellence
by diverse cultures collaborating on research, teaching in schools, treating the sick,
promoting business, and setting government policy. Yale STEM students who
are actively engaged in the study of any aspect of identity and society, whether
contemporary or historical, learn how STEM is intertwined with these interests. To
achieve this goal, students in this course must be simultaneously enrolled in a full-
credit, humanities course at Yale. Instructor permission is required and is based on a
proposal (250 words) that makes a compelling case for exploring STEM’s engagement
with the concurrent humanities course. Students use knowledge from the humanities
course to develop a unique project that can include anecdotal sources, but must also
include elements of formal scholarship learned in class. Primary scientific literature and
publicly available data relevant to students’ projects in any given semester are engaged
and discussed during seminar-styled class meetings. Dissemination of projects take
several forms including one appropriate for the public or popular press, a flash talk
presentation open to the Yale community, and lastly a formal term-paper. Prerequisite:
BIOL 101 (or permission of the instructor). ½ Course cr

MB&B 275a, Biology at the Molecular Level  Enrique De La Cruz and Andrew
Miranker
An introductory course for students to learn the key concepts from physics and physical
chemistry that govern the structure and function of biomolecules in biology and
medicine. Emphasis is placed on atomic-scale biomolecular motions, energy, reaction
rates and mechanisms; core elements that underpin the exquisite specificity and
regulated control of life processes. This course prepares students for upper level course
content where these concepts are revisited. Connections to medicine and research are
made through the use of practical examples, laboratory-based activities and training in
biologically relevant areas of math, statistics and computer programming. This course
is open to all Yale students. For MB&B majors, this course is accepted as fulfillment of
one semester of MB&B’s two-semester requirement in physical chemistry. Prerequisites:
BIOL 101-102, MATH 112 (or equivalent), college level General Chemistry, and high school Physics.  SC

**MB&B 300a, Principles of Biochemistry I**  Staff  
Discussion of the physical, structural, and functional properties of proteins, lipids, and carbohydrates, three major classes of molecules in living organisms. Energy metabolism and hormone signaling 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 175 (or CHEM 125) or 220.  SC  o Course cr

**MB&B 301b, Principles of Biochemistry II**  Christian Schlieker, Karla Neugebauer, and Franziska Bleichert  
Building on the principles of MB&B 300 through study of the chemistry and metabolism of DNA, RNA, and proteins. Critical thinking emphasized by exploration of experimental methods and data interpretation, from classic experiments in biochemistry and molecular biology through current approaches. Prerequisite: MB&B 300 or permission of instructor.  SC

**MB&B 330a / BENG 230a / MCDB 330a / NSCI 324a, Modeling Biological Systems I**  Staff  
Biological systems make sophisticated decisions at many levels. This course explores the molecular and computational underpinnings of how these decisions are made, with a focus on modeling static and dynamic processes in example biological systems. This course is aimed at biology students and teaches the analytic and computational methods needed to model genetic networks and protein signaling pathways. Students present and discuss original papers in class. They learn to model using MatLab in a series of in-class hackathons that illustrate the biological examples discussed in the lectures. Biological systems and processes that are modeled include: (i) gene expression, including the kinetics of RNA and protein synthesis and degradation; (ii) activators and repressors; (iii) the lysogeny/lysis switch of lambda phage; (iv) network motifs and how they shape response dynamics; (v) cell signaling, MAP kinase networks and cell fate decisions; and (vi) noise in gene expression. Prerequisites: MATH 115 or 116. BIOL 101-104, or with permission of instructors. This course also benefits students who have taken more advanced biology courses (e.g. MCDB 200, MCDB 310, MB&B 300/301).  QR, SC  o Course cr

**MB&B 361b / BENG 465b / MCDB 361b / NSCI 325b, Modeling Biological Systems II**  Jonathan Howard, Thierry Emonet, and Damon Clark  
Advanced topics related to dynamical processes in biological systems. Processes by which cells compute, count, tell time, oscillate, and generate spatial patterns. Time-dependent dynamics in regulatory, signal-transduction, and neuronal networks; fluctuations, growth, and form. Comparisons between models and experimental data. Dynamical models applied to neurons, neural systems, and cellular biophysical processes. Use of MATLAB to create models. Prerequisite: MCDB 330 or equivalent, or a 200-level biology course, or with permission of instructor.  QR

**MB&B 364a / MCDB 364a, Light Microscopy: Techniques and Image Analysis**  Joseph Wolenski  
A rigorous study of principles and pertinent modalities involved in modern light microscopy. The overall course learning objective is to develop competencies involving
advanced light microscopy applications common to multidisciplinary research. Laboratory modules coupled with critical analysis of pertinent research papers cover all major light microscope methods—from the basics (principles of optics, image contrast, detector types, fluorescence, 1P and 2P excitation, widefield, confocal principle, TIRF), to more recent advances, including: superresolution, lightsheet, FLIM/FRET, motion analysis and force measurements. This course is capped at 8 students to promote interactions and ensure a favorable hands-on experience. Priority for enrollment is given to students who are planning on using these techniques in their independent research. Prerequisites: MCDB 205, PHYS 170/171 or above, either CHEM 161/165 or above; with CHEM 134L, 136L or permission from the instructor.

**MB&B 365b, Biochemistry and Our Changing Climate**  Karla Neugebauer
Climate change is impacting how cells and organisms grow and reproduce. Imagine the ocean spiking a fever: cold-blooded organisms of all shapes, sizes and complexities struggle to survive when water temperatures go up 2-4 degrees. Some organisms adapt to extremes, while others cannot. Predicted and observed changes in temperature, pH and salt concentration do and will affect many parameters of the living world, from the kinetics of chemical reactions and cellular signaling pathways to the accumulation of unforeseen chemicals in the environment, the appearance and dispersal of new diseases, and the development of new foods. In this course, we approach climate change from the molecular point of view, identifying how cells and organisms—from microbes to plants and animals—respond to changing environmental conditions. To embrace the concept of “one health” for all life on the planet, this course leverages biochemistry, cell biology, molecular biophysics, and genetics to develop an understanding of the impact of climate change on the living world. We consider the foundational knowledge that biochemistry can bring to the table as we meet the challenge of climate change. Prerequisites: MB&B 300, MB&B 301, MB&B 200, or permission of the instructor.  sc

**MB&B 420a, Macromolecular Structure and Biophysical Analysis**  Yong Xiong and Jonathan Howard
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: MBB 301 and 302.

* **MB&B 425a / MCDB 425a, Basic Concepts of Genetic Analysis**  Jun Lu
The universal principles of genetic analysis in eukaryotes. Reading and analysis of primary papers that illustrate the best of genetic analysis in the study of various biological issues. Focus on the concepts and logic underlying modern genetic analysis. Prerequisite: MCDB 202 or pre-approval of instructor. sc

**MB&B 431b, Illuminating Biomolecular Mechanism with Structure**  Charles Sindelar, Julien Berro, and Nikhil Malvankar
This class focuses on methods for observing biomolecular structure and dynamics on the atomic and near-atomic length scales. Upon completion of the class, students have a working understanding of the theory that underpin methods such as cryo-electron microscopy and optical spectroscopy. All methods introduced are anchored to fundamental processes in biology and to biomedical advances through guided discussion of ground-breaking studies in contemporary primary literature. Prerequisite: MB&B 275, 301, or permission of the instructor. Enrolled students should have an introductory level understanding of Fourier transforms, linear/matrix algebra and
multivariate calculus, but note, portions of class time are used to review the small
subset of relevant mathematics essential for this course.  QR, SC

**MB&B 435a, Quantitative Approaches in Biophysics and Biochemistry**  Julien Berro,
Nikhil Malvankar, and Yong Xiong
An introduction to quantitative methods relevant to analysis and interpretation of
biophysical and biochemical data. Topics include statistical testing, data presentation,
and error analysis; introduction to mathematical modeling of biological dynamics;
analysis of large datasets; and Fourier analysis in signal/image processing and
macromolecular structural studies. Instruction in basic programming skills and data
analysis using MATLAB; study of real data from MB&B research groups. Prerequisites:
MATH 120 and MB&B 300 or equivalents, or with permission of instructors.  QR, SC

**MB&B 443b, Advanced Eukaryotic Molecular Biology**  Mark Hochstrasser, Wendy
Gilbert, and Matthew Simon
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**  Wendy Gilbert, Julien Berro,
and Mark Hochstrasser
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, Karla Neugebauer,
Seyedtaghi Takyar, George Miller, David Schatz, Sandy Chang, Daniel DiMaio, and
Franziska Bleichert
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 / Mcdb 452b / S&ds 352b, Biomedical Data Science, Mining and
Modeling**  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 459b / ENGL 459b / EVST 215b, Writing about Science, Medicine, and the
Environment**  Carl Zimmer
Advanced non-fiction workshop in which students write about science, medicine, and
the environment for a broad public audience. Students read exemplary work, ranging
from newspaper articles to book excerpts, to learn how to translate complex subjects
into compelling prose. Admission by permission of the instructor only. Applicants
should email the instructor at carl@carlzimmer.com with the following information:
1. One or two samples of nonacademic, nonfiction writing. (No fiction or scientific papers, please.) Indicate the course or publication, if any, for which you wrote each sample. 2. A note in which you briefly describe your background (including writing experience and courses) and explain why you’d like to take the course. WR RP

* MB&B 460Lb, Biochemical Analytics Laboratory  Staff
This is a project-oriented lab based around DNA aptamer design and microfluidics. Often referred to as lab-on-a-chip, these are mainstays of contemporary efforts in biomedical and environmental diagnostics. Students learn cutting-edge molecular evolution techniques to optimize DNA structures that can recognize and bind selectively to a molecular target. Students further learn from each other as they each report on their progress. Useful and transferrable skills include biomolecular engineering, next generation DNA sequencing, and assays using microfluidic devices built in collaboration with the Yale Center for Engineering, Innovation, and Design. Prerequisite or taken concurrently: MB&B 251L/MCDB 301L or equivalent. SC 1/2 Course cr

* MB&B 470a and MB&B 471b, Research in Biochemistry and Biophysics for the Major  Staff
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. 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. Students receive a letter grade. Up to 2 credits of MB&B 470/471 may be counted toward the MB&B major requirements. Enrollment limited to MB&B majors. Prerequisite: MB&B 251L or permission of the instructor. SC

* MB&B 472b and MB&B 473b, Research in Biochemistry and Biophysics  Staff
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. 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. Students are graded pass/fail. Taken after students have completed two credits of MB&B 470 and 471. These courses do not count toward the major requirements. Prerequisites: MB&B 470, 471 and 251L or permission of the instructor. SC

* MB&B 478a and MB&B 479b, Intensive Research in Biochemistry and Biophysics for the Major  Staff
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. 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  Dieter Soll and Nikhil Malvankar
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.

Molecular, Cellular, and Developmental Biology
(MCDB)

* MCDB 040b, The Science and Politics of Cancer  Robert Bazell
Fundamentals of cell biology, Darwinian evolution, immunology, and genetics that
underlie cancer; the history of cancer science and treatment; historical and current
policy issues. Enrollment limited to first-year students. Preregistration required; see
under First-Year Seminar Program.  SC

* MCDB 050a, Immunity and Microbes  Paula Kavathas
Introduction to the immune system and its interaction with specific microbes. Microbes
that cause illness such as influenza, coronaviruses, HIV, and HPV are discussed as well
as how we live in harmony with microbes that compose our microbiome. Readings
include novels and historical works on diseases such as polio and AIDS. Enrollment
limited to first-year students. Preregistration required; see under First-Year Seminar
Program.  SC

* MCDB 065a, The Science and Politics of HIV/AIDS  Robert Bazell
Study of the basic virology and immunology of HIV/AIDS, along with its extraordinary
historical and social effects. Issues include the threat of new epidemics emerging from a
changing global environment; the potential harm of conspiracy theories based on false
science; and how stigmas associated with poverty, gender inequality, sexual preference,
and race facilitate an ongoing epidemic. For all first-year students regardless of whether
they are considering a science major. Prerequisite: AP Biology or equivalent. Enrollment
limited to first-year students. Preregistration required; see under First-Year Seminar
Program.  SC

* MCDB 099b / MB&B 099b / MENG 099b / PHYS 099b / SCIE 099b, Introduction
to Research Methods in Physics and Biology: Preparing for a First Research
Experience  Staff
Spanning both the classroom and laboratory, this seminar course provides an
immersive introduction to scientific research. Students build practical laboratory skills,
computational competency, and begin to build fluency in the structures and modes of
communication that define modern research. The course also facilitates identification
of a laboratory mentor and devising a research proposal (with mentorship) for
competitive summer research fellowship applications. This class is open to first-year
students, interested in any STEM major, who have no prior research experience. This
course does not count toward major requirements. Enrollment limited to first-year
students. Preregistration required; see under First-Year Seminar Program.

* MCDB 103b, Cancer  Alexia Belperron
The main purpose of this course is the development of an understanding of the biology
of cancer, with emphasis on understanding the core biological principles and how an
understanding of these principles is essential to understanding how cancer develops,
how it can be treated, and how we can try to prevent its development. Topics include
Molecular, Cellular, and Developmental Biology (MCDB)

Genetics, biochemistry, immunity, infection agents, and challenges for prevention and treatment. Intended for non-science majors and preference is given to first years and sophomores. Prerequisite: High school biology is required.  

**MCDB 105a or b / MB&B 105a or b, Biology, the World, and Us**  Staff  
Biological concepts taught in context of current societal issues, such as emerging diseases, genetically modified organisms, green energy, and the human brain and its disorders. Emphasis on biological literacy to enable students to evaluate scientific arguments.  

**SC** 0 Course cr  

**MCDB 106a / E&EB 106a / HLTH 155a, 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, dengue, and Lyme disease. Biology of the pathogens including modes of transmission, establishment of infection, and immune responses; the challenges associated with vector control, prevention, development of vaccines, and treatments. Intended for non-science majors; preference to freshmen and sophomores. Prerequisite: high school biology.  

**SC** 0 Course cr  

**MCDB 109b, Immunity and Contagion**  Paula Kavathas  
This interdisciplinary course is for students that want to learn both about infectious diseases, pandemics, and the immune system. The immune system evolved to fight pathogens while maintaining homeostasis with our microbiome. The first part of the course is on how the immune system works; this is followed by discussion of different microbes and associated pandemics. This includes flu (1918 pandemic), HIV/AIDS, human papillomavirus (link to cancer), and coronaviruses. Other topics include the human microbiome, cancer immunotherapy and vaccines. Artwork and relevant history are included.  

**SC** 0 Course cr  

**MCDB 200b, Molecular Biology**  Anna Marie Pyle and Farren Isaacs  
The way we think about our health, our material world, and even our national economy, is undergoing radical change because of the revolution in biology. In this course, students learn the basic concepts that drive this revolution to become active and informed participants. Specifically, this course provides a comprehensive overview of modern molecular biology and its applications. 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, genome editing, transcriptional and translational regulation, structure and function of regulatory noncoding RNAs, RNA splicing, editing and modification and first principles of synthetic biology. Upon completion of the course, students understand the molecular basis for regulated gene expression and the many implications for medicine, biotechnology, and biological engineering. Prerequisites: CHEM 161 or 163, and BIOL 101 (or placement out of BIOL 101 via BIOL 101 placement exam, or via AP5 or IB7HL with permission of core course instructor).  

**SC** 0 Course cr  

**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. Concurrently with or after MCDB 200, or with permission from instructor. For freshmen and sophomores interested in research
integrated laboratory experience. 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**  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 or equivalent performance on the corresponding biological sciences placement examination. SC 0 Course cr

* MCDB 203La, Laboratory for Genetics  Amaleah Hartman
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; complementation, epistasis, and genetic suppressors; mutagenesis and mutant analysis, recombination and gene mapping, isolation and manipulation of DNA, and transformation of model organisms. Concurrently with or after MCDB 202. SC 0 Course cr

**MCDB 205b, Cell Biology**  David Breslow and Megan King
A comprehensive introductory course in cell biology. Emphasis on the general principles that explain the molecular mechanisms of cellular function. Prerequisites: BIOL 101 and 102, or equivalent performance on the corresponding biological sciences placement examinations, 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, or MCDB 200. SC 0 Course cr

**MCDB 210b, Developmental Biology**  Scott Holley and Douglas Kankel
A survey of the molecular and genetic control of embryonic development, cell-cell communication, and cell differentiation. Emphasis on mechanistic investigation in model organisms that reveal fundamental concepts explaining human birth defects and disease. Topics include gastrulation; neural and mesoderm induction; limb development; heart and vascular development; craniofacial development; adult and embryonic stem cells; regeneration; evolution and development. Prerequisites: BIOL 101, 102, and 103, or equivalent performance on the corresponding biological sciences placement examinations. SC

**MCDB 221La, Laboratory for Foundations of Biology**  Maria Moreno
This lab complements the BIOL 101-103 series. An introduction to research and common methodologies in the biological sciences, with emphasis on the utility of model organisms. Techniques and methods commonly used in biochemistry, cell biology, genetics, and molecular and developmental biology; experimental design; data analysis and display; scientific writing. With permission of instructor or concurrently with or after BIOL 101, 102 or 103. WR, SC 0 Course cr

**MCDB 231La, RNAseq Analysis/Intro to Bioinformatics**  Josien van Wolfswinkel
This course is about learning to analyze High-throughput sequencing data. This requires insight in what the data represents, as well as the ability to perform basic computational analysis. We approach this by using various scripting languages, to organize and modify the data for further analysis, and use the High Performance
Computing Cluster and R to obtain new insights. No prior experience with coding is required, but access to a laptop and an internet connection is essential. Prerequisites: BIOL 101-104, and one 200 level course, or instructor permission.

**MCDB 250b, Biology of Reproduction**  Hugh Taylor and Seth Guller
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. BIOL 101, 102, and 103, or equivalent performance on the corresponding biological sciences placement examinations, 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

**MCDB 251b, The Lab for Biology of Plants**  Seth Guller
RP ½ Course cr

**MCDB 290b, Microbiology**  Stavroula Hatzios and Jing Yan
Cell structure of bacteria, bacterial genetics, microbial evolution and diversity, bacterial development, microbial interaction, chemotaxis and motility, gene regulation, microbial genomics and proteomics, CRISPR, metabolism, infectious diseases, mechanisms of pathogenesis, host defense systems, viruses, gut microbiota in health and disease. Prerequisites: BIOL 101, 102, and 103, or equivalent performance on the corresponding biological sciences placement examinations; or one term of biochemistry, or cell biology, or genetics; or with permission of instructor.

**MCDB 291Lb, Laboratory for Microbiology**  Amaleah Hartman
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 prior to the first class meeting.

**MCDB 300a / MB&B 200a, Biochemistry**  Ronald Breaker
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. Prerequisites: BIOL 101 or equivalent performance on the corresponding biological sciences placement examination; one term of organic chemistry; or with permission of instructor.

**MCDB 301La or b / MB&B 251La or b, Laboratory for Biochemistry**  Aruna Pawashe and Staff

**MCDB 303Lb, Advanced Molecular Biology Laboratory**  Maria Moreno and F Kenneth Nelson
A laboratory course that provides advanced biology research skills. Weekly workshops focus on laboratory practice, 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. Enrollment limited. Special registration procedures apply; interested students must contact the instructor and attend an organizational meeting. This class is recommended to students...
in the sciences who are in their junior year and will be completing a senior research project requirement for graduation. SC RP

* MCDB 310a / BENG 350a, Physiological Systems 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 165 or 167 (or CHEM 113 or 115), or PHYS 180 and 181; MCDB 120, or BIOL 101 and 102. SC 0 Course cr

MCDB 315b, Pathobiology Jon Morrow, Samuel Katz, Karin Finberg, Gilbert Moeckel, Harold Sanchez, and Declan McGuone
Mechanisms of human disease from a pathologic perspective. Topics include general cell injury and the biology of cellular senescence, cancer genetics, renal disease, neurologic disease, Gastrointestinal and lung disease, along with the systemic manifestations of disease with clinical correlations. Opportunities to observe under the tutelage of an attending pathologist the manifestations of disease in autopsies at Yale-New Haven Hospital and the role of molecular-based diagnostics in medical decision making will be available. Enrollment limited; preference to junior and senior majors in MCDB or MB&B. Prerequisites: MCDB 205, 300, or 310 SC RP

MCDB 320a / NSCI 320a, Neurobiology Haig Keshishian and 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. At least 1 semester of college chemistry is strongly recommended. SC 0 Course cr

MCDB 321La / NSCI 321La, Laboratory for Neurobiology Haig Keshishian and Paul Forscher
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 325a, Molecular Hallmarks of Cancer Staff
This course provides a comprehensive introduction to the fundamentals of cancer biology and cancer treatment. Topics covered include: cancer genetics, genomics and epigenetics; familial cancer syndromes; signal transduction, cell cycle control, and apoptosis; cancer metabolism; stem cells and cancer; metastasis; cancer immunology and immunotherapy; conventional and molecularly-targeted therapies; and early detection and prevention. Prerequisites: Introductory courses (BIOL101-104) and two MCDB200-level courses (selected from MCDB200, MCDB202, MCDB205, and MCDB210) or instructor permission. SC 0 Course cr

MCDB 329a / NSCI 329a, Sensory Neuroscience Through Illusions Damon Clark and Michael O'Donnell
Animals use sensory systems to obtain and process information about the environment around them. Sensory illusions occur when our sensory systems provide us with surprising or unexpected percepts of the world. The goal of this course is to introduce students to sensory neuroscience at the levels of sensor physiology and of the neural circuits that process information from sensors. The course is centered around sensory illusions, which are special cases of sensory processing that can be especially illustrative,
as well as delightful. These special cases are used to learn about the general principles that organize sensation across modalities and species. Prerequisites: BIOL 101-104; NSCI 160 or NSCI 320 or permission of instructor.

MCDB 330a / BENG 230a / MB&B 330a / NSCI 324a, Modeling Biological Systems I

Staff

Biological systems make sophisticated decisions at many levels. This course explores the molecular and computational underpinnings of how these decisions are made, with a focus on modeling static and dynamic processes in example biological systems. This course is aimed at biology students and teaches the analytic and computational methods needed to model genetic networks and protein signaling pathways. Students present and discuss original papers in class. They learn to model using MatLab in a series of in-class hackathons that illustrate the biological examples discussed in the lectures. Biological systems and processes that are modeled include: (i) gene expression, including the kinetics of RNA and protein synthesis and degradation; (ii) activators and repressors; (iii) the lysogeny/lysis switch of lambda phage; (iv) network motifs and how they shape response dynamics; (v) cell signaling, MAP kinase networks and cell fate decisions; and (vi) noise in gene expression. Prerequisites: MATH 115 or 116. BIOL 101-104, or with permission of instructors. This course also benefits students who have taken more advanced biology courses (e.g. MCDB 200, MCDB 310, MB&B 300/301).

* MCDB 342La, Laboratory in Nucleic Acids I  
  F 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 should contact the instructor during January of the year you intend to take the course.

* MCDB 343La, Laboratory in Nucleic Acids II  
  F Kenneth Nelson
  Continuation of MCDB 342L to more advanced projects in molecular and cell biology, such as microarray screening and analysis, next-generation DNA sequencing, or CRISPR/Cas editing of genes. Laboratories meet twice a week for the second half of the term. 0.5 Yale College course credit(s) Enrollment limited. Special registration procedures apply; students should contact the instructor during January of the year you intend to take the course. Prerequisite; MCDB 342L or permission of instructor.

* MCDB 344Lb, Experimental Techniques in Cellular Biology  
  Joseph Wolenski
  An inquiry-based approach to research in cell and molecular biology, with emphasis on experimental techniques commonly used in modern biomedical laboratories. Research is module-based and covers pertinent and timely topics. Methods include SDS-PAGE, immunoblotting, immunoprecipitation of proteins, column chromatography, mammalian cell culture, cell fractionation, cell transfection, DNA purification, PCR, and phase contrast and confocal microscopy. Meets during January and February. Prerequisite: MCDB 205. Special registration procedures apply; interested students must contact the instructor at least eighteen months in advance.

* MCDB 345Lb, Experimental Strategies in Cellular Biology  
  Joseph Wolenski
  Continuation of MCDB 344L, with increased emphasis on experimental design, independent research, presentation of data and research seminars. Students develop
semi-independent research projects in modern biomedical research. Emphasis on key components of being a successful principal investigator, including benchwork, seminar presentations, lab meetings, and critical analysis of data. Prepares for MCDB 475, 485, or 495. Meets during March and April. Prerequisite: MCDB 344L. Special registration procedures apply; interested students should contact the instructor.  

* MCDB 355a, The Cytoskeleton, Associated Proteins, and Disease  Surjit Chandhoke  
In-depth discussion of the cytoskeleton, proteins associated with the cytoskeleton, and diseases that implicate members of these protein families. Preference given to seniors in the MCDB major. Prerequisites: BIOL 101-104 and at least one MCDB 200-level course.  

SC  
MCDB 361b / BENG 465b / MB&B 361b / NSCI 325b, Modeling Biological Systems II  
Jonathan Howard, Thierry Emonet, and Damon Clark  
Advanced topics related to dynamical processes in biological systems. Processes by which cells compute, count, tell time, oscillate, and generate spatial patterns. Time-dependent dynamics in regulatory, signal-transduction, and neuronal networks; fluctuations, growth, and form. Comparisons between models and experimental data. Dynamical models applied to neurons, neural systems, and cellular biophysical processes. Use of MATLAB to create models. Prerequisite: MCDB 330 or equivalent, or a 200-level biology course, or with permission of instructor.  

QR  
* MCDB 364a / MB&B 364a, Light Microscopy: Techniques and Image Analysis  
Joseph Wolenski  
A rigorous study of principles and pertinent modalities involved in modern light microscopy. The overall course learning objective is to develop competencies involving advanced light microscopy applications common to multidisciplinary research. Laboratory modules coupled with critical analysis of pertinent research papers cover all major light microscope methods—from the basics (principles of optics, image contrast, detector types, fluorescence, 1P and 2P excitation, widefield, confocal principle, TIRF), to more recent advances, including: superresolution, lightsheet, FLIM/FRET, motion analysis and force measurements. This course is capped at 8 students to promote interactions and ensure a favorable hands-on experience. Priority for enrollment is given to students who are planning on using these techniques in their independent research. Prerequisites: MCDB 205, PHYS 170/171 or above, either CHEM 161/165 or above; with CHEM 134L, 136L or permission from the instructor.  

SC  
* MCDB 370b, Biotechnology  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, 202, or 300.  

SC  
0 Course cr  
* MCDB 425a / MB&B 425a, Basic Concepts of Genetic Analysis  Jun Lu  
The universal principles of genetic analysis in eukaryotes. Reading and analysis of primary papers that illustrate the best of genetic analysis in the study of various biological issues. Focus on the concepts and logic underlying modern genetic analysis. Prerequisite: MCDB 202 or pre-approval of instructor.  

SC
* MCDB 430a, Biology of the Immune System  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  o Course cr

MCDB 452b / MB&B 452b / S&D 352b, Biomedical Data Science, Mining and Modeling  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

* MCDB 470a, Tutorial in Molecular, Cellular, and Developmental Biology  Valerie Horsley
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, which is available at http://mcdb.yale.edu/forms as well as on the course site on Classes*v2, and a written plan of study with bibliography, approved by the faculty research adviser. The form and proposal must be uploaded to Classes*v2 by the end of the second week of classes. The final paper is due in the hands of the sponsoring faculty member, with a copy to the course instructor, by the last day of classes. 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 may count as an elective toward the major. Fulfills the senior requirement for the B.A. degree if taken in the senior year.

* MCDB 471a, Senior Seminar in Biology  Valerie Horsley
This course instructs students in developing effective writing and speaking skills required for preparation of scientific manuscripts and presentations, and communicating in the scientific world. Students will be required to prepare and present oral presentations and to submit a literature review and written grant proposal by the end of the semester.  sc  o Course cr

* MCDB 474a, Independent Research  Joseph Wolenski
Research project under faculty supervision taken Pass/Fail. This is the only independent research course available to underclassmen. Students are expected to spend approximately ten hours per week in the laboratory. To register, the student must submit a form, which is available at http://mcdb.yale.edu/forms as well as on the course site on Canvas@Yale, and a written plan of study with bibliography, approved by the faculty research adviser. The form and proposal must be uploaded to Canvas@Yale by the end of the second week of classes. A final research report is required at the end of the term. Students who take this course more than once must
reapply each term. Guidelines for the course should be obtained from the office of the director of undergraduate studies or downloaded from the Canvas@Yale server.

* MCDB 475a, Senior Independent Research  Joseph Wolenski
Research project under faculty supervision, ordinarily taken to fulfill the senior requirement. This course is only available to MCDB seniors and they are awarded a letter grade. Students are expected to spend approximately ten hours per week in the laboratory. To register, the student must prepare a form, which is available at http://mcdb.yale.edu/forms as well as on the course site on Canvas@Yale, and a written plan of study with bibliography, approved by the faculty research adviser. The form and proposal must be uploaded to Canvas@Yale by the end of the second week of classes. The final research paper is due in the hands of the sponsoring faculty member, with a copy uploaded to Canvas@Yale, by the last day of classes. 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. 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.

* 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.

* MCDB 485a and MCDB 486a, Senior Research  
Joseph Wolenski
Individual two-term laboratory research projects under the supervision of a faculty member. For MCDB seniors only. Students are expected to spend ten to twelve hours per week in the laboratory, and to make presentations 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 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 may be obtained at http://mcdb.yale.edu/forms and on the course site on Canvas@Yale. Written proposals are due by the end of the second week of classes. Fulfills the senior requirement for the B.S. degree if taken in the senior year.

* MCDB 495a and MCDB 496a, Senior Research Intensive  
Joseph Wolenski
Individual two-term directed research projects in the field of biology under the supervision of a faculty member. For MCDB seniors only. Before registering, the student must be accepted 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
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 may be obtained at http://mcdb.yale.edu/forms and on the course site on Canvas@Yale. Written proposals are due by the end of the second week of classes.

Fulfills the senior requirement for the B.S. degree with an intensive major.

Course credit per term

**Music (MUSI)**

*MUSI 035b / CPSC 035b, Twenty-First Century Electronic and Computer Music Techniques*  
Scott Petersen

Exploration of twenty-first century electronic and computer music through the diverse subjects and issues at the intersection of technology and new music. How computers have changed and challenged the analysis, composition, production, and appreciation of music over the last fifty years. Knowledge of basic music theory and the ability to read Western musical notation is assumed. Enrollment limited to first-year students. Preregistration required; see under First-Year Seminar Program.

* MUSI 050a, Transformations in 20th and 21st Century Music  
Trevor Baca

Introduction to outstanding pieces of 20th- and 21st-century instrumental music. Students examine details of the music and the social/historical context of each piece, in chronological order: one piece for each of the twelve decades from 1900 to the present. Composers include Mahler, Stravinsky, Ravel, Varèse, Copland, Cage, Reich, Xenakis, Eastman, Takemitsu, Czernowin, and Monk. Enrollment limited to first-year students. Preregistration required; see under First-Year Seminar Program.

* MUSI 081a / ER&M 081a / SOCY 081a, Race and Place in British New Wave, K-Pop, and Beyond  
Grace Kao

This seminar introduces you to several popular musical genres and explores how they are tied to racial, regional, and national identities. We examine how music is exported via migrants, return migrants, industry professionals, and the nation-state (in the case of Korean Popular Music, or K-Pop). Readings and discussions focus primarily on the British New Wave (from about 1979 to 1985) and K-Pop (1992-present), but we also discuss first-wave reggae, ska, rocksteady from the 1960s-70s, British and American punk rock music (1970s-1980s), the precursors of modern K-Pop, and have a brief discussion of Japanese City Pop. The class focuses mainly on the British New Wave and K-Pop because these two genres of popular music have strong ties to particular geographic areas, but they became or have become extremely popular in other parts of the world. We also investigate the importance of music videos in the development of these genres. Enrollment limited to first year students. Pre-registration required: see under First Year Seminar Program.

* MUSI 087b, Music, Memes, and Digital Culture  
Braxton Shelley

How are contemporary expressive cultures shaped by the virtual venues in which they circulate—Twitter, Instagram, TikTok, YouTube, WhatsApp, and Facebook, among many others? What force sustains the constant flurry of images and videos, hashtags and challenges? In pursuit of these questions, this first-year seminar grapples with the musicality of internet culture, attending to the ever-expanding virtual archive of memes, GIFS, and other digital media. Our examination of the production, modification, and distribution of these contagious, and frequently-
humorous, items advance two queries: 1) What modes of creativity do these digital artifacts reveal? 2) What ways of listening do these potentially-viral objects solicit? Drawing together resources from musicology, ethnomusicology, music theory, media studies, visual culture, and philosophy, we evaluate antiphony as a rubric for digital culture. Can the phrase “digital antiphony” elucidate the emphatically intertextual and intermusical product and process of meme culture, the rich, emergent conversation that simultaneously materializes and reforges social categories of race and gender, concepts of belief and authorship? If antiphony is the logic of contemporary internet culture, then the meme is its animating force. With its generative interpenetration of call and response, the meme evidences a distinctly digital preoccupation with form, offering one sense of what it means to be musical in the 21st century. Enrollment limited to first-year students. Preregistration required; see under First-Year Seminar Program.  

**MUSI 110a or b, Elements of Musical Pitch and Time**  Ian Quinn  
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 115a, The Mathematics of Music**  Richard Cohn  
An introduction to applied mathematics in the context of music theory and analysis. Concepts from algebra, modular arithmetic, set theory, geometry, and elementary topology are applied to the study of musical rhythms, melodies, and chords across a wide repertoire of classical, atonal, and popular musics. Prerequisite: ability to read music.  

**MUSI 137a / HUMS 139a, Western Philosophy in Four Operas 1600-1900**  Gary Tomlinson  
This course intensively studies four operas central to the western repertory, spanning the years from the early 17th to the late 19th century: Monteverdi’s *Orfeo*, Mozart’s *Don Giovanni*, Wagner’s *Die Walküre* (from *The Ring of the Nibelungs*), and Verdi’s *Simon Boccanegra*. The course explores the expression in these works of philosophical stances of their times on the human subject and human society, bringing to bear writings contemporary to them as well as from more recent times. Readings include works of Ficino, Descartes, Rousseau, Wollstonecraft, Schopenhauer, Kierkegaard, Douglass, Marx, Nietzsche, Freud, and Adorno. We discover that the expression of changing philosophical stances can be found not only in dramatic themes and the words sung, but in the changing natures of the musical styles deployed.  

**MUSI 175b, Listening to Music**  Brian Kane  
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.  

**MUSI 185a / THST 236a, American Musical Theater History**  Dan 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. Limited enrollment. Interested students should contact dan.egan@yale.edu for application requirements.  

**MUSI 189b / HUMS 189b, Music & Jane Austen**  Jessica Peritz
This course takes Jane Austen as a guide to the world of early nineteenth-century music culture in Britain, exploring through her novels the relationships between music, gender, and class in the decades around 1800. We approach this period of music history by delving into how "regular people" – especially women – consumed, curated, and created music in their everyday lives. Austen, an accomplished musician herself, wove music into her novels in ways that reveal much about contemporary practices of (and prejudices against) musicking. We focus on three of Austen’s novels (*Pride & Prejudice*, *Sense & Sensibility*, *Emma*) and excerpts from her music manuscript collections, alongside recent scholarship and modern film adaptations, which taken together raise a series of interdisciplinary questions. By learning about Austen’s musical milieu, we open up the musical lives of Regency-era women and the "middling sort," while becoming more attuned to the social critiques embedded in Austen’s representations of music, ultimately enriching our engagement with the novels themselves. The ability to read musical notation is not required, but will be helpful. **HU**

**MUSI 207a or b, Commercial and Popular Music Theory**  Staff
An introduction to music-theory analysis of commercial and popular song (with a focus on American and British music of the past 50 years, across multiple genres). Coursework involves study of harmony, voice leading and text setting, rhythm and meter, and form, with assigned reading, listening, musical transcription and arranging, and written/oral presentation of analysis. Prerequisite: Completion of a 100- or 200-level music theory course or the corresponding placement exam, and/or permission of instructor. **HU 0 Course cr**

**MUSI 208b, Commercial and Popular Music Theory II**  Nathaniel Adam
This course is a continuation of MUSI 207 Commercial and Popular Music Theory I. While 207 covered fundamentals of analysis, 208 will involve further research and more complex analysis, with more presentations and transcription projects in addition to a final paper. Beyond harmonic and formal analysis, 208 will explore intersectional topics such as history, video, politics, race, gender, and sexuality in the context of popular music. Completion of MUSI 207 (Seniors and Graduate students may request instructor’s permission without taking 207). **HU**

**MUSI 210b, Counterpoint, Harmony, and Form: 1500–1800**  Staff
A concentrated investigation of basic principles and techniques of period musical composition through study of strict polyphonic voice leading, figuration, harmonic progression, phrase rhythm, and small musical forms. **HU**

**MUSI 211a, Systematic Theory for Music: 1800 to the present**  Daniel Harrison
Continuation of MUSI 210’s study of western art music, focusing on techniques developed 1800 to the present. Introduction to formal models of musical analysis and composition. Prerequisite: MUSI 207, 210, 217, 218, or equivalent. **HU**

**MUSI 217a or b, Keyboard Skills for Tonal Music**  Staff
This course teaches music-theory keyboard skills such as score reading, melody harmonization, figured-bass realization, and improvisation, and how these topics connect to written music-theory analysis and composition. Prerequisite: Completion of a 100- or 200-level music theory course, intermediate keyboard ability*, and permission of instructor. *eg: 2-octave scales in major and minor keys through 4 sharps/flats; sightread simple hymns/chorales at beat=60; knowledge of roman numerals
* MUSI 218a or b, Aural Skills for Tonal Music  Staff
Tonal music theory topics with an emphasis on sight-sightreading, rhythm, melodic and harmonic dictation, and aural analysis. Prerequisite: Completion of MUSI 110, or any 200-level MUSI course, or the following: ability to match pitch and sing a major scale; knowledge of standard staff notation (treble/bass clefs); knowledge of major/minor key signatures; knowledge of basic time signatures; knowledge of intervals; knowledge of triads. HU RP 0 Course cr

* MUSI 220a and MUSI 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. Credit for MUSI 220 only on completion of MUSI 221. ½ Course cr per term

* MUSI 228a / THST 224a, Musical Theater Performance I  Dan Egan and Maria-Christina Oliveras
The structure, meaning, and performance 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. This semester’s course also embraces the online format to address performing and recording virtually as a vital tool in the current field of musical theater. The course combines weekly synchronous learning and private coaching sessions. For singers, music directors, and directors. Admission by audition and application only. Auditions/interviews will be scheduled during the first two weeks of August. May be repeated for credit. For audition information contact dan.egan@yale.edu. HU RP

* MUSI 229b / THST 226b, Musical Theater Performance II  Staff
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. May be repeated for credit. For audition information e-mail dan.egan@yale.edu. RP

* MUSI 230a, Composing for Musical Theater  Dan Egan and Joshua Rosenblum
This course is open to all students (including graduate programs) and from any major, although priority is given to music majors. Knowledge of the basics of music theory and music notation is required, and some familiarity with the musical theater idiom is expected. Some prior composing experience is recommended. Piano skills are very helpful, but not required. Normally the class size is limited, so that all assignments can be performed and fully considered during the class meeting time. Prerequisite: MUSI 110 or equivalent. Enrollment limited to 12. Please contact joshua.rosenblum@yale.edu with any questions about eligibility. HU RP

* MUSI 238a or b, Contemporary Chamber Music Performance  Maiani da Silva
Contemporary chamber music ensemble that emphasizes collaborative workshopping methods for the performance of recent professional repertoire and pieces written by student and faculty composers. Students learn about musical analysis through performance, extended techniques, and the instrumentalists’ role in bringing to life a new piece. Admission by audition only. Students must bring their instruments to class. ½ Course cr
* **MUSI 240a or b, 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.  

* **MUSI 315a, Fundamentals of Music Technology**  Konrad Kaczmarek  
Fundamental principles of music technology including sound recording and reproduction, digital audio, digital signal processing, audio synthesis techniques, musical acoustics, and psychoacoustics. Emphasis on the theory of music technology through investigations into the tools used to analyze, perform, and create electroacoustic and computer-generated music.  

* **MUSI 318a, Intermediate Musicianship**  Richard Lalli  
Training in advanced aural perception, sight-singing, and keyboard skills. Prerequisite: MUSI 219 or equivalent.  

* **MUSI 320a, Composition Seminar I**  Kathryn Alexander  
Intermediate analytic and creative projects in music composition, instrumentation, and scoring for visual media. Study of compositional procedures and techniques in different genres and styles. Group and individual lessons to supplement in-class activities. Enrollment limited to 20. Students with questions should contact the instructor at kathryn.alexander@yale.edu. Previously MUSI 312. Prerequisite: MUSI 207 or MUSI 210 or MUSI 211 or equivalent.  

* **MUSI 321b, Composition Seminar II**  Konrad Kaczmarek  
Intermediate analytic and creative projects in music composition and instrumentation, with a focus on jazz harmony, voice-leading, and music production tools. Study of compositional procedures and techniques in different ensemble settings. Group and individual lessons to supplement in-class lectures. Enrollment limited to 20. Students with questions should contact the instructor at konrad.kaczmarek@yale.edu. Prerequisite: MUSI 210 or MUSI 211 and/or MUSI 312.  

* **MUSI 328a, Introduction to Conducting**  William Boughton  
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 329b, Intermediate Conducting**  William Boughton  
Intermediate studies in baton technique and score preparation. After MUSI 323.  

* **MUSI 330b, Musical Theater Composition II**  Staff  
Intermediate and advanced project-oriented studies in composition of musical theater. Prerequisite: MUSI 210. May be repeated for credit. Enrollment limited to 12.  

* **MUSI 340b / THST 318b, Analyzing, Directing, and Performing Early Opera**  Grant Herreid and Toni Dorfman  
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, instrumentalists, and directors. Admission by audition only. May be repeated for credit. For audition information e-mail grant.herreid@yale.edu.  

*MUSI 345a, Lessons*  Kyung Yu  
Individual instruction in the study and interpretation of musical literature. No more than four credits of lessons can be applied towards the 36-credit degree requirement. Auditions for assignment to instructors (for both credit and noncredit lessons) are required for first year and some returning students, and are held only at the beginning of the fall term. For details, see the Music department’s program description in the YCPS.

*MUSI 351a, Music in European Court, Church, and Theater, 1600-1800*  Staff  
A detailed investigation of the history of musical style from 1600 to 1800. Preference to Music majors according to class.

*MUSI 352b, The Western Art-Music Tradition, 1800-2020*  Gundula Kreuzer  
A survey of musical practices, institutions, genres, styles, and composers in Europe and North America from 1800 to the present. This class is for Music majors and includes obligatory sections that focus on detailed musical discussions. Knowledge of Western musical notation and basic harmony is required. Interested non-majors may enroll with permission from instructor.

*MUSI 378b, American Neighborhood Musics*  Trevor Baca  
Introduction to American regional musics. Five units, including go-go in Washington, DC; Tejano music in South Texas; Detroit techno and its influence on global EDM; Puerto Rican reggaeton; and the American reception of K-pop. Extensive listening lists and select readings help students understand both the musical attributes and social context of all musics studied in the course.

*MUSI 380a / HUMS 381a, Jazz in America 1900-1960*  Brian Kane  
A course on key moments in the history of jazz in America until 1960 with special focus on the role of jazz within broader streams of American cultural life; improvisation; jazz as popular music and as art music; the racial politics of jazz; and its artistic achievements.

*MUSI 414b, Instrumentation and Orchestration*  Kathryn Alexander  
A study of instrumentation and orchestration in a variety of musical periods, genres and styles including arranging and scoring for visual media. Related creative project work. MUSI 210 or equivalent.

*MUSI 416a, Advanced Studies in Musical Meter*  Richard Cohn  
Analytical models of rhythm and meter and their applications to nineteenth- and twentieth-century Western classical repertory (Beethoven, Brahms, Dvořák, Bartók, Reich). Extensions to jazz and to genres from Ghana, India, Indonesia, and southeastern Europe. Prerequisite: MUSI 216, and one of MUSI 207, MUSI 210, or permission of instructor.

*MUSI 420a, Composition Seminar III*  Konrad Kaczmarek  
Advanced analytic and creative projects in music composition and instrumentation, with a focus on writing for chamber ensembles. Ongoing study of evolving contemporary procedures and compositional techniques. Group and individual lessons to supplement in-class lectures. Admission by audition only. May be repeated for
credit. Enrollment limited to 10. To audition, students should upload two PDF scores and MP3 recordings in a single zip file by 4 p.m. on the second Wednesday of the semester, to the designated Music 420 audition assignment page at the Canvas site. Students with questions should contact the instructor at konrad.kaczmarek@yale.edu. Prerequisites: Both MUSI 320 and 321. RP

MUSI 427b / CPSC 432b, Computer Music: Sound Representation and Synthesis
Scott Petersen
Study of the theoretical and practical fundamentals of computer-generated music, with a focus on low-level sound representation, acoustics and sound synthesis, scales and tuning systems, 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

MUSI 428a / CPSC 431a, Computer Music: Algorithmic and Heuristic Composition
Scott Petersen
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

* MUSI 445a, Advanced Lessons  Kyung Yu
Individual instruction for advanced performers in the study and interpretation of musical literature. No more than four credits of lessons can be applied towards the 36-credit degree requirement. Auditions for assignment to instructors (for both credit and noncredit lessons) are required for first year and some returning students, and are held only at the beginning of the fall term. For details, see the Music department’s program description in the YCPS.

* MUSI 449a, Jazz Improvisation  Wayne Escoffery
In this course students study basic, intermediate, and advanced concepts of improvisation and learn the essentials for the Jazz Language through solo transcription and analysis. Students learn how to use vocabulary (or musical phrases) and a variety of improvisational devices and techniques over common chords and chord progressions. Upon completion of the course students have a deeper understanding of what it takes to become a great improviser, what to practice and how to practice it, and how to go about expanding their Jazz Vocabulary in order to naturally develop a unique improvisational voice. Students are required to bring their instruments to class. Prerequisite: Basic understanding of Jazz nomenclature and some experience improvising is advised. Admission by audition only. Permission of the instructor is required. ½ Course cr

* MUSI 455a, A History of Music Notation  Anna Zayaruznaya
The history of music notation is intimately linked with the histories of musical composition and performance. This course combines a study of musical paleography (i.e. how music is written down) with consideration of the historical and intellectual currents that shaped, and were shaped by, systems of music writing. Among the systems surveyed are the neumes used to preserve early plainchant, the increasingly specific rhythmic notations that recorded Western polyphony from the thirteenth century onward, and the notational puzzles and games of the fourteenth and fifteenth
centuries. Final projects may focus on medieval or later music notations. Prerequisite: ability to read modern music notation comfortably.  

* MUSI 462b / ENGL 205b / HUMS 200b / LITR 195b, Medieval Songlines  Ardis Butterfield  
Introduction to medieval song in England via modern poetic theory, material culture, affect theory, and sound studies. Song is studied through foregrounding music as well as words, words as well as music.  

* MUSI 480a / AFAM 479a, Music of the Caribbean: Cuba and Jamaica  Michael Veal  
An examination of the Afro-diasporic music cultures of Cuba and Jamaica, placing the historical succession of musical genres and traditions into social, cultural, and political contexts. Cuban genres studied include religious/folkloric traditions (Lucumi/Santeria and Abakua), rumba, son, mambo, pachanga/charanga, salsa, timba and reggaeton. Jamaican genres studied include: folkloric traditions (etu/tambu/kumina), Jamaican R&B, ska, rock steady, reggae, ragga/dancehall. Prominent themes include: slavery, Afro-diasporic cultural traditions, Black Atlantic culture, nationalism/independence/post-colonial culture, relationships with the United States, music & gender/sexuality, technology.  

* MUSI 482a, African Counterpoint  Michael Veal  
This course explores the various compositional techniques used in traditional and contemporary music across sub-Saharan Africa and the African diaspora, with an emphasis on the qualities of counterpoint, groove, polyrhythm and texture. Seminar meetings are devoted to discussion of assigned readings, analysis of assigned listenings, student presentations, and, when possible, performance of assigned transcriptions. There are no prerequisites, but the ability to read, transcribe, and analyze music is necessary, and instrumental performance skills will be very helpful.  

* MUSI 495a, Individual Study  Anna Zayaruznaya  
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 496a, The Senior Recital  Anna Zayaruznaya  
Preparation and performance of a senior recital and accompanying essay under faculty supervision. Admission by permission of the director of undergraduate studies. Prerequisite: MUSI 461.  

* MUSI 497a, The Senior Project in Composition  Anna Zayaruznaya  
Preparation of a senior composition project under faculty supervision. Admission by permission of the composition faculty of the Department of Music. Prerequisites: MUSI 312, 313, 412, and 413.  

* MUSI 498a, The Senior Project in Musical Theater Composition  Anna Zayaruznaya  
Preparation of a senior composition project in the field of musical theater under faculty supervision. Admission by permission of the coordinator of the Shen Curriculum. Two terms of MUSI 314 or equivalent.
Naval Science (NAVY)

*MUSI 499a, The Senior Essay*  Anna Zayaruznaya
Preparation of a senior essay under faculty supervision. Admission by permission of the director of undergraduate studies.

**Naval Science (NAVY)**

**NAVY 100a, Naval Science Laboratory**  Dale Pettenski
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. Receives no credit; cannot be applied toward the 36-course-credit requirement for the Yale bachelor's degree. Grades earned in this course do not count toward GPA or eligibility for General Honors.

* NAVY 111a, Introduction to Naval Science  Scott Ryan
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; cannot be applied toward the 36-course-credit requirement for the Yale bachelor’s degree. Grades earned in this course do not count toward GPA or eligibility for General Honors.

* NAVY 212a, Seapower and Maritime Affairs  Ron Withrow
This course is a study of the U.S. Navy and the influence of U.S. sea power on world history that incorporates both a historical and political science process to explore the major events, attitudes, personalities, and circumstances that have imbued the U.S. Navy with its proud history and rich tradition. This course introduces grand strategy, evaluating key components, and examples from ancient history and modern U.S. history. It deals with issues of national imperatives in peacetime, as well as war, varying maritime philosophies that were interpreted into naval strategies/doctrines, budgetary concerns which shaped force realities, and the pursuit of American diplomatic objectives. It concludes with a discussion of the Navy’s strategic and structural changes post-Cold War, the evolution of its focus, mission, and strategy both in the post-September 11, 2001 world and post-Global War on Terrorism era.

**NAVY 311a, Naval Engineering**  Samantha Barszowski
An overview of Naval engineering systems and a detailed study of the principles behind ship construction. Topics include ship design, hydrodynamic forces, stability, conventional and nuclear propulsion, electrical theory and systems, interior communications, damage control, hydraulics, and ship control. Basic concepts in the theory and design of steam, gas turbine, and diesel propulsion. For enrollment credit only; cannot be applied toward the 36-course-credit requirement for the Yale bachelor’s degree. Grades earned in this course do not count toward GPA or eligibility for General Honors.
NAVY 411a, Naval Operations and Seamanship  Dale Pettenski
Study of relative motion, formation tactics, and ship employment. Introductions to Naval operations and operations analysis, ship behavior and characteristics in maneuvering, applied aspects of ship handling, afloat communications, Naval command and control, Naval warfare areas, and joint warfare. Analysis of case studies involving related moral, ethical, and leadership issues. Prerequisites: NAVY 111 and 112. For enrollment credit only; cannot be applied toward the 36-course-credit requirement for the Yale bachelor's degree. Grades earned in this course do not count toward GPA or eligibility for General Honors.

Near Eastern Languages and Civilizations (NELC)

* NELC 000b / ANTH 331b / ARCG 000b / ARCG 354b / EVST 354b / HIST 204Jb / NELC 324b, The Ancient State: Genesis and Crisis from Mesopotamia to Mexico  Harvey Weiss
Ancient states were societies with surplus agricultural production, classes, specialization of labor, political hierarchies, monumental public architecture and, frequently, irrigation, cities, and writing. Pristine state societies, the earliest civilizations, arose independently from simple egalitarian hunting and gathering societies in six areas of the world. How and why these earliest states arose are among the great questions of post-Enlightenment social science. This course explains (1) why this is a problem, to this day, (2) the dynamic environmental forces that drove early state formation, and (3) the unresolved fundamental questions of ancient state genesis and crisis, –law-like regularities or a chance coincidence of heterogenous forces?  HU, SO

* NELC 001b / AFST 001b / ARCG 001b, Egypt and Northeast Africa: A Multidisciplinary Approach  John Darnell
An introduction to Egyptology, examining approximately 10,000 years of Nile Valley cultural records and 3,000 years of Egyptian history. The course presents an overview of the historical and archaeological study of Egypt and her southern neighbor Nubia. Various original written and visual sources are used, including the collections of the Peabody Museum and the Yale Art Gallery, with some material accessible in the classroom. Students gain a basic understanding of the hieroglyphic script and the Ancient Egyptian language, and are able to read some inscriptions in museum visits at the end of the course. Enrollment limited to first-year students. Preregistration required; see under First-Year Seminar Program.  WR, HU

* NELC 026b / ARCG 031b / EVST 030b, Origins of Civilization: Egypt and Mesopotamia  Harvey Weiss
The origins of the earliest civilizations in Mesopotamia and Egypt along the Nile and Tigris-Euphrates Rivers explored with archaeological, historical and environmental data for the origins of agriculture, the classes and hierarchies that marked earliest cities, states and empires, the innovative monumental architecture, writing, imperial expansion, and new national ideologies. How and why these civilizational processes occurred with the momentous societal collapses at periods of abrupt climate change. Enrollment limited to first-year students. Preregistration required; see under First-Year Seminar Program.  HU, SO
NELC 109a / ARCG 244a / RLST 245a, The Age of Akhenaton  
Staff
Study of the period of the Egyptian pharaoh Akhenaton (reigned 1353–1336 B.C.E.), often termed the Amarna Revolution, from historical, literary, religious, artistic, and archaeological perspectives. Consideration of the wider Egyptian, ancient Near Eastern, African, and Mediterranean contexts. Examination of the international diplomacy, solar theology, and artistic developments of the period. Reading of primary source material in translation. **HU**  

*NELC 121b / HUMS 140b, 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 128a / HUMS 128a, From Gilgamesh to Persepolis: Introduction to Near Eastern Literatures*  
Samuel Hodgkin
This lecture course is an introduction to Near Eastern civilization through its rich and diverse literary cultures. We read and discuss ancient works, such as the *Epic of Gilgamesh*, *Genesis*, and “The Song of Songs,” medieval works, such as *A Thousand and One Nights*, selections from the *Qur’an*, and *Shah-nama: The Book of Kings*, and modern works of Israeli, Turkish, and Iranian novelists and Palestinian poets. Students complement classroom studies with visits to the Yale Babylonian Collection and the Beinecke Rare Book and Manuscript Library, as well as with film screenings and guest speakers. Students also learn fundamentals of Near Eastern writing systems, and consider questions of tradition, transmission, and translation. All readings are in translation. Permission from the instructor required. **WR, HU**

*NELC 129b / AFST 128b / ARCG 128b / EGYP 128b / RLST 251b, Magic and Ritual in Ancient Egypt and the Near East*  
John Darnell
Introduction to ancient Egyptian magic and rituals with an overview on the use of magic and discussion of the different rituals and festivals attested in Ancient Egypt and the Near East. **HU**

*NELC 156a / HUMS 233a / LITR 178a / MMES 201a, Classics of the Arabic-Islamic World*  
Shawkat Toorawa
Survey of the literary tradition of the Arabic-Islamic world (West Asia, North Africa, and Muslim Spain), a textual conversation among diverse authors from late antiquity to the Mamluk period. Prose and poetry from the Qur’an to the *Arabian Nights*; attention to the interdependence of the works and their cultural setting, the agendas authors pursued, and the characters they portrayed. **HU TR**

*NELC 157b / JDST 306b / MMES 157b, Israeli Narratives*  
Shiri Goren
This course looks at contemporary representations of social, political, and domestic space in Israel through cultural production such as literature, visual work, and art. It focuses on close reading of major Israeli works in translation with attention to how their themes and forms relate to the Israeli condition. Reading and viewing include: Amos Oz’s major novel *A Tale of Love and Darkness*, *Anne Frank: The Graphic Diary*, Maya Arad’s novella “The Hebrew Teacher,” TV show *Arab Labor* and writing by Yehudah Amichai, Etgar Keret, and Sayed Kashua, among others. We discuss topics and theories of personal and collective identity formation, war and peace, ethnicity and race, migration, nationalism, and gender. No knowledge of Hebrew required. **WR, HU TR**
* NELC 168a / CLCV 260a, Origins of Writing  Klaus Wagensonner
Exploration of writing in the ancient Near East and the profound effects this new method of communication had on human society. Focus on Egypt and Mesopotamia, where advanced writing systems first developed and were used for millennia, with consideration of Chinese, Mayan, and Indus Valley writing systems as well.  HU

* NELC 243a / ARCG 245a, Archaeology of Ancient Egypt: An Introduction  Gregory Marouard
This seminar is an introductory class that examines in detail the archaeology of ancient Egypt following the chronological order of Egyptian history and covering almost 4000 years, from the late Neolithic period to the end of the Greco-Roman period. The aim is not only to give a comprehensive overview of major sites and discoveries but also to use as much as possible information from recent excavations, discuss problems and priorities concerning this field, offer an introduction to new fieldwork methods and approaches used in Egypt as well as a short history of this discipline.  HU

* NELC 250b, Assyria: The First Near Eastern Empire  Eckart Frahm
Survey of the history and culture of ancient Assyria, with a focus on its imperial phase in the first millennium B.C.E. Assyria's aggressive foreign policy; the role of the military; Assyrian royal ideology, religion, literature, art, and court life; Assyria's impact on the Bible; Assyria's image in classical sources. Readings from primary sources in translation.  HU

* NELC 321b / ANTH 492b / ARCG 492b, Imaging Ancient Worlds  Klaus Wagensonner and Agnete Lassen
The interpretation of epigraphic and archaeological material within the broader context of landscape, by means of creating a virtual model to reconstruct the sensory experiences of the ancient peoples who created those sites. Use of new technologies in computer graphics, including 3D imaging, to support current research in archaeology and anthropology.

* NELC 324b / ANTH 331b / ARCG 000b / ARCG 354b / EVST 354b / HIST 204Jb / NELC 000b, The Ancient State: Genesis and Crisis from Mesopotamia to Mexico  Harvey Weiss
Ancient states were societies with surplus agricultural production, classes, specialization of labor, political hierarchies, monumental public architecture and, frequently, irrigation, cities, and writing. Pristine state societies, the earliest civilizations, arose independently from simple egalitarian hunting and gathering societies in six areas of the world. How and why these earliest states arose are among the great questions of post-Enlightenment social science. This course explains (1) why this is a problem, to this day, (2) the dynamic environmental forces that drove early state formation, and (3) the unresolved fundamental questions of ancient state genesis and crisis, –law-like regularities or a chance coincidence of heterogenous forces?  HU, SO

* NELC 325a / HUMS 274a / LITR 388a, The Education of Princes: Medieval Advice Literature of Rulership and Counsel  Shawkat Toorawa
In this course we read “mirrors for princes,” a type of political writing by courtiers and advisors. The genre flourished in the courts of medieval Europe and the Islamic world. We learn about the ethical and moral considerations that guided (or were meant to guide) rulers in their conduct, in the formulation of their policies, and about theories of rule and rulership. The works we read are from several cultural, religious,

* NELC 327a / MMES 327a, Introduction to the Field of Near Eastern Languages & Civilizations  Kevin van Bladel
This half-credit course is a concise introduction to the field of Near Eastern Languages & Civilizations and its cognates (Middle Eastern Studies, etc.), focusing on the history and constitution of institutional bases for the study of the Near East, the development of the terms by which it is defined, subfields like Assyriology, Egyptology, and Arabic studies, the debate over Orientalism and its aftermath, the conflation of the Near East with religions and nations, the development of Area Studies, the place of NELC knowledge in higher education and scholarship generally, the public face of Near Eastern studies, and how careers in NELC are made. Priority given to seniors and juniors with majors in the NELC department. ½ Course cr

* NELC 338a / ARBC 173a / ARBC 598a / NELC 614a, Tracing the Image of the Arab "Other"  Jonas Elbousty
This advanced Arabic language course places the modern Arabic novel in conversation with the west in an effort to uncover both dominant narratives regarding Arab identity, as well as counter narratives that present a challenge to these dominant narratives. We study the tradition of modern Arabic literature, looking specifically to the ways in which the image of the “other” is presented in Arabic narratives as well as the ways in which the image of the Arab is constructed through the others’ literature. Readings, discussions, and written assignments will be in Arabic. Prerequisite: ARBC 151. L5

* NELC 492a and NELC 493b, The Senior Essay  Kathryn Slanski
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 fall 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, Rm 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.
Neuroscience (NSCI)

**NSCI 141b / PSYC 141b, The Criminal Mind**  Arielle Baskin-Sommers
Theoretical and empirical study of the development of criminal behavior, including constitutional, social, and neurobiological elements. Personality and psychopathological factors associated with criminal behavior; theoretical and psychobiological explanations of crime; the biological/environment interaction; the impact of psychobiological models for policy and intervention.  SO

**NSCI 160a / PSYC 160a, The Human Brain**  Gregory McCarthy
Introduction to the neural bases of human psychological function, including social, cognitive, and affective processing. Preparation for more advanced courses in cognitive and social neuroscience. Topics include memory, reward processing, neuroeconomics, individual differences, emotion, social inferences, and clinical disorders. Neuroanatomy, neurophysiology, and neuropharmacology are also introduced.  SC

* **NSCI 240b / PSYC 230b, Research Methods in Human Neuroscience**  Gregory McCarthy
Primary focus on structural, functional, and diffusion magnetic resonance imaging, with a secondary emphasis upon brain stimulation, electroencephalography, and evoked potentials. Students learn the fundamentals of each method and the experimental designs for which they are most applicable. Prerequisites: PSYC 160/NSCI 160 and a course in statistics, or permission of instructor.  SC

* **NSCI 258b / PSYC 258b, Computational Methods in Human Neuroscience**  Nick Turk-Browne
This course provides training on how to use computational science for the advanced analysis of brain imaging data, primarily from functional magnetic resonance imaging (fMRI). Topics include scientific programming, high-performance computing, machine learning, network/graph analysis, real-time neurofeedback, nonparametric statistics, and functional alignment. Prerequisites: CPSC 100, CPSC 112 or other course involving terminal commands and programming (Python preferred); course in statistics and/or data science; PSYC 160 or other human neuroscience course; or permission of instructor.  QR, SC

* **NSCI 260a / PSYC 260a, Research Methods in Psychopathology: Psychotic Disorders**  Tyrone Cannon
Methods of research in psychopathology. Focus on longitudinal designs, high-risk sampling approaches, prediction of outcomes, and modeling change over time. Students design and perform analyses of clinical, cognitive, genetic, neuroimaging and other kinds of measures as predictors of psychosis and related outcomes, using existing datasets supplied by the instructor.  SO

* **NSCI 270a / PSYC 270a, Research Methods in Cognitive Neuroscience**  Stephanie Lazzaro
This course introduces methods used by cognitive neuroscientists to discover the structural and functional features of the nervous system. A combination of lectures and hands-on lab activities help students understand the structure and function of the human brain.  WR, SC
NSCI 320a / MCDB 320a, Neurobiology  Haig Keshishian and 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. At least 1 semester of college chemistry is strongly recommended.  
sc 0 Course cr

NSCI 321La / MCDB 321La, Laboratory for Neurobiology  Haig Keshishian and Paul Forscher
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

NSCI 324a / BENG 230a / MB&B 330a / MCDB 330a, Modeling Biological Systems I  Staff
Biological systems make sophisticated decisions at many levels. This course explores the molecular and computational underpinnings of how these decisions are made, with a focus on modeling static and dynamic processes in example biological systems. This course is aimed at biology students and teaches the analytic and computational methods needed to model genetic networks and protein signaling pathways. Students present and discuss original papers in class. They learn to model using MatLab in a series of in-class hackathons that illustrate the biological examples discussed in the lectures. Biological systems and processes that are modeled include: (i) gene expression, including the kinetics of RNA and protein synthesis and degradation; (ii) activators and repressors; (iii) the lysogeny/lysis switch of lambda phage; (iv) network motifs and how they shape response dynamics; (v) cell signaling, MAP kinase networks and cell fate decisions; and (vi) noise in gene expression. Prerequisites: MATH 115 or 116. BIOL 101-104, or with permission of instructors. This course also benefits students who have taken more advanced biology courses (e.g. MCDB 200, MCDB 310, MB&B 300/301).  
qr, sc 0 Course cr

NSCI 325b / BENG 465b / MB&B 361b / MCDB 361b, Modeling Biological Systems II  Jonathan Howard, Thierry Emonet, and Damon Clark
Advanced topics related to dynamical processes in biological systems. Processes by which cells compute, count, tell time, oscillate, and generate spatial patterns. Time-dependent dynamics in regulatory, signal-transduction, and neuronal networks; fluctuations, growth, and form. Comparisons between models and experimental data. Dynamical models applied to neurons, neural systems, and cellular biophysical processes. Use of MATLAB to create models. Prerequisite: MCDB 330 or equivalent, or a 200-level biology course, or with permission of instructor.  
qr

NSCI 329a / MCDB 329a, Sensory Neuroscience Through Illusions  Damon Clark and Michael O’Donnell
Animals use sensory systems to obtain and process information about the environment around them. Sensory illusions occur when our sensory systems provide us with surprising or unexpected percepts of the world. The goal of this course is to introduce students to sensory neuroscience at the levels of sensor physiology and of the neural circuits that process information from sensors. The course is centered around sensory illusions, which are special cases of sensory processing that can be especially illustrative, as well as delightful. These special cases are used to learn about the general principles
that organize sensation across modalities and species. Prerequisites: BIOL 101-104; NSCI 160 or NSCI 320 or permission of instructor.  sc

**NSCI 340b / PSYC 335b, Cognitive Neuroscience**  Steve Chang
This course covers how cognition is made by the brain. Students learn brain mechanisms underlying human cognition, including making decisions, paying attention, regulating emotion, remembering events, as well as understanding others. The course discusses both established and newly emerging findings based on several landmark experiments in both humans and animals. During this process, students are also introduced to cutting-edge techniques in cognitive neuroscience for studying human cognition. Prerequisite: PSYC 160 or specific chapter readings from the instructor.  sc

* **NSCI 440a or b / CGSC 420a or b / PSYC 420a or b, Topics in Clinical Neuroscience**  Avram Holmes
An overview and examination of the neuroscience of psychiatric illness. We focus on cutting-edge research in humans and animals aimed at understanding the biological mechanisms that underlie psychiatric illness. Although these questions date back to early philosophical texts, only recently have experimental psychologists and neuroscientists begun to explore this vast and exciting domain of study. We discuss the evolutionary and developmental origins of individual differences in human personality, measurement issues, fundamental dimensions of psychopathology, stability/plasticity, heritability, and implications therapeutic interventions as well as the associated broader implications for public policy. A major focus is on the neurobiology of fear and anxiety, including brain circuits, molecular genetic pathways, and epigenetics. A secondary focus is on differences in behavior and biology that confer risk for the development of depression and addiction, including the biological systems involved in hedonic pleasure, motivated goal pursuit, and the regulation of impulses in the face of everyday temptation. Students should have some background in psychology; PSYC 110 and PSYC 160 preferred.  so

* **NSCI 441a / PSYC 438a, Computational Models of Human Behavior**  Robb Rutledge
Why do we do the things we do? How do we adapt to changes in the environment? And how does our happiness depend on our choices and what happens to us? How can computational models help us to gain new insights into psychological processes? The goal of this course is to use computational models to understand human behavior and its relationship to our emotions. Data is collected in a variety of tasks including new experiments designed by students, and is analyzed using computational models. CPSC 112 or other course involving programming (e.g., C++, Java, Python, Matlab), or permission of instructor.  sc

* **NSCI 449a / PSYC 449a, Neuroscience of Social Interaction**  Steve Chang
This seminar covers influential studies that inform how the brain enables complex social interactions from the perspectives of neural mechanisms. Students thoroughly read selected original research papers in the field of social neuroscience across several animal species and multiple modern neuroscience methodologies. In class, the instructor and students work together to discuss these studies in depth. Focused topics include neural mechanisms behind brain-to-brain coupling, empathy, prosocial
decision-making, oxytocin effects, and social dysfunction. Prerequisite: PSYC 160 or permission from the instructor. SC

* **NSCI 470a, Independent Research**  Damon Clark and Steve Chang
Research project under faculty supervision taken Pass/Fail; does not count toward the major, but does count toward graduation requirements. Students are expected to spend approximately ten hours per week in the laboratory. A final research report and/or presentation is required by end of term. Students who take this course more than once must reapply each term. To register, students must submit a form and written plan of study with bibliography, approved by the faculty research adviser and DUS, by the end of the first week of class. More detailed guidelines and forms can be obtained from http://neuroscience.yale.edu.

* **NSCI 480a, Senior Non-empirical Research**  Damon Clark and Steve Chang
Research survey under faculty supervision fulfills the senior requirement for the B.A. degree and awards a letter grade. For NSCI seniors only (and second term juniors with DUS permission). Students are expected to conduct a literature review, to complete written assignments, and to present their research once in either the fall or spring term. Students are encouraged to pursue the same research project for two terms. The final research paper is due in the hands of the sponsoring faculty member, with a copy submitted to the department, by the stated deadline near the end of the term. To register, students submit a form and written plan of study with bibliography, approved by the faculty research adviser and DUS, by the end of the first week of classes. More detailed guidelines and forms can be obtained from http://neuroscience.yale.edu.

* **NSCI 490a, Senior Empirical Research**  Damon Clark and Steve Chang
Laboratory or independent empirical research project under faculty supervision to fulfill the senior requirement for the B.S. degree. For NSCI seniors only (and second term juniors with DUS permission); this course awards a letter grade. Students are expected to spend at least ten hours per week in the laboratory, to complete written assignments, and to present their research once in either the fall or the spring term. Written assignments include a short research proposal summary due at the beginning of the term and a full research report due at the end of the term. Students are encouraged to pursue the same research project for two terms, in which case, the first term research report and the second term proposal summary may be combined into a full research proposal due at the end of the first term. Final papers are due by the stated deadline. Students should reserve a research laboratory during the term preceding the research. To register, students must submit a form and written plan of study with bibliography, approved by the faculty research adviser and DUS, by the end of the first week of classes. More detailed guidelines and forms can be obtained from http://neuroscience.yale.edu.

**Ottoman (OTTM)**

* **OTTM 310a, Introduction To Ottoman Turkish I**  Ozgen Felek
This course studies the Turkish language written in the Arabic alphabet during the Ottoman Empire (1299-1923), which ruled for almost 700 years from North Africa to the Balkans, and the early years of the Turkish Republic established in 1923. The knowledge of Ottoman Turkish thus gives students an important advantage over experts on just one geographical and cultural area of the Muslim world. Students
participating in the course develop skills that enable them to read Ottoman Turkish texts and pursue independent work in Ottoman studies. We work on building up a richer vocabulary, developing a good competence of Ottoman Turkish, and improving students’ reading skills. Since culture is an integrated part of the language, various cultural expressions are introduced through a variety of historical and literary Ottoman texts from the fourteenth to nineteenth centuries.

* OTTM 320b, Introduction to Ottoman Turkish II  Ozgen Felek
This course studies the Turkish language written in the Arabic alphabet during the Ottoman Empire (1299-1923), which ruled for almost 700 years from North Africa to the Balkans, and the early years of the Turkish Republic established in 1923. The knowledge of Ottoman Turkish thus gives students an important advantage over experts on just one geographical and cultural area of the Muslim world. Students develop skills that enable them to read Ottoman Turkish texts and pursue independent work in Ottoman studies. We work on building up a richer vocabulary, developing a good competence of Ottoman Turkish, and improving students’ reading skills. Since culture is an integrated part of language, various cultural expressions are introduced through a variety of historical and literary Ottoman texts from the fourteenth to twentieth centuries. Prerequisite: OTTM 310.

Persian (PERS)

PERS 110a, Elementary Persian I  Farkhondeh Shayesteh
Introduction to modern Persian, with emphasis on all four language skills: reading, writing, listening, and speaking.  L1  1½ Course cr

PERS 120b, Elementary Persian II  Farkhondeh Shayesteh
Continuation of PERS 110, with emphasis on all four language skills: reading, writing, listening, and speaking. Prerequisite: PERS 110 or permission of instructor.  L2  RP  1½ Course cr

PERS 130a, Intermediate Persian I  Farkhondeh Shayesteh
Continuation of PERS 120, with emphasis on expanding vocabulary and understanding more complex grammatical forms and syntax. Prerequisite: PERS 120 or permission of instructor.  L3  RP  1½ Course cr

PERS 140b, Intermediate Persian II  Farkhondeh Shayesteh
Continuation of PERS 130, with emphasis on expanding vocabulary and understanding more complex grammatical forms and syntax. Prerequisite: PERS 130 or permission of instructor.  L4  RP  1½ Course cr

* PERS 161a / MMES 176a, Cinema of Iran, Past and Present  Farkhondeh Shayesteh
A thematic survey of Iranian cinema, past and present. Prominent Iranian directors such as Kiarostami, Beyzai, Panahi, Baniyemad, and Farhadi are explored through discussion and in-class viewing of clips from assigned films. Students enhance their awareness of Persian culture through Iranian films while advancing their language skills. L4 and instructor permission.  L5
Philosophy (PHIL)

* PHIL 022a, Philosophy of Masculinities  Robin Dembroff
What is masculinity? What relationships does it bear to femininity, misogyny, and homophobia? To race? To biological sex? This course examines these and other questions related to masculinity from a philosophical perspective. The course develops students' understanding of masculinity as a cultural product that changes across context and time. It pays particular attention to the ways that masculinity is socially policed and reinforced, rather than a “natural” expression of male sex. Through combinations of academic and popular texts, students critically examine language surrounding masculinity (e.g., “real man”, “bromance”), interlocking relationships between masculinity and other social features, such as race/ethnicity and class, social mechanisms that reproduce masculine norms (e.g., misogyny), and forces that challenge these norms (e.g., trans and queer identifications). From this groundwork, students consider the influence of masculinity on main fields of philosophy, such as epistemology, philosophy of science, ethics, and metaphysics, as well as the prospects for non-hierarchical, non-“toxic” forms of masculinity. Enrollment limited to first-year students. Preregistration required; see under First-Year Seminar Program.  HU

* PHIL 040b, Ethics of Data Science  Lily Hu
This course focuses on the ethical questions raised by the growing domain of “data science.” Data-based algorithmic systems are increasingly taking the helm of decision-making processes that significantly impact our lives. These tools range from affecting the mundane—the online advertisements we are shown—to the life-altering—the criminal justice verdicts we receive. In the past several years, many scholars as well as activists, journalists, and policymakers have begun to consider the various ways that the widespread adoption of these systems can lead to prickly social problems. Some of the challenges these systems bring, you’ve likely heard of: concerns about unfairness and discrimination; about privacy and surveillance. Others have received less popular attention but still bear on the preceding moral questions: When is it permissible to use statistical inferences to make decisions about individuals? What are the benefits and dangers of using certain social categories, e.g., racial categories, in data collection and eventual model-based decision-making? The umbrella term “data science” in this course encompasses also algorithmic and machine learning decision systems. Enrollment limited to first-year students. Preregistration required; see under First-Year Seminar Program.  HU

PHIL 115a, First-Order Logic  Alexander Meehan
An introduction to formal logic. Study of the formal deductive systems and semantics for both propositional and predicate logic. Some discussion of metatheory.  QR

PHIL 118a / RLST 127a / SAST 261a, Buddhist Thought: The Foundations  Staff
This class introduces the fundamentals of Buddhist thought, focusing on the foundational doctrinal, philosophical, and ethical ideas that have animated the Buddhist tradition from its earliest days in India 2500 years ago down to the present, in places such as Tibet, China, and Japan. Though there will be occasional discussion of the social and practical contexts of the Buddhist religion, the primary focus of this course lies on how traditional Buddhist thinkers conceptualize the universe, think about the nature of human beings, and propose that people should live their lives. Our main
objects of inquiry are therefore the foundational Buddhist ideas, and the classic texts in which those ideas are put forth and defended, that are broadly speaking shared by all traditions of Buddhism. In the later part of the course, we take up some of these issues in the context of specific, regional forms of Buddhism, and watch some films that provide glimpses of Buddhist religious life on the ground. HU o Course cr

PHIL 125a / CLCV 125a, Introduction to Ancient Philosophy Brad Inwood
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. WR, HU o Course cr

PHIL 126b, Introduction to Modern Philosophy from Descartes to Kant Michael Della Rocca
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 o Course cr

PHIL 130b / EDST 135b, Philosophy of Education Jason Stanley
An introduction to the philosophy of education. In this course, we read classical texts about the nature and purpose of education, focusing ultimately on the question of the normative shape and form of education in liberal democracy. What is the difference between education and indoctrination? What is the proper relation, in a liberal democracy, between civic education and vocational education? What shape or form should education take, if it is to achieve its goals? How, for example, is the liberal ideal of equality best realized in the form and structure of an educational system? Authors include Plato, Rousseau, Du Bois, Washington, Stanton, Dewey, Cooper, Woodson, and Freire. HU

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 o Course cr

PHIL 177a / AFAM 198a / CGSC 277a / EDST 177a / EP&E 494a, Propaganda, Ideology, and Democracy Jason Stanley
Historical, philosophical, psychological, and linguistic introduction to the issues and challenges that propaganda raises for liberal democracy. How propaganda can work to undermine democracy; ways in which schools and the press are implicated; the use of propaganda by social movements to address democracy’s deficiencies; the legitimacy of propaganda in cases of political crisis. HU o Course cr

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 203b / EALL 212b, Ancient Chinese Thought Mick 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.  

* PHIL 227a / ENGL 268a / HUMS 254a / LITR 463a, Literature and Philosophy, Revolution to Romanticism  
  Jonathan Kramnick  
This is a course on the interrelations between philosophical and literary writing beginning with the English Revolution and ending with the beginnings of Romanticism. We read major works in empiricism, political philosophy, and ethics alongside poetry and fiction in several genres. Topics include the mind/body problem, political ideology, subjectivity and gender, and aesthetic experience as they take philosophical and literary form during a long moment of historical change.  

* PHIL 264b / JDST 272b / PHIL 295b / RLST 295b, Al-Ghazali and Maimonides  
  Frank Griffel  
The lives and thought of the philosopher theologians Al-Ghazali and Maimonides. Comparison of their lives and writings, focusing on their integration of Aristotelian philosophy into the theology of Islam and Judaism.  

PHIL 267b, 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.  

* PHIL 272a, Philosophy of Mind  
  Daniel Greco  
A survey of contemporary issues in the philosophy of mind, including arguments for and against materialism and accounts of intentional states, qualitative states, and mental causation.  

PHIL 281a, Infinity  
Staff  
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.  

PHIL 284a, The Will, Agency, and Free Choice  
Staff  
Some philosophers have celebrated the will’s capacity for choice, making it central to human freedom. On the other hand, other philosophers have argued that the free agent does not use the will to choose, as often there is only one rational course of action, and thus no space for choice within the will, which must simply follow the intellect—otherwise the agent is acting against reason and hence unfreely, and if the agent is acting irrationally, they cannot be responsible either. This course focuses on this debate (sometimes characterized as a debate between voluntarism and intellectualism), considering the arguments on both sides, and whether a satisfactory solution can be found. The debate has a long history, which provides the background to the course, and thus focuses on work by thinkers such as Augustine, Luther, Leibniz, Kant, Hegel, Nietzsche, Sartre, and Murdoch. We do not follow their writings in chronological order, but trace out various conceptual connections on this issue that can be found in their works. We do consider how the debate connect to related issues in philosophy of religion, ethics, and metaphysics.  

PHIL 290b / EVST 219b, Philosophical Environmental Ethics  
Stephen Latham  
This is a philosophical introduction to environmental ethics. The course introduces students to the basic contours of the field and to a small number of special
philosophical problems within the field. No philosophical background is required or expected. Readings are posted on Canvas and consist almost entirely of contemporary essays by philosophers and environmentalists. SO Course cr

* PHIL 295b / JDST 272b / PHIL 264b / RLST 295b, Al-Ghazali and Maimonides
  Frank Griffel
  The lives and thought of the philosopher theologians Al-Ghazali and Maimonides. Comparison of their lives and writings, focusing on their integration of Aristotelian philosophy into the theology of Islam and Judaism. HU

* PHIL 304b / ECON 302b / EP&E 364b, Choice Theory and its Critics
  Daniel Greco and Larry Samuelson
  The aim of the course is to build up a sufficiently strong foundation in the philosophy of science to allow students to critically assess the challenge posed to the rational choice framework in social science by evidence of human irrationality. Readings are drawn from philosophy, economics (including behavioral economics), and psychology. Prerequisites: Four courses in a combination of economics, philosophy, and psychology. HU, SO

* PHIL 305b / CGSC 313b / PSYC 313b, Philosophy for Psychologists
  Joshua Knobe
  Introduction to frameworks developed within philosophy that have applications in psychological research. Principal topics include the self, causation, free will, and morality. Recommended preparation: a course in philosophy or psychology. HU, SO

* PHIL 311a / RLST 303a, The End of Metaphysics
  Nancy Levene
  Exploration of metaphysics in light of the supposition that it is at an end. Readings from classics and critics in philosophy, religion, and literature. WR, HU

PHIL 326b / RLST 402b, The Philosophy of Religion
  John Pittard
  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 Course cr

* PHIL 338b, Happiness and Tragedy
  David Charles
  The goal of the course is to investigate and assess the accounts of happiness and misery offered by historical philosophers such as Plato, Aristotle, Augustine, Kant, and Mill and by more recent thinkers such as Bernard Williams, Philippa Foot, Christine Korsgaard, and Thomas Nagel. We also consider some recent psychological work on related topics. Enrollment priority is given to junior and seniors. HU

* PHIL 361a / ENGL 248a / HSHM 476a / HUMS 430a / LITR 483a, Thought Experiments: Connecting Literature, Philosophy and the Natural Sciences
  Paul Grimstad
  The course looks closely at the intersection of literature, philosophy and natural science through the lens of the thought experiment. Do thought experiments yield new knowledge about the world? What role does narrative or scene setting play in thought experiments? Can works of literary fiction or films function as thought experiments? Readings take up topics such as personal identity, artificial intelligence, meaning and intentionality, free will, time travel, the riddle of induction, “trolley problems” in ethics and the hard problem of consciousness. Authors may include Mary Shelley, Plato, Albert Einstein, Franz Kafka, H.G. Wells, Rene Descartes, Kazuo Ishiguro, Rivka Galchen, Alan Turing, Hilary Putnam, as well as films (The Imitation Game) and television shows (Black Mirror). Students should have taken
at least one course involving close analysis of works of literature or philosophy. WR, HU

**PHIL 367a, Renaissance Philosophy**  Paul Franks  
Can inherited tradition be a source of wisdom and/or knowledge? Under what conditions does tradition need renewal or rebirth in a Renaissance? Descartes begins one version of modernity by doubt both tradition and sense perception. He eventually restores sense perception on a new basis, but never returns to the question of tradition. Nevertheless, he uses traditional ideas, and his contemporaries took themselves not to be starting from scratch but rather to be renewing the wisdom of ancient Greek Platonism, ancient Israelite kabbalah, and ancient Egyptian Hermeticism. Can this project of Renaissance be vindicated? Is it opposed to modernity, or does it give rise to alternative conceptions of modernity. Figures studied include Gemisthos Plethon, Marsilio Ficino, Pico della Mirandola, Giordano Bruno, Nicholas Cusanus, Henry More, Ralph Cudworth, Abraham ha-Kohen Herrera, and Anne Conway. Prerequisites: Some exposure to modern philosophy, e.g., Directed Studies, or PHIL 126. WR, HU

**PHIL 383b, Critical Perspectives on the Canon**  Stephen Darwall and Moya Mapps  
How should we engage with canonical philosophers, like Hume and Kant, when their writings are riddled with racist and sexist claims and theories? And what about relatively recent writers, like John Rawls, whose "ideal theory" of justice seems blind to the fact of racial and gender oppression? We engage Kant's and Rawls's writings, tackling these questions head on. We also read scholarly treatments of Kant’s racism and sexism and how we should approach his writings in light of it. We study also critiques of Rawls along race and gender lines—Charles Mills's brief for "nonideal" moral and political theories that attempt to come to terms with racial injustice and Susan Moller Okin's gender-based critique of Rawls. Finally, we consider as well how Mills and Okin make use of Rawlsian ideas in their own constructive accounts. Students should have at least one prior college-level philosophy course, ideally in a relevant subfield: ethics, history of philosophy, feminist philosophy, or philosophy of race. HU

**PHIL 395a / CGSC 395a, Junior Colloquium in Cognitive Science**  Guilherme Almeida  
Survey of contemporary issues and current research in cognitive science. By the end of the term, students select a research topic for the senior essay. Enrollment limited to Cognitive Science majors. ½ Course cr

**PHIL 402b / GMAN 227b / HUMS 330b / LITR 330b, Heidegger's Being and Time**  Martin Hagglund  
Systematic, chapter by chapter study of Heidegger's *Being and Time*, arguably the most important work of philosophy in the twentieth-century. All major themes addressed in detail, with particular emphasis on care, time, death, and the meaning of being. HU

**PHIL 408b, The Ethics of Marx, Kierkegaard, and Nietzsche**  Stephen Darwall  
Marx, Kierkegaard, and Nietzsche were united by their critical attitude toward morality. Yet each had an ethical philosophy, even if it was only implicit, as in Marx. Moreover, there are themes that run through the thought of all three, though they differ profoundly from one another. For example, all three think and write in response to Kant and the German Idealists, Hegel and Fichte. And all three develop the idea of freedom, which was so important to Kant and post-Kantian Idealists. This course is an
intensive study of the ethics of Marx, Kierkegaard, and Nietzsche: each in its own right, in comparison with each other, and in the context of the history of moral philosophy in the modern period, including up to the present time. One course in philosophical ethics advisable. HU

* PHIL 414a, Mind in Modern Philosophy  
Kenneth Winkler and Bridger Ehli
Study and discussion of a range of philosophical problems that arose or intensified in the early modern period and persist in the present day. Among the themes we consider: dualism; perception; representation (particularly representation of an external world); and personal identity. Readings in both early modern and present-day sources. Prerequisite: PHIL 126 or equivalent study. HU

* PHIL 419b, Descartes  
Michael Della Rocca
An examination of Descartes as a founder of the modern world picture. Consideration of all his major works. Prerequisites: two courses in philosophy. HU

* PHIL 423b, Philosophy of Probability  
Alexander Meehan
Probability plays a central role in modern life, and enjoys applications to areas ranging from fundamental physics to individual decision-making and the law. This course has two goals. First, to explore general foundational questions about the nature of probability: what are probabilities? Can they be reduced to frequencies? Do probabilities make sense even if the world is deterministic? Second, to use probabilistic tools to investigate some of the deepest and most pressing questions at the intersection of the above areas: Does evidence from physics show that there are probably many universes? Can probabilities be used to model individual uncertainty, and if so, what are the rational norms governing those uncertainties? Is it possible for an AI-based categorization systems to be minimally fair? Should defendants be convicted based on merely statistical evidence? No prior background in probability is assumed; students are taught the basics of probability theory during the first part of the course. For those with a strong background in probability or statistics, it is important to understand that this is a philosophy course, and students are expected to read, write, and argue like a philosopher. HU

* PHIL 425b, Topics in Epistemology  
Keith DeRose and Timothy Williamson
Survey of recent work in epistemology, with an emphasis on connections between formal approaches to epistemology and traditional epistemological questions. Bayesian approaches and their limitations; the relationship of credence to belief and knowledge; higher-order knowledge and probability. Prerequisite: a course in epistemology, or with permission of instructor. HU

Joshua Knobe
Introduction to the emerging field of moral cognition. Focus on questions about the philosophical significance of psychological findings. Topics include the role of emotion in moral judgment; the significance of character traits in virtue ethics and personality psychology; the reliability of intuitions and the psychological processes that underlie them. HU

* PHIL 427b, 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 434a, Disagreement and Higher-Order Evidence  John Pittard
Investigation of the epistemic significance of disagreement. Whether one can reasonably maintain confident belief in the face of disagreement with apparently qualified thinkers; recent responses to that question from conciliationists and anticonciliationists. Related issues in the theory of rationality. HU

* PHIL 444a / WGSS 432a, Social Ontology  Robin Dembroff
Study of conceptual and methodological foundations of social ontology, as well as particular topics within social ontology, such as the nature of gender and race. Prerequisites: at least one, but preferably two philosophy courses. HU

* PHIL 445b / LING 376b, Implicature and Pragmatic Theory  Staff
This seminar explores theoretical and experimental approaches to conversational and conventional implicature. We examine the role that pragmatic inference plays in the determination of what is said and of truth-conditional content in neo-Gricean pragmatics and relevance theory as well as considering arguments for and against the grammatical view of scalar implicature. Our investigations draw on evidence from linguistic diagnostics, corpora, and a range of experimental studies on the acquisition, processing, and patterning of scalar implicature, negative strengthening, and exhaustivity in focus constructions. Finally, we review current work on the effects of discourse context, politeness considerations, and lexical semantics in constraining when and how pragmatic inferences are drawn. Prerequisite: At least one course in semantics, pragmatics, or philosophy of language; or permission of instructor. SO RP

* PHIL 457b / EP&E 235b / PLSC 283b, 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

* PHIL 458a, Morality and Evolution  Stephen Darwall
Ever since Darwin’s *On the Origin of the Species*, the question of evolutionary theory’s implications for our understanding of morality and of ourselves as moral beings has been pressing. In recent years, several philosophers have argued that evolution undermines the possibility of moral knowledge and, perhaps, there being facts of moral right and wrong. In this course, we investigate evolutionary theory’s implications for morality. We begin with questions about the nature of morality (as we ordinarily understand it) and the fundamentals of evolutionary theory. The focus then shifts to philosophers who have argued for moral skepticism and forms of moral anti-realism on evolutionary grounds. Our third focus is on evolutionary theories that show a deep compatibility between evolution and morality. We finish with a metaethical account of morality that fits with one of these evolutionary theories, to see if it provides a plausible way of responding to the evolutionary critique. A prior course in ethics is helpful. HU

* PHIL 463a, Varieties of Explanatory Relations  Lily Hu and Issa Kohler-Hausmann
We explore various kinds of relations that figure into different types of explanations and the relata that figure in those explanatory relations. Examples of such explanations include causal explanations, constitutive explanations, functional explanations; examples of such relations include causal relations, grounding relations, supervenience
relations; examples of relata in those explanations include events, variables, properties, social kinds. This then sets us up to consider a set of (social) scientific, legal, and normative claims that rely on these explanations, which are the focus of a related course, Explanatory Relations in Normative, Legal, and Empirical Analysis of Discrimination. Enrollment in both courses is strongly encouraged but not required.

HU

* PHIL 464a / PLSC 291a, Justice, Taxes, and Global Financial Integrity  Thomas Pogge
Study of the formulation, interpretation, and enforcement of national and international tax rules from the perspective of national and global economic justice. Previous courses in one or two of the following: law, economics, political science, or political philosophy.
HU

* PHIL 466a / GMAN 329a / JDST 348a, German Idealism and Religion  Paul Franks
The philosophies of Kant and his German Idealist successors address a number of central questions in the philosophy of religion and also presuppose a religious background in their approaches to questions of general metaphysics, epistemology and ethics. In this course, we explore the relevant religious context—both in works of Erasmus and Luther and also in the writings of the kabbalists of Safed, Christian kabbalah, and Jakob Boehme. We then read major works by Kant, Hegel and Schelling against that background. Other authors include Conway, Herrera, Jacobi, Kierkegaard, Lessing and Mendelsohn. Issues considered include freedom of the will and determinism, pantheism and panentheism, infinity and finitude, knowledge and faith, love and law, commandment and antinomianism, love of God and love of neighbor. Some prior study of Kant and German Idealism is recommended.
WR, HU

* PHIL 469a / GMAN 288a / HUMS 480a / LITR 482a, The Mortality of the Soul: From Aristotle to Heidegger  Martin Hagglund
This course explores fundamental philosophical questions of the relation between matter and form, life and spirit, necessity and freedom, by proceeding from Aristotle's analysis of the soul in De Anima and his notion of practical agency in the Nicomachean Ethics. We study Aristotle in conjunction with seminal works by contemporary neo-Aristotelian philosophers (Korsgaard, Nussbaum, Brague, and McDowell). We in turn pursue the implications of Aristotle's notion of life by engaging with contemporary philosophical discussions of death that take their point of departure in Epicurus (Nagel, Williams, Scheffler). We conclude by analyzing Heidegger's notion of constitutive mortality, in order to make explicit what is implicit in the form of the soul in Aristotle.
HU

* PHIL 480a, Tutorial  Daniel Greco
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 487a, The Philosophy of the Ordinary and the Extraordinary  Jason Stanley
An investigation of the significance of ordinary life for philosophy, and of the relevance of the extraordinary—the philosophical, the religious, the aesthetic—to the everyday.
Attention is paid to the supposed refutation of skepticism by appeals to ordinary language; the politics of speech-acts and of claims to ordinariness or extraordinariness; the aesthetics of film in relation to the everyday; modernist aspirations to transfigure the everyday and post-modernist attempts to debunk the extraordinary. Authors include J. L. Austin, Ludwig Wittgenstein, Stanley Cavell, Michael Fried, and Toril Moi, among others. Films are also be analysed. HU

* PHIL 490a, The Senior Essay  Daniel Greco
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 5; the deadline for both one- and two-term senior essays completed in the spring is April 21.

* PHIL 494b, Topics in Kant  Thomas Pogge
Featuring some of the most important and difficult texts in philosophy, this seminar involves a close reading of Kant’s works from one subset of his philosophy. It also guides students to identify and engage with the most insightful secondary literature and to grapple with Kant’s arguments both orally and in writing. Each instantiation of the seminar selects readings according to student and instructor interests, with a focus for instance on Kant’s epistemology, centering around his Critique of Pure Reason, on his moral philosophy, as developed in his Groundwork and Critique of Practical Reason, or on his political philosophy and teachings about human progress. Students may take this seminar twice in consecutive years, provided a different set of Kant’s works is covered. Prerequisites: Two courses in the history of philosophy, or one such course with the instructor’s permission. WR, HU

Physics (PHYS)

* PHYS 040a / ASTR 040a, Expanding Ideas of Time and Space  Meg Urry
Discussions on astronomy, and the nature of time and space. Topics include the shape and contents of the universe, special and general relativity, dark and light matter, and dark energy. Observations and ideas fundamental to astronomers’ current model of an expanding and accelerating four-dimensional universe. Enrollment limited to first-year students. Preregistration required; see under First-Year Seminar Program. SC

* PHYS 050a or b / APHY 050a or b / ENAS 050a or b, Science of Modern Technology and Public Policy  Daniel Prober
Examination of the science behind selected advances in modern technology and implications for public policy, with 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, renewable energy technologies, 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 first-year students. Preregistration required; see under First-Year Seminar Program. SC
* PHYS 099b / MB&B 099b / MCDB 099b / MENG 099b / SCIE 099b, Introduction to Research Methods in Physics and Biology: Preparing for a First Research Experience  
Staff  
Spanning both the classroom and laboratory, this seminar course provides an immersive introduction to scientific research. Students build practical laboratory skills, computational competency, and begin to build fluency in the structures and modes of communication that define modern research. The course also facilitates identification of a laboratory mentor and devising a research proposal (with mentorship) for competitive summer research fellowship applications. This class is open to first-year students, interested in any STEM major, who have no prior research experience. This course does not count toward major requirements. Enrollment limited to first-year students. Preregistration required; see under First-Year Seminar Program.

* PHYS 100b / APHY 100b / ENAS 100b / EPS 105b / EVST 100b, Energy, Environment, and Public Policy  
Daniel Prober  
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. QR, SC

* PHYS 120b, Quantum Physics and Beyond  
Staff  
Current topics in modern physics, beginning with quantum physics and continuing through subatomic physics, special and general relativity, cosmology, astrophysics, and string theory. SC

PHYS 151a or b / APHY 151a or b / ENAS 151a or b, Multivariable Calculus for Engineers  
Staff  
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

PHYS 165La and PHYS 166Lb, General Physics Laboratory  
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 0 Course cr per term

* PHYS 170a and PHYS 171b, University Physics for the Life Sciences  
Staff  
An introduction to classical physics with special emphasis on applications drawn from the life sciences and medicine. Fall-term topics include vectors and kinematics, Newton's laws, momentum, energy, random walks, diffusion, fluid mechanics, mathematical modeling, and statistical mechanics. Spring-term topics include oscillations, waves, sound, electrostatics, circuits, Maxwell's equations, electromagnetic waves, gene circuits, and quantum mechanics. Essential mathematics are introduced and explained as needed. Completion of MATH 112 or equivalent is prerequisite for PHYS 170. Completion of PHYS 170 is a prerequisite for PHYS 171. MATH 116 (or MATH 115) is recommended prior to or concurrently with PHYS 171. QR, SC 0 Course cr per term

PHYS 180a and PHYS 181b, University Physics  
Staff  
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
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electromagnetism, special relativity, and quantum physics. Concurrently with MATH 115 and 120 or equivalents. See comparison of introductory sequences and laboratories in the YCPS. May not be taken for credit after PHYS 170, 171. QR, SC

**PHYS 200a and PHYS 201b, Fundamentals of Physics**  Staff
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. MATH 210 and either MATH 225 or MATH 222, are generally taken concurrently. See comparison of introductory sequences and laboratories in the YCPS. QR, SC

**PHYS 205a or b and PHYS 206a or b, Modern Physical Measurement**  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 0 Course cr per term

* **PHYS 260a and PHYS 261b, Intensive Introductory Physics**  Staff
An introduction to major branches of physics—classical and relativistic mechanics; gravitation; electricity and magnetism; and quantum physics, information, and computation—at a sophisticated level. For students majoring in the physical sciences, mathematics, and philosophy whose high school training included both mechanics and electricity and magnetism at the typical college/AP level and have excellent training in, and a flair for, mathematical methods and quantitative analysis. Concurrently with MATH 120, ENAS 151, PHYS 151, or PHYS 301, or equivalent. Students considering an alternative MATH course should check with the DUS in Physics. QR, SC

**PHYS 295a / ASTR 255a, Research Methods in Astrophysics**  Hector Arce
An introduction to research methods in astronomy and astrophysics. 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. Use of the Python programming language. Prerequisite: background in high school calculus and physics. No previous programming experience required. QR, SC RP

**PHYS 301a, Introduction to Mathematical Methods of Physics**  Simon Mochrie
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 343a / ASTR 343a, Gravity, Astrophysics, and Cosmology**  Daisuke Nagai
Introduction to frontier areas of research in astrophysics and cosmology exploring ideas and methods. In—depth discussion of the physics underlying several recent discoveries
including extrasolar planets—their discovery, properties, and issues of habitability; black holes—prediction of their properties from GR, observational signatures, and detection; and the accelerating universe—introduction to cosmological models and the discovery of dark energy. Prerequisites: PHYS 170, 171, or 180, 181, or 200, 201, or 260, 261, or permission of instructor. QR, SC

**PHYS 345b, Introduction to Quantum Information Processing and Communication**

Staff

This course is intended for undergraduate physics, chemistry, engineering, computer science, statistics and data science, and mathematics majors seeking an introduction to quantum information science. There is now a second quantum revolution underway and a world-wide race to build powerful new types of computers based on quantum principles, and to develop new techniques for encrypted communication whose security is guaranteed by the laws of quantum mechanics. The approach of this course to these topics will strip away much of the traditional physics details to focus on the information content of quantum systems, the nature of measurement, and why the true randomness of certain measurement results can be a feature rather than a bug. We learn what it means for a quantum bit (‘qubit’) to be simultaneously 0 and 1 (in some sense). We learn about quantum entanglement and the associated ‘spooky action at a distance’ that convinced Einstein that the quantum theory must be wrong. Ironically, this bizarre effect is now used on a daily basis to prove that quantum mechanics is indeed correct and used as a routine engineering test to make sure that quantum computers are working properly and are truly quantum. Specific topics include: the mathematical representation of quantum states as complex vectors, the superposition principle, entanglement and Bell inequalities, quantum gates and algorithms for quantum computers, quantum error correction, dense coding, teleportation, and secure quantum communication. Students learn to do problem sets based on programming and operating publicly-accessible cloud-based quantum computers. See for example: https://www.ibm.com/quantum-computing/. Familiarity with complex numbers and the basics of linear algebra (matrices, determinants, eigenvectors and eigenvalues) is assumed. Prior exposure to basic probability and statistics, as well as a course in quantum mechanics are useful but not required. SC

**PHYS 353a / BENG 353a, Introduction to Biomechanics**

Michael Murrell

An introduction to the biomechanics used in biosolid mechanics, biofluid mechanics, biothermomechanics, 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 0 Course cr

* **PHYS 378b, Introduction to Scientific Computing & Data Science**

Daisuke Nagai

This course introduces students to essential computational and data analysis methods and tools and their problem-solving applications. These are skills and knowledge essential for beginning research in the sciences, and are not typically taught in an introductory physics curriculum. The goal here is not completeness across any of these areas, but instead the introduction of the most important and useful skills, concepts, methods, techniques, tools and relevant knowledge for getting started in research in physics. Key learning goals include basic programming in Python, data analysis, modeling, simulations and machine learning, and their applications to problems in physics and beyond. Prerequisites: Introductory physics and familiarity with
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single variable calculus (basic integration, differentiation, Taylor series, etc). Previous experience in Python programming is not required. Contact instructor if you are unsure about your preparation. sc

* PHYS 382Lb, Advanced Physics Laboratory  Staff
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. After or concurrently with PHYS 439 or 440, or with permission of instructor. PHYS 206L WR, SC

PHYS 401a and PHYS 402b, Advanced Classical Physics from Newton to Einstein  Staff
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  Steven Girvin
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 412a, Relativity  Vincent Moncrief
This course covers special relativity and an introduction to general relativity. A thorough treatment of special relativity, stressing equally conceptual understanding and certain formal aspects. Introduction to general relativity covers curved spaces, Einstein's equations, and some of their solutions. Prerequisite: PHYS 401 or PHYS 410. QR, SC

* PHYS 420a / APHY 420a, Thermodynamics and Statistical Mechanics  Nicholas Read
This course is subdivided into two topics. We study thermodynamics from a purely macroscopic point of view and then we devote time to the study of statistical mechanics, the microscopic foundation of thermodynamics. Prerequisites: PHYS 301, 410, and 440 or permission of instructor. QR, SC

PHYS 428a / AMTH 428a / E&EB 428a / EPS 428a, Science of Complex Systems  Jun Korenaga
Introduction to the quantitative analysis of systems with many degrees of freedom. Fundamental components in the science of complex systems, including how to simulate complex systems, how to analyze model behaviors, and how to validate models using observations. Topics include cellular automata, bifurcation theory, deterministic chaos, self-organized criticality, renormalization, and inverse theory. Prerequisite: PHYS 301, MATH 247, or equivalent. QR, SC
PHYS 430b, Electromagnetic Fields and Optics  Staff
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, Basic Quantum Mechanics  Peter Rakich
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

PHYS 440a or b, Quantum Mechanics and Natural Phenomena I  Staff
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  Steve Lamoreaux
Continuation of PHYS 440. Prerequisite: PHYS 440 and either PHYS 430 or
permission of the instructor.  QR, SC

PHYS 442b, Introduction to Nuclear and Elementary Particle Physics  Staff
Fundamental concepts in nuclear and particle physics, including the discovery of
radioactivity, the Dirac equation, antimatter, Feynman diagrams, hadron resonances,
quarks and gluons, fundamental symmetries, the weak interaction, beta decay, quantum
chromodynamics, neutrino oscillation, unification, and particle theories for dark matter.
Prerequisite: two term courses in quantum mechanics.  QR, SC

PHYS 448a / APHY 448a, Solid State Physics I  Sohrab Ismail-Beigi
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, PHYS 420.  QR, SC

PHYS 449b / APHY 449b, Solid State Physics II  Yu He
The second term of the sequence described under APHY 448.  QR, SC

PHYS 458a / APHY 458a, Principles of Optics with Applications  Hui Cao
Introduction to the principles of optics and electromagnetic wave phenomena with
applications to microscopy, optical fibers, laser spectroscopy, and nanostructure
physics. Topics include propagation of light, reflection and refraction, guiding light,
polarization, interference, diffraction, scattering, Fourier optics, and optical coherence.
Prerequisite: PHYS 430.  QR, SC

PHYS 460a, Mathematical Methods of Physics  Keith Baker
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 469a and PHYS 470b, Independent Research in Physics  Staff
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 required. For students with a strong background in physics coursework. This course may be taken multiple times for pass/fail credit. Suggested for first years and sophomores.

* PHYS 471a and PHYS 472b, Independent Projects in Physics  Staff
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 required. Registration is limited to junior and senior physics majors. This course may be taken up to four times for a letter grade.

Polish (PLSH)

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. 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 150a, Advanced Polish  Krystyna Illakowicz
Improvement of high-level language skills through reading, comprehension, discussion, and writing. Focus on the study of language through major literary and cultural texts, as well as through film and other media. Exploration of major historical and cultural themes. Prerequisite: PLSH 140 or equivalent. L5

* 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
Political Science (PLSC)

**PLSC S220a / PLSC 220a / WGSS 220a, Gender and Politics**  Andrea Aldrich
Exploration of theoretical and empirical work in political science to study the relationship between gender and politics in the United States and around the world. Topics include women’s representative in legislative and executive branch politics in democratic regimes; the impact of gender stereotypes on elections and public opinion; conditions that impact the supply and demand of candidates across genders; and the underrepresentation of women in political institutions. 1 Credit. Tuition $4,200. Session A: May 27-June 28  SO

* **PLSC 015a, The Politics of Human Flourishing: Ancient Political Philosophy**  Heather Wilford
This course considers ancient Greek perspectives on fundamental questions about human nature, human flourishing, the philosophic life, the purpose of politics, and the possibilities and limits of reason, justice, freedom, and law. Our authors invite us to reflect on the purposes and practices of our lives and offer us a perspective from which to challenge prevailing assumptions about liberal democracy and the modern state. Although they lived in a very different time and place, the course seeks to engage with their arguments about the human good, human happiness, and the best regime as though they were our contemporaries.  Enrollment limited to first-year students. Preregistration required; see under First-Year Seminar Program.  HU

* **PLSC 028a, American Constitutionalism: Power and its Limits**  Gordon Silverstein
What happens when a modern superpower tries to govern itself under an 18th Century Constitution? Using original documents, contemporaneous books, and U.S. Supreme Court cases, this course explores the debates that have defined America’s struggle to live up to its sometimes conflicting commitments to liberty, equality and the consent of the governed. Enrollment limited to first-year students. Preregistration required; see under First-Year Seminar Program.  SO

* **PLSC 030a, Law and the Limits of Freedom**  Alexander Rosas
This course evaluates the desired role of law in free and modern societies and dissects, more broadly, the relationship between law, the state, and the individual in such societies. Particularly, this course considers when, if ever, it is appropriate to use law to limit freedom in the name of equality, security, community, utility, and/or morality. Enrollment limited to freshmen. Preregistration required; see under Freshman Seminar Program.  SO

**PLSC 116a, Comparative Politics: States, Regimes, and Conflict**  Sarah Khan
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  o Course cr

**PLSC 130a / GLBL 260a, Nuclear Politics**  Alex 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 161a or b / GLBL 344a or b / HIST 483Ja or b, Studies in Grand Strategy II  
   Michael Brenes  
The study of grand strategy, of how individuals and groups can accomplish large ends with limited means. During the fall term, students put into action the ideas studied in the spring term by applying concepts of grand strategy to present day issues. Admission is by application only; the cycle for the current year is closed. This course does not fulfill the history seminar requirement, but may count toward geographical distributional credit within the History major for any region studied, upon application to the director of undergraduate studies. Prerequisite: PLSC 321. Previous study courses in political science, history, global affairs, or subjects with broad interdisciplinary relevance encouraged.  
* PLSC 167b / GLBL 284b, Mass Atrocities in Global Politics  
   David Simon  
Examination of the impact of global politics and institutions on the commission, execution, prevention, and aftermath of mass atrocities.  
* PLSC 175a / AFST 175a, Africa in International Relations  
   David Simon  
This course examines key facets of how African countries interact with the rest of the world, and with other countries on the continent. Focusing mostly on Sub-Saharan African countries, it looks at international economic relations (focusing on aid but also addressing trade, investment, and debt); peacemaking and peacebuilding; and regional governance institutions.  
* PLSC 182a / GLBL 236a, The Politics of International Law and Cooperation  
   Tyler Pratt  
This course focuses on the political processes and institutions that facilitate cooperation among states. Students examine the obstacles to cooperation in the international arena, the reasons for the creation of international laws and institutions, and the extent to which such institutions actually affect state policy. Students also explore the tension between international cooperation and concerns about power, state sovereignty, and institutional legitimacy. Course materials draw from a variety of substantive issues, including conflict prevention, trade, human rights, and environmental protection.  
* PLSC 205a, The American Presidency  
   Stephen Skowronek  
Examination of the constitutional law, historical development, and current operations of the American presidency. Topics include formal powers, the organization and mobilization of popular support, the modern executive establishment, and the politics of presidential leadership.  
* PLSC 209a / HIST 167Ja, Congress in the Light of History  
   David Mayhew  
This course begins by studying analytic themes, including congressional structure, incentives bearing on members and parties, conditions of party control, supermajority rules, and polarization, followed by narrative works of major political showdowns entailing Congress such as those in 1850, 1876-77, 1919 (defeat of the Versailles Treaty), 1937 (defeat of court-packing), 1954 (the McCarthy-Army hearings), 1964 (civil rights), 1973-74 (Watergate), and 1993-94 (defeat of health care). Students also examine a series of policy performances, for the better or the worse in today’s judgments, ranging from early state-building through reacting to the Great Depression, constructing a welfare state, and addressing climate change. This is a reading course and does not accommodate senior essays.
* **PLSC 210a, Political Preferences and American Political Behavior**  Joshua Kalla
Introduction to research methods and topics in American political behavior. Focus on decision making from the perspective of ordinary citizens. Topics include utility theory, heuristics and biases, political participation, retrospective voting, the consequences of political ignorance, the effects of campaigns, and the ability of voters to hold politicians accountable for their actions.  

* PLSC 212a / EP&E 390a / EVST 212a, 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.  

* **PLSC 215b / EVST 255b / F&ES 255b / GLBL 282b, Environmental Law and Politics**  John Wargo
We explore relations among environmental quality, health, and law. We consider global-scale *avoidable* challenges such as: environmentally related human illness, climate instability, water depletion and contamination, food and agriculture, air pollution, energy, packaging, culinary globalization, and biodiversity loss. We evaluate the effectiveness of laws and regulations intended to reduce or prevent environmental and health damages. Additional laws considered include rights of secrecy, property, speech, worker protection, and freedom from discrimination. Comparisons among the US and EU legal standards and precautionary policies will also be examined. Ethical concerns of justice, equity, and transparency are prominent themes.  

* **PLSC 220a / PLSC S220a / WGSS 220a, Women & Politics**  Andrea Aldrich
Exploration of theoretical and empirical work in political science to study the relationship between women and politics in the United States and around the world. Topics include women's descriptive and substantive representation in legislative and executive branch politics in democratic regimes; the impact of gender stereotypes on elections and public opinion; conditions that impact the supply and demand of candidates across genders; and the underrepresentation of women in political institutions.  

* **PLSC 223a / EDST 223a, Learning Democracy: The Theory and Practice of Civic Education**  Amir Fairdosi
This is a seminar on the theory and practice of civic education. We begin by investigating philosophies of civic education, asking such questions as: What is civic education and what is its purpose? What knowledge, skills, and values promote human flourishing and the cultivation of a democratic society? What role can and should schools play in this cultivation? In the next part of the course we focus on civic education in practice, exploring various approaches to teaching civics and the empirical evidence in support of each method's effectiveness. We also discuss variations in access to civic education opportunities across socioeconomic, demographic, and national contexts, and how societies might deal with these disparities.  

* **PLSC 228a / EP&E 306a, First Amendment and Ethics of Law**  Karen Goodrow
This course addresses the First Amendment and freedom of speech, focusing on the ethical implications of restrictions on free speech, as well as the exercise of free speech. Course topics and discussions include the “fighting words” doctrine, hate speech, true threats, content regulated speech, freedom of speech and the internet, and the
so-called “right to be forgotten.” By the end of the course, students recognize the role free speech plays in society, including its negative and positive impacts on various segments of society. Students also have an understanding of the competing interests arising from the First Amendment’s right to free speech, and can analyze how these competing interests are weighed and measured in the United States as compared with other countries.

* PLSC 238a / EDST 238a, The Education Beat: Writing on Policy, Learning, and Life
  Staff
  Exploration of the national conversation around education issues, and how to write smartly about them. Classes delve into top stories of the last few years—diversity and desegregation, school choice and culture wars, and Covid-19. Students learn journalistic values and methods and how to develop marketable ideas. The class examines approaches to nonacademic writing, including opinion and narratives, and then puts them into practice. Journalists who cover education are frequent guests.

* PLSC 247a / AMST 245a / ENGL 246a, The Media and Democracy
  Joanne Lipman
  In an era of "fake news," when mainstream media is attacked as the "enemy of the people" and social platforms are enabling the spread of misinformation, how do journalists hold power to account? Students explore topics including objectivity versus advocacy, and hate speech versus First Amendment speech protections. Case studies will span from 19th century yellow journalism to the media’s role in #MeToo and #BlackLivesMatter movements.

* PLSC 253a or b / ENGL 467a or b, Journalism
  Staff
  Examination of the practices, methods, and impact of journalism, with focus on reporting and writing; consideration of how others have done it, what works, and what doesn’t. Students learn how to improve story drafts, follow best practices in journalism, improve methods for obtaining, skeptically evaluating, and assessing information, as well as writing a story for others to read. The core course for Yale Journalism Scholars. No prerequisites.

PLSC 254a, Political Parties in the American System
  Staff
  The evolution of American political parties and the role of parties and partisanship in contemporary government and elections. Empirical and theoretical accounts of parties, including divided government, parties in Congress, realignment, responsible party government, party identification, and ideology. Elite-led polarization, decline and resurgence of strong parties, and the antiparty constitutional tradition.

* PLSC 255a, America From Scratch
  Amir Fairdosi
  What would the United States look like without a Supreme Court? Without a Senate? Without states? What if the United States had ten presidents instead of one? Or no president at all? As radical as these constitutional propositions might sound, they were all at least considered by America’s founders. In this class, we examine such proposals—proposals considered unthinkable today, but not during the Constitutional Convention or in other countries throughout history. We read the American founding documents, speeches, and letters considering these “radical” constitutional designs and connect them to attempts to realize these reforms today.
* PLSC 256b / EP&E 248b, American Political Institutions  Michael Fotos
The origins and development of American political institutions, especially in relation to constitutional choice and the agency of persons seeking freedom, equality, and self-governing capabilities as a driver of constitutional change. Key concepts include: American federalism, compound republic, citizenship, social movements, racial justice, and nonviolence.  wr, so

* PLSC 269b / AMST 427b / WGSS 427b, Politics of Gender and Sexuality in the United States  Dara Strolovitch
The 2016 Presidential election made clear that gender matters a great deal in American politics, but it also revealed that how gender matters is far from obvious. This course explores the ways in which gender and sexuality shape and are shaped by American politics and public policy. We explore the history, findings, and controversies in research about gender and sexuality in American politics from a range of approaches, examining what political science research helps us understand about questions such as: Does gender influence political campaigns and whether people will vote for particular candidates? Once elected, are gender and sexuality related to legislators’ behavior in office? How are norms related to race, class, gender, and sexuality reflected in and constructed by public policy? We also explore feminist, queer, and intersectional theories and methodologies and important work from other disciplines and interdisciplines, paying particular attention to the implications of intersectionality for understanding gender, sexuality, and politics. We also analyze the ways in which gender and sexuality intersect with other politically salient categories, identities, and forms of marginalization, including race, ethnicity, class, and ideological and partisan identification, paying particular attention to their implications for the 2016, 2018, and 2020 elections.  so

* PLSC 274a, Cities: Making Public Choices in New Haven  John DeStefano
Examination of cities, particularly the relationship of people to place and most importantly to one another, through the prism and experiences of the City of New Haven. Exploration of how concepts of social capital and legitimacy of institutions in policy design and execution, are key to the well being of community residents. How cities, in the context of retreating or antagonistic strategies by the state and federal governments, can be key platforms for future economic and social wealth creation.  so

PLSC 277a, The United States Congress  Staff
The United States Congress is arguably the most powerful legislature in the world. Its actions—and inaction—affect taxes, healthcare, business, the environment, and international politics. To understand the nature of legislative power in Congress and in democracies more broadly, we ask: How do successful politicians become powerful? How do they navigate rules and institutions to their advantage? What is the proper role of the lawmaking in regulating private business? Should we limit legislative lobbying and put a cap on campaign contributions? Class discussions use case studies including the Civil Rights movement in the 1960s, the Tax Reform Act under Reagan, and the Affordable Care Act under Obama. Exercises include coding and data analysis. The goal is to equip students with a broad understanding of the principles of politics, economics, public policy, and data science. Prerequisites: No prior knowledge about U.S. law or history is necessary. Prior experience (or concurrent enrollment) in programming, coding, or data science is beneficial, but not a prerequisite. Students without coding
experience should be prepared to spend extra time in the programming sessions during the first half of our class. **SO 0 Course cr**

* **PLSC 283b / EP&E 235b / PHIL 457b, 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**

* **PLSC 286a / HIST 292Ja / HUMS 279a, Democracy and the French Revolution**  Isaac Nakhimovsky  
The French Revolution of 1789 and its legacies, as viewed through the late-eighteenth-century debates about democracy, equality, representative government, and historical change that shaped an enduring agenda for historical and political thought in Europe and around the world. **WR, HU**

**PLSC 290a / SOCY 151a, Foundations of Modern Social Theory**  Philip Gorski  
Major works of social thought from the beginning of the modern era through the 190s. Attention to social and intellectual concepts, conceptual frameworks and methods, and contributions to contemporary social analysis. Writers include W.E.B. Du Bois, Simone De Beauvoir, Adam Smith, Thomas Hobbes, Jean-Jacques Rousseau, Immanuel Kant, Emile Durkheim, Max Weber, and Karl Marx. **SO 0 Course cr**

* **PLSC 291a / PHIL 464a, Justice, Taxes, and Global Financial Integrity**  Thomas Pogge  
Study of the formulation, interpretation, and enforcement of national and international tax rules from the perspective of national and global economic justice. Previous courses in one or two of the following: law, economics, political science, or political philosophy. **HU**

* **PLSC 297a / EP&E 312a, 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**

**PLSC 298a / WGSS 207a, Gender, Justice, Power, Institutions**  Staff  
Examination of how inequalities based on gender, race, caste, class, sexuality as well as a host of other identities are embedded in institutions that make up our social world. From the family and the home to the workplace, from the University, and the Corporation, to the Military and Media, we track how inequalities emerge and are sustained by power and institutional structures. We also see how they are challenged and what sorts of instruments are needed to challenge them. In particular, we focus on sexual politics and sexual violence as a key issue to understanding the gendered workings of institutions, in order to examine structures that sustain inequality. Through the semester, we hope to consider many domains of life–bedrooms and boardrooms, international borders and feminist movements–to understand the stubborn and sticky forms and hierarchies of power that are challenged and contested by activists, scholars, and communities. **SO 0 Course cr**

* **PLSC 302a, Liberty, Equality, and Citizenship**  Heather Wilford  
America is often described as a liberal democracy, but do we really know what democratic equality requires or what individual liberty demands? The ideals of our political order point to a number of philosophic questions: What is freedom? What is
equality? What is a free regime? Is a democracy necessarily a free regime? Is a liberal regime necessarily democratic? This course investigates such questions through a close reading of the works of two of the greatest minds of the 18th century, Montesquieu and J.J. Rousseau. These two French philosophers had a hand in shaping modernity and in transforming a Europe of feudal monarchies into a landscape of national republics. Both authors had an outsized influence on the two great revolutions of the 18th century which tried to realize the political ideals of freedom and equality. Whether we consider Madison's defense of the separation of powers or Robespierre's exhortations to republican virtue, the American and French revolutions and thus the shape of the modern world bear the stamp of these two thinkers. By turning to Montesquieu and Rousseau, the course aims to illuminate some of our most contentious contemporary political debates about freedom and equality, solidarity and diversity, and international commerce and national sovereignty. The conversation between these two authors poses forcefully a question we must all consider: what does it mean to be a good citizen in the modern world?

* PLSC 304b / EP&E 325b, Business Ethics and Law  
Robin Landis
This seminar is intended to provide frameworks for the analysis of ethical issues that may arise in the context of business decisions, including such aspects as the role of ethics, competing values and interests, and tools for making principled decisions. The course also covers, as appropriate, some aspects of law as they relate to business ethics. Previous courses in philosophy and ethics may be helpful.

* PLSC 305b / EP&E 353b, 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.

* PLSC 307b / HUMS 295b / JDST 223b, Trials of Uncertainty  
Norma Thompson
Is the demise of the trial at hand? The trial as cultural achievement, considered as the epitome of humanistic inquiry, where all is brought to bear on a crucial matter in an uncertain context. Truth may be hammered out or remain elusive, but the expectation in the court case has been that the adversarial mode works best for sorting out evidentiary conundrums. Inquiries into issues of meaning of the trial, its impartiality, and challenges to its endurability. The role of character, doubt, and diagnosis explored in Sophocles, Plato, Cicero, Burke, Jane Austen, Tocqueville, and Kafka, as well as in twentieth-century trials, films, documentaries, and twenty-first-century medical narratives.

Helene Landemore-Jelaca
Many today believe that the model of representative government that we have inherited from its 18th century founders is broken. It is seen as too oligarchic, disconnected, and unresponsive to the demands of 21st century citizens and, as such, no longer fitting the ideal of democracy that it was supposed to render possible in large, industrial societies. In this course we explore possible reforms and alternatives to the existing political and social system from both empirical and normative perspectives. We try to think both beyond representation by looking at new ways in which citizens can directly affect policy-making by either working with or by-passing entirely elected officials, and beyond government itself, by questioning the assumed divide between the political and
the economic spheres and interrogating the internal structure and governance of the workplace.

* **PLSC 318a, Lincoln’s Statecraft and Rhetoric**  Steven Smith
Close reading of major speeches and letters by Abraham Lincoln, with a focus on his views concerning slavery, equality, and race in American society. The relation of words to deeds in Lincoln’s practice of statecraft; his place in the history and theory of statesmanship. The emergence of Lincoln’s thought from an engagement with views of the American founders; ways in which his vision of American democracy both drew upon and transformed the founders’ vision.  SO  o Course cr

* **PLSC 320b / EP&E 421b, Ethics, Law, and Current Issues**  Karen Goodrow
Examination of how freedom of speech and bias influence the criminal justice system, focusing on wrongful convictions and administration of the death penalty. Understanding the role of potential bias at various levels and the competing interests of protecting speech, due process, and the innocent. Topics include limitations on speech, practical effects of speech, the efficacy of the death penalty, actual innocence, gender/race/economic bias and its effects on the justice system, as well as best practices for improving our sense of justice.

* **PLSC 324a / AFST 324a / EP&E 317a / HIST 368Ja, Nelson and Winnie Mandela**  Jonny Steinberg
A study of Nelson and Winnie Mandela’s marriage and public careers and the political and philosophical questions the marriage raises. Students examine the Mandelas’ conflicting ideas on race and on the colonial experience and compare them to those of Mohandas Gandhi and Franz Fanon. Students also read recent philosophical work on forgiveness and on violence in order critically to assess the politics of reconciliation that so divided the Mandelas. The course examines the politics of global celebrity and the portrayal of men and women in public media.

* **PLSC 332a / EP&E 299a / GLBL 299a, Philosophy of Science for the Study of Politics**  Ian Shapiro
An examination of the philosophy of science from the perspective of the study of politics. Particular attention to the ways in which assumptions about science influence models of political behavior, the methods adopted to study that behavior, and the relations between science and democracy. Readings include works by both classic and contemporary authors.  SO

**PLSC 344a / EP&E 295a, Game Theory and Political Science**  Staff
Introduction to game theory—a method by which strategic interactions among individuals and groups in society are mathematically modeled—and its applications to political science. Concepts employed by game theorists, such as Nash equilibrium, subgame perfect equilibrium, and perfect Bayesian equilibrium. Problems of cooperation, time-consistency, signaling, and reputation formation. Political applications include candidate competition, policy making, political bargaining, and international conflict. No prerequisites other than high school algebra. Political Science majors who take this course may not count ECON 159 toward the major.  QR, SO  o Course cr
* PLSC 347a / EP&E 328a / S&DS 172a, YData: Data Science for Political Campaigns  
Joshua Kalla

Political campaigns have become increasingly data driven. Data science is used to inform where campaigns compete, which messages they use, how they deliver them, and among which voters. In this course, we explore how data science is being used to design winning campaigns. Students gain an understanding of what data is available to campaigns, how campaigns use this data to identify supporters, and the use of experiments in campaigns. This course provides students with an introduction to political campaigns, an introduction to data science tools necessary for studying politics, and opportunities to practice the data science skills presented in S&DS 123, YData.

PLSC 357a / EAST 310a / GLBL 309a, The Rise of China  
Staff

Analysis of Chinese domestic and foreign politics, with a focus on the country's rise as a major political and economic power. Topics include China's recent history, government, ruling party, technology, trade, military, diplomacy, and foreign policy.

* PLSC 358a, Comparative Political Parties and Electoral Systems  
Andrea Aldrich

This course explores democratic representation through political parties around the world and the effects of electoral systems on party system development. In doing so, we critically examine the role of political parties in the representation of societal interests, party system evolution, the consequences of electoral law, and challenges facing modern political parties today with a particular focus on the growth of authoritarian and far right parties around the world. Prerequisite: It is helpful, although not mandatory, to have taken Intro to American Politics and Intro to Comparative Politics. A course on research design in the Social Sciences is also helpful.

PLSC 359b / ECON 340b, Economics and Politics of Development  
Gerard Padro

This course covers recent scholarship on the political economy of development. It starts with the study of macro-historical facts and moves on to micro issues, such as conflict and corruption. Prerequisite: Intermediate microeconomics and Econometrics (ECON 117 or equivalent).

* PLSC 374a / ECON 449a / EP&E 244a, The Economic Analysis of Conflict  
Gerard Padro

In this course we apply microeconomic techniques, theoretical and empirical, to the analysis of internal violent conflict, including civil wars, terrorism and insurgencies, its causes and consequences. Topics include forced migration, ethnic conflict, long-term consequences of war and individual choices to participate in violence. Readings comprise frontier research papers and students will learn to critically engage with cutting-edge research designs. Prerequisites: Intermediate econometrics.

* PLSC 375a / GLBL 215a / LAST 386a / MGRK 237a / SOCY 389a, Populism  
Paris Aslanidis

Investigation of the populist phenomenon in party systems and the social movement arena. Conceptual, historical, and methodological analyses are supported by comparative assessments of various empirical instances in the US and around the world, from populist politicians such as Donald Trump and Bernie Sanders, to populist social movements such as the Tea Party and Occupy Wall Street.
* PLSC 376b / ER&M 376b / MGRK 304b / SOCY 307b, Extreme and Radical Right Movements  Paris Aslanidis

Extreme and radical right movements and political parties are a recurrent phenomenon found in most parts of the world. Discussion of their foundational values and the causes of their continuous, even increasing, support among citizens and voters.  so

PLSC 378a / AFAM 186a / LAST 214a / SOCY 170a, Contesting Injustice  Staff

Exploration of why, when, and how people organize collectively to challenge political, social, and economic injustice. Cross-national comparison of the extent, causes, and consequences of inequality. Analysis of mobilizations for social justice in both U.S. and international settings. Intended primarily for freshmen and sophomores.  so

* PLSC 399a / EP&E 257a / LAST 251a, Political Power and Inequality in Latin America  Ana De La O

Overview and analysis of politics in Latin America. The emergence of democracy and the forces that led to the unprecedented increase in inequality in the twentieth century. Topics include institutional design, historical legacies, corruption, clientelism, and violence.  so

* PLSC 410a, Political Protests  Maria Jose Hierro

The 2010s was the “decade of protest,” and 2019 capped this decade with an upsurge of protests all over the world. In 2020, amidst the Covid-19 pandemic, the US is witnessing the broadest protests in its history. What are the roots of these protests? Under what conditions does protest start? Why do people decide to join a protest? Under what conditions do protests succeed? Can repression kill protest movements? Focusing on recent protest movements across the world, this seminar addresses these, and other questions related to the study of political protest.  so

* PLSC 415a / EP&E 241a / SOCY 172a, Religion and Politics in the World  Katharine Baldwin

A broad overview of the relationship between religion and politics around the world, especially Christianity and Islam. Religions are considered to constitute not just theologies but also sets of institutions, networks, interests, and sub-cultures. The course’s principal aim is to understand how religion affects politics as an empirical matter, rather than to explore moral dimensions of this relationship.  so

* PLSC 417b / EDST 282b, Comparative International Education  Mira Debs

Around the world, education is one of the central institutions of society, developing the next generation of citizens, workers and individuals. How do countries balance these competing priorities? In which ways do countries converge on policies, or develop novel approaches to education? Through the course, students learn the a) impact of colonialism on contemporary education systems, b) the competing tensions of the demands of citizen and worker and c) how a variety of educational policies are impacted around the world and their impact on diverse populations of students. EDST 110 Foundations in Education Studies recommended.  wr, so

* PLSC 429a / AFST 385a / EP&E 350a / HIST 391Ja / HLTH 385a, Pandemics in Africa: From the Spanish Influenza to Covid-19  Jonny Steinberg

The overarching aim of the course is to understand the unfolding Covid-19 pandemic in Africa in the context of a century of pandemics, their political and administrative management, the responses of ordinary people, and the lasting changes they wrought.
The first eight meetings examine some of the best social science-literature on 20th-century African pandemics before Covid-19. From the Spanish Influenza to cholera to AIDS, to the misdiagnosis of yaws as syphilis, and tuberculosis as hereditary, the social-science literature can be assembled to ask a host of vital questions in political theory: on the limits of coercion, on the connection between political power and scientific expertise, between pandemic disease and political legitimacy, and pervasively, across all modern African epidemics, between infection and the politics of race. The remaining four meetings look at Covid-19. We chronicle the evolving responses of policymakers, scholars, religious leaders, opposition figures, and, to the extent that we can, ordinary people. The idea is to assemble sufficient information to facilitate a real-time study of thinking and deciding in times of radical uncertainty and to examine, too, the consequences of decisions on the course of events. There are of course so many moving parts: health systems, international political economy, finance, policing, and more. We also bring guests into the classroom, among them frontline actors in the current pandemic as well as veterans of previous pandemics well placed to share provisional comparative thinking. This last dimension is especially emphasized: the current period, studied in the light of a century of epidemic disease, affording us the opportunity to see path dependencies and novelties, the old and the new.

* PLSC 431a / GLBL 289a / HIST 245Ja, War and Peace in Northern Ireland  
Bonnie Weir
Examination of theoretical and empirical literature in response to questions about the insurgency and uneasy peace in Northern Ireland following the peace agreement of 1998 which formally ended the three-decade long civil conflict known widely as The Troubles and was often lauded as the most successful of its kind in modern history. Consideration of how both the conflict and the peace have been messier and arguably more divisive than most outside observers realize.

PLSC 438a, Applied Quantitative Research Design  
Shiro Kuriwaki
Research designs are strategies to obtain empirical answers to theoretical questions. Research designs using quantitative data for social science questions are more important than ever. This class, intended for advanced students interested in social science research, trains students with best practices for designing and implementing rigorous quantitative research. We cover designs in causal inference, prediction, and missing data at a high level. This is a hands-on, application-oriented class. Exercises involve programming and statistics in addition to the social sciences (politics, economics, and policy). The final project advances a research question chosen in consultation with the instructor. Prerequisite: Any statistics or data science course that teaches ordinary least squares regression. Past or concurrent experience with a programming language such as R is strongly recommended. Students with no prior R experience should plan on attending extra practice sessions in the first few weeks.

* PLSC 442a / ECON 212a, Introduction to Political Economy  
John Roemer
The course is an introduction to important economic ideas: preferences and rationality, Pareto efficiency, economic equilibrium in a capitalist economy, externalities, the role of the state, uncertainty and von Neumann-Morgenstern utility, the principle of insurance, elementary game theory (Nash equilibrium), the median voter theorem, political equilibrium with party competition, distributive justice, equality of opportunity, and Arrow’s impossibility theorem. These topics are essential tools for
political economists. Prerequisite: One year of calculus or intermediate microeconomics with calculus.  

* PLSC 445a / GLBL 244a, The Politics of Fascism  Lauren Young

The subject of this course is fascism: its rise in Europe in the 1930s and deployment during the Second World War as a road map to understanding the resurgence of nationalism and populism in today’s political landscape, both in Europe and the United States. The course begins with an examination of the historic debates around fascism, nationalism, populism, and democracy. It then moves geographically through the 1930s and 1940s in Europe, looking specifically at Weimar Germany, Vichy France, the rise of fascism in England in the 1930s, and how fascist ideology was reflected in Italy’s colonial ambitions during the Abyssinian War. The course examines fascism and the implementation of racial theory and the example of anti-Semitism as an ideological and political tool. It also looks at the emergence of fascism in visual culture. The second part of the seminar turns to fascist ideology and the realities of today’s political world.

We examine the political considerations of building a democratic state, question the compromise between security and the preservation of civil liberties and look at the resurgence of populism and nationalism in Europe and the US. The course concludes by examining the role of globalization in contemporary political discourse.  

* PLSC 452a / EP&E 203a / S&DS 102a, Introduction to Statistics: Political Science  
Jonathan Reuning-Scherer

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.  

* PLSC 453a / EP&E 209a / S&DS 103a, 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.  

* PLSC 466b / HIST 268Jb / JDST 351b / RLST 324b, The Global Right: From the French Revolution to the American Insurrection  
Elli Stern

This seminar explores the history of right-wing political thought from the late eighteenth century to the present, with an emphasis on the role played by religious and pagan traditions. This course seeks to answer the question, what constitutes the right? What are the central philosophical, religious, and pagan, principles of those groups associated with this designation? How have the core ideas of the right changed over time? We do this by examining primary tracts written by theologians, political philosophers, and social theorists as well as secondary literature written by scholars interrogating movements associated with the right in America, Europe, Middle East and Asia. Though touching on specific national political parties, institutions, and think tanks, its focus is on mapping the intellectual overlap and differences between various right-wing ideologies. While the course is limited to the modern period, it adopts a global perspective to better understand the full scope of right-wing politics.  

* PLSC 490a, The Senior Colloquium  Maria Jose Hierro

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.

**Portuguese (PORT)**

**PORT 110a, Elementary Portuguese I**  Giseli Tordin  
Basic vocabulary and fundamentals of grammar through practice in speaking, reading, and writing, with stress on audio-lingual proficiency. Introduces Brazilian and Portuguese culture and civilization.  L1 RP  1½ Course cr

**PORT 120b, Elementary Portuguese II**  Staff  
Continuation of PORT 110. To be followed by PORT 130. Prerequisite: PORT 110.  L2  1½ Course cr

**PORT 130a, Intermediate Portuguese I**  Giseli Tordin  
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 are used to build vocabulary. Exercises develop students' oral command of the language.  L3 RP  1½ Course cr

**PORT 140b, Intermediate Portuguese II: Portuguese Through the Arts**  Staff  
Continuation of PORT 130. Grammar review, conversation, cultural topics, and readings from Brazilian literature. Concentration on varieties of artistic and cultural expression. Counts for the major in Portuguese. Prerequisite: PORT 130.  L4  1½ Course cr

**PORT 150a, Advanced Practice: Brazilian Culture through Black Lives**  Giseli Tordin  
This special topic, *Brazilian Culture through Black Lives*, offers an overview of the sociocultural diversity in Portuguese language through arts, street-arts, film, music, and theoretical and literary texts created by Afro-Brazilian authors. This course offers an opportunity to study the correlation between culture and language through Afro-Brazilian perspectives from authors including Lélia Gonzalez, Clementina de Jesus, Carolina Maria de Jesus, Conceição Evaristo, Machado de Assis, among others. Students can improve their Portuguese language skills by developing podcasts, clips, and digital essays using different technologies. After PORT 140 or equivalent. May be repeated for credit.  L5, HU

* PORT 352a / CPLT 657a / LITR 256a / PORT 652a, Clarice Lispector: The Short Stories  Kenneth David Jackson  
This course is a seminar on the complete short stories of Clarice Lispector (1920-1977), a master of the genre and one of the major authors of twentieth-century Brazil known for existentialism, mysticism and feminism.  WR, HU TR

* PORT 356a / LAST 252a / LITR 259a, Concrete Poetry in Brazil & Portugal: Verbibivocovisual Poetics in Theory and Practice  Kenneth David Jackson  
Brazilian concrete poetry in international perspective; production and theory of concrete poetry, translation, and criticism during the second half of the twentieth century. Brazilian concrete poets in the context of visual and concrete poetics. Representative works include 'Pilot Plan' and *Theory of Concrete Poetry*, graphic and spatial poems, and public expositions of works. Brazilian concrete poets were among the leaders of an international neo-vanguard movement in mid-twentieth century related to geometrical abstraction in painting. In the journals *Noigandres* and *Invenção*,...
and the *Theory of Concrete Poetry* the Brazilians link their poetics to Pound, Mallarmé, cummings and other inventive figures in world poetry, while relating poetry to graphic arts through reference to painting and to semiotics, including Fenollosa's essay on use of the Chinese character. The exhibit in S. Paulo's Museum of Modern Art in December 1956 was the beginning of the public exhibition of concrete poetry, now the topic of anthologies, websites, criticism, and museum retrospectives. Concrete poetics dominated the production of poetry in Brazil for half a century with a major effect on cultural and intellectual life. Prerequisite: PORT 140 or equivalent. HU TR

* PORT 471a, Directed Reading or Directed Research  
  Kenneth 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 is required.

* PORT 491a, The Senior Essay  
  Kenneth 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 (PSYC)**

**PSYC 110a or b, Introduction to Psychology**  
Stephanie Lazzaro

A survey of major psychological approaches to the biological, cognitive, and social bases of behavior. SO

**PSYC 116b / CGSC 216b / LING 116b, Cognitive Science of Language**  
Staff

The study of language from the perspective of cognitive science. Exploration of mental structures that underlie the human 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 to which language shapes perceptions of color, number, space, and gender. SO

* **PSYC 125a / CHLD 125a / EDST 125a, Child Development**  
  Ann Close and Carla Horwitz

This course is first in a sequence including Theory and Practice of Early Childhood Education (CHLD127/PSYCH 127/EDST 127) and Language Literacy and Play (CHLD 128/PSYCH 128/EDST 128). This course provides students a theoretical base in child development and behavior and tools to sensitively and carefully observe infants and young children. The seminar will consider aspects of cognitive, social, and emotional development. An assumption of this course is that it is not possible to understand children – their behavior and development – without understanding their families and culture and the relationships between children and parents. The course will give an overview of the major theories in the field, focusing on the complex interaction between the developing self and the environment, exploring current research and theory as well as practice. Students will have the opportunity to see how programs for young children use psychodynamic and interactional theories to inform the development of their philosophy and curriculum. In the past students have done weekly in-person classroom observations at a Yale affiliated childcare program. If this is not possible, students will be expected to arrange on their own to do a weekly observation in-person or virtually of a child under the age of 6. For a portion of class meetings, the class will
divide into small supervisory discussion groups. Priority given to juniors, seniors, Ed Study students.  

**PSYC 126a, Attraction and Relationships**  Jennifer Hirsch  
Theory and empirical research on the antecedents and consequences of attraction, and on intra- and interpersonal processes that either facilitate or interfere with the formation and maintenance of close relationships. Methodological bases for rigorous study of these topics.  

**PSYC 130a / CGSC 110a, 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.  

**PSYC 140a / EDST 140a, Developmental Psychology**  Julia Leonard  
An introduction to research and theory on the development of perception, action, emotion, personality, language, and cognition from a cognitive science perspective. Focus on birth to adolescence in humans and other species. Prerequisite: PSYC 110.  

**PSYC 141b / NSCI 141b, The Criminal Mind**  Arielle Baskin-Sommers  
Theoretical and empirical study of the development of criminal behavior, including constitutional, social, and neurobiological elements. Personality and psychopathological factors associated with criminal behavior; theoretical and psychobiological explanations of crime; the biological/environment interaction; the impact of psychobiological models for policy and intervention.  

**PSYC 150b / EDST 160b, Social Psychology**  Jennifer Hirsch  
Theories, methodology, and applications of social psychology. Core topics include the self, social cognition/social perception, attitudes and persuasion, group processes, conformity, human conflict and aggression, prejudice, prosocial behavior, and emotion.  

**PSYC 160a / NSCI 160a, The Human Brain**  Gregory McCarthy  
Introduction to the neural bases of human psychological function, including social, cognitive, and affective processing. Preparation for more advanced courses in cognitive and social neuroscience. Topics include memory, reward processing, neuroeconomics, individual differences, emotion, social inferences, and clinical disorders. Neuroanatomy, neurophysiology, and neuropharmacology are also introduced.  

* **PSYC 230b / NSCI 240b, Research Methods in Human Neuroscience**  Gregory McCarthy  
Primary focus on structural, functional, and diffusion magnetic resonance imaging, with a secondary emphasis upon brain stimulation, electroencephalography, and evoked potentials. Students learn the fundamentals of each method and the experimental designs for which they are most applicable. Prerequisites: PSYC 160/NSCI 160 and a course in statistics, or permission of instructor.  

* **PSYC 235a or b, Research Methods, Writing Intensive**  Staff  
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. Prerequisite: PSYC 200 or S&DS 103.  

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* PSYC 237b, Research Methods with Diverse Samples  Maria Gendron
Introduction to general principles and approaches to psychological research, with a focus on sampling diversity and cultural/cross-cultural research. Topics include generating and testing hypotheses, laboratory and field experiments, scale construction, sampling, archival methods, case studies, ethics, and politics of research. Hands-on research experience is part of the course. Prerequisites: PSYC 110 or Psychology AP equivalent, and Intro Statistics course (concurrent enrollment is acceptable with instructor permission).  WR, SO

* PSYC 258b / NSCI 258b, Computational Methods in Human Neuroscience  Nick Turk-Browne
This course provides training on how to use computational science for the advanced analysis of brain imaging data, primarily from functional magnetic resonance imaging (fMRI). Topics include scientific programming, high-performance computing, machine learning, network/graph analysis, real-time neurofeedback, nonparametric statistics, and functional alignment. Prerequisites: CPSC 100, CPSC 112 or other course involving terminal commands and programming (Python preferred); course in statistics and/or data science; PSYC 160 or other human neuroscience course; or permission of instructor.  QR, SC

* PSYC 260a / NSCI 260a, Research Methods in Psychopathology: Psychotic Disorders  Tyrone Cannon
Methods of research in psychopathology. Focus on longitudinal designs, high-risk sampling approaches, prediction of outcomes, and modeling change over time. Students design and perform analyses of clinical, cognitive, genetic, neuroimaging and other kinds of measures as predictors of psychosis and related outcomes, using existing datasets supplied by the instructor.  SO

* PSYC 270a / NSCI 270a, Research Methods in Cognitive Neuroscience  Stephanie Lazzaro
This course introduces methods used by cognitive neuroscientists to discover the structural and functional features of the nervous system. A combination of lectures and hands-on lab activities help students understand the structure and function of the human brain.  WR, SC

* PSYC 312a / ER&M 412a, Native American Mental Health  Mark Beitel and Christopher Cutter
Issues of health policy, research, and service delivery in Native American communities, with a focus on historical antecedents that shape health outcomes and social policy for indigenous communities. Urgent problems in health and wellness, with special attention to Native American mental health. The roles of the Indian Health Service, state and local agencies, and tribal health centers; comparison of Native American and European American conceptions of health and illness.  SO

* PSYC 313b / CGSC 313b / PHIL 305b, Philosophy for Psychologists  Joshua Knobe
Introduction to frameworks developed within philosophy that have applications in psychological research. Principal topics include the self, causation, free will, and morality. Recommended preparation: a course in philosophy or psychology.  HU, SO

PSYC 315a / CGSC 315a, The Modern Unconscious  John Bargh
The notion of the unconscious mind traced from the early 1800s through Freud to present-day cognitive science, with a focus on the past thirty years. The power and
function of the unconscious as a pervasive part of normal everyday human functioning. Readings mainly from cognitive and social cognitive psychology but also philosophy of mind and evolutionary biology.  

**PSYC 317a / EDST 237a / LING 217a, Language and Mind**  Maria Pinango  
The structure of linguistic knowledge and how it is used during communication. The principles that guide the acquisition of this system by children learning their first language, by children learning language in unusual circumstances (heritage speakers, sign languages) and adults learning a second language, bilingual speakers. The processing of language in real-time. Psychological traits that impact language learning and language use.  

**PSYC 318a / LING 220a, Phonetics I**  Jason Shaw  
Each spoken language composes words using a relatively small number of speech sounds, a subset of the much larger set of possible human speech sounds. This course introduces tools to describe the complete set of speech sounds found in the world’s spoken languages. It covers the articulatory organs involved in speech production and the acoustic structure of the resulting sounds. Students learn how to transcribe sounds using the International Phonetic Alphabet, including different varieties of English and languages around the world. The course also introduces sociophonetics, how variation in sound patterns can convey social meaning within a community, speech perception, and sound change.  

**PSYC 320a / ENGL 382a / FILM 280a, The Science and Culture of Memory**  John Williams and Samuel McDougle  
This is an FAS-sponsored cross-divisional course. This course offers a comparative and interdisciplinary approach to the science and culture of memory. We aim to bring traditional philosophies, narratives, and histories of memory into conversation with both long established and cutting-edge research findings on the neuroscience of memory. Questions explored in the course include: What is memory and how does it work? How has memory been conceptualized over time in both culture and science? What are the various media through which we process memories, including collective and individual forms? What can we learn from moments of mnemonic failure? What new technologies of memory are on the horizon? How is our vision of the future influenced by the content and processes of memory? In wrestling with these questions, we encounter a wide selection of narratives, art objects, films, and scientific data. Students also have an opportunity to explore their own experiences in learning and memory (including experiential assignments, e.g., asking them to memorize certain things and report on the experience, as well as opportunities to reflect on their experiences of and access to forms of collective, communal memory).  

**PSYC 327b / LING 227b, Language and Computation I**  Staff  
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.  

**PSYC 331b / LING 231b, Neurolinguistics**  Staff  
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. At least one class that introduces students to linguistic theory and linguistic argumentation from at least one perspective, including any of the following: (1) LING 217 Language and Mind, (2) LING 110 Intro to linguistics, (3) LING 253 Syntax 1, (4) LING 112 Historical Linguistics, (5) LING 232 Phonology 1, (6) LING 220 General Phonetics, or (7) Instructor permission. * PSYC 334a / CHLD 334a, Developmental Psychopathology Fred Volkmar, Eli Lebowitz, and Denis Sukhodolsky

Study of developmental psychopathology during childhood and adolescence, team taught by a child psychiatrist and three psychologists. Topics include: aspects of normal development, assessment methods, clinical disorders, treatment, and legal and social policy issues. Review of normative development, followed by discussion of theoretical approaches to understanding developmental aspects of common mental health conditions in childhood. Attention to treatment models as well as relevant issues of culture and ethnicity in the expression of psychopathology. Prerequisites: PSYC 130, 140, 180, or equivalent, or with permission of instructor.

PSYC 335b / NSCI 340b, Cognitive Neuroscience Steve Chang

This course covers how cognition is made by the brain. Students learn brain mechanisms underlying human cognition, including making decisions, paying attention, regulating emotion, remembering events, as well as understanding others. The course discusses both established and newly emerging findings based on several landmark experiments in both humans and animals. During this process, students are also introduced to cutting-edge techniques in cognitive neuroscience for studying human cognition. Prerequisite: PSYC 160 or specific chapter readings from the instructor. * PSYC 420a or b / CGSC 420a or b / NSCI 440a or b, Topics in Clinical Neuroscience Avram Holmes

An overview and examination of the neuroscience of psychiatric illness. We focus on cutting-edge research in humans and animals aimed at understanding the biological mechanisms that underlie psychiatric illness. Although these questions date back to early philosophical texts, only recently have experimental psychologists and neuroscientists begun to explore this vast and exciting domain of study. We discuss the evolutionary and developmental origins of individual differences in human personality, measurement issues, fundamental dimensions of psychopathology, stability/plasticity, heritability, and implications therapeutic interventions as well as the associated broader implications for public policy. A major focus is on the neurobiology of fear and anxiety, including brain circuits, molecular genetic pathways, and epigenetics. A secondary focus is on differences in behavior and biology that confer risk for the development of depression and addiction, including the biological systems involved in hedonic pleasure, motivated goal pursuit, and the regulation of impulses in the face of everyday temptation. Students should have some background in psychology; PSYC 110 and PSYC 160 preferred. * PSYC 422a / CGSC 426a / EP&E 490a / PHIL 426a, The Cognitive Science of Morality Joshua Knobe

Introduction to the emerging field of moral cognition. Focus on questions about the philosophical significance of psychological findings. Topics include the role of emotion in moral judgment; the significance of character traits in virtue ethics and personality.
psychology; the reliability of intuitions and the psychological processes that underlie them. **HU**

* **PSYC 425b / CGSC 425b, Social Perception**  Brian Scholl  
Connections between visual perception, among the earliest and most basic of human cognitive processes, and social cognition, among the most advanced forms of high-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 429b, Psychology of Prejudice, Stereotyping, and Discrimination**  Jennifer Richeson  
Examination of the social psychology of stereotyping, prejudice, and discrimination. Specifically, the processes of mind and brain that give rise to both positive and negative relations between members of different societal groups. PSYC 110, PSYC 200 (or equivalent), PSYC 235 (or equivalent), PSYC 150 (recommended)

* **PSYC 430a, Topics in Cultural Psychology**  Maria Gendron  
Overview of theory and research in cultural psychology, including the role of culture in social, cognitive, and health domains. Principles of the acquisition, transmission, and evolution of culture. Specialized topics include culture in non-human animals, and the intersection between culture and globalization and technology. Prerequisite: PSYC 110. **SO**

* **PSYC 435a / CGSC 435a, The Kinds We Keep: Sorting and Distorting Reality**  Frank Keil  
Sorting the world into kinds is crucial human cognition. It grounds concepts, the currency of thought. But this cognitive asset can corrode our humanity and become a curse if we fail to understand the attendant biases. We first consider some metaphysical assumptions about causal patterns in the world that sustain relatively stable kinds and how these provide grounds for building early categories. We then examine why humans, and most AI systems, must sort individuals into kinds to learn and think about the world. But while categorization greatly amplifies the power of thought, it also distorts what is sorted and how the resulting kinds are construed. We explore why learning is impossible without such distortions of and consider different sets of distortions and when they occur. We focus on thought about fundamental, or ontological kinds, many of which are first apprehended in infancy or early childhood. These include non-living natural kinds, goal-directed entities, thinking things, living things, and artifacts. We ask how human and artificial agents might take more care with the kinds they use. How can we embrace the kinds that inspire exploration and discovery without having our mis-construals turn them towards darker ends? Prerequisites: PSYC 110 or CGSC 110 and two additional courses relevant to cognition. **SO**

* **PSYC 437b / CGSC 437b, Minds, Brains, and Machines**  Julian Jara-Ettinger  
Exploration of the implications that the brain is a kind of computer that gives rise to the mind. Readings combine classical and cutting-edge research in psychology, philosophy, and artificial intelligence. **SO**  **RP**
* PSYC 438a / NSCI 441a, Computational Models of Human Behavior  Robb Rutledge

Why do we do the things we do? How do we adapt to changes in the environment? And how does our happiness depend on our choices and what happens to us? How can computational models help us to gain new insights into psychological processes? The goal of this course is to use computational models to understand human behavior and its relationship to our emotions. Data is collected in a variety of tasks including new experiments designed by students, and is analyzed using computational models. CPSC 112 or other course involving programming (e.g., C++, Java, Python, Matlab), or permission of instructor.  

* PSYC 439a / CGSC 439a, The Psychology of Social Construction  Yarrow Dunham

We live in a world replete with “forgeries that become genuine”: pieces of paper that become money, words that become promises, lines in the sand that become borders. Nearly every aspect of our lives is shaped and constrained by these kinds of socially constructed entities, things as real as mountains but far more mysterious. How do such entities come to be, and how do (and how should) we understand them? How are they made and how can they be contested when they go astray? Answering these questions requires ranging across diverse literatures beginning with psychology but including philosophy, anthropology, economics, and game theory. Prerequisite: PSYC 110 or CGSC 110.  

* PSYC 449a / NSCI 449a, Neuroscience of Social Interaction  Steve Chang

This seminar covers influential studies that inform how the brain enables complex social interactions from the perspectives of neural mechanisms. Students thoroughly read selected original research papers in the field of social neuroscience across several animal species and multiple modern neuroscience methodologies. In class, the instructor and students work together to discuss these studies in depth. Focused topics include neural mechanisms behind brain-to-brain coupling, empathy, prosocial decision-making, oxytocin effects, and social dysfunction. Prerequisite: PSYC 160 or permission from the instructor. 

* PSYC 493a or b, Directed Research  Yarrow Dunham

Empirical research projects or literature review. A student must be sponsored by a faculty member, who sets the requirements and supervises the student’s progress. To register, the student must download a tutorial form from http://psychology.yale.edu/undergraduate/undergraduate-major-forms, complete it with the adviser, and submit it to the director of undergraduate studies by the deadline listed on the form. The normal minimum requirement is a written report of the completed research or literature review, but individual faculty members may set alternative equivalent requirements. May be elected for one or two terms. May not be used for the Psychology senior essay requirement.  

* PSYC 495a or b, Research Topics  Yarrow Dunham

Empirical research project or literature review. A student must be sponsored by a faculty member, who sets the requirements and supervises the student’s progress. To register, the student must download a tutorial form from http://psychology.yale.edu/undergraduate/undergraduate-major-forms, complete it with the adviser, and submit it to the director of undergraduate studies by the date indicated on the form. The normal minimum requirement is a written report of the completed research or literature review, but individual faculty members may set alternative equivalent requirements.
May be elected for one or two terms. May not be used for the Psychology senior essay requirement. ½ Course cr

* PSYC 499a or b, Senior Essay  Yarrow Dunham
Independent senior research project (either empirical research or literature review), conducted under the guidance of a faculty adviser who sets the requirements and supervises the research. To register, the student must download a tutorial form from http://psychology.yale.edu/undergraduate/undergraduate-major-forms, complete it with the adviser, and submit it by the deadline indicated on the form. The normal minimum requirement is a written report of the completed research or literature review, but individual faculty members may set alternative equivalent requirements. A paper of 5,000 words or more meets the writing needed for the senior requirement. To be considered for Distinction in the Major, the paper should be submitted at least one week before the last day of classes and will be graded by the adviser and a second reader assigned by the DUS.

Punjabi (PNJB)

Religious Studies (RLST)

* RLST 102b / EAST 390b, Atheism and Buddhism  Hwansoo Kim
A critical examination of atheism and religions (Buddhism), with a focus on intellectual, religious, philosophical, and scientific debates about God, the origin of the universe, morality, evolution, neuroscience, happiness, enlightenment, the afterlife, and karma. Readings selected from philosophical, scientific, and religious writings. Authors include some of the following: Charles Darwin, Bertrand Russell, Christopher Hitchins, Richard Dawkins, Deepak Chopra, Sam Harris, Owen Flanagan, Stephen Batchelor, and the Dalai Lama.  HU

* RLST 121b / EALL 296b / EAST 391b, Religion and Culture in Korea  Hwansoo Kim
Introduction to Shamanism, Buddhism, Confucianism, Daoism, Christianity, and new religions in Korea from ancient times to the present. Examination of religious traditions in close relationships with social, economic, political, and cultural environments in Korean society. Examination of religious tensions, philosophical arguments, and ethical issues that indigenous and foreign religions in Korea have engaged throughout history to maximize their influence in Korean society.  HU

RLST 127a / PHIL 118a / SAST 261a, Buddhist Thought: The Foundations  Staff
This class introduces the fundamentals of Buddhist thought, focusing on the foundational doctrinal, philosophical, and ethical ideas that have animated the Buddhist tradition from its earliest days in India 2500 years ago down to the present, in places such as Tibet, China, and Japan. Though there will be occasional discussion of the social and practical contexts of the Buddhist religion, the primary focus of this course lies on how traditional Buddhist thinkers conceptualize the universe, think about the nature of human beings, and propose that people should live their lives. Our main objects of inquiry are therefore the foundational Buddhist ideas, and the classic texts in which those ideas are put forth and defended, that are broadly speaking shared by all traditions of Buddhism. In the later part of the course, we take up some of these
issues in the context of specific, regional forms of Buddhism, and watch some films that provide glimpses of Buddhist religious life on the ground. HU o Course cr

* RLST 135b / EAST 335b, Zen Buddhism  Eric Greene
Survey of the history and teachings of Zen Buddhism in China and Japan. Emphasis on reading and interpretation of primary Zen texts in their historical and religious context, along with investigation of modern interpretations and appropriations of Zen in the West. HU

* RLST 136b, The History and Contemporary (Ab)uses of the New Testament  Laura Nasrallah
The course introduces students to the historical context of New Testament texts, to the processes of its becoming scripture, and to a variety of approaches for its interpretation (evangelical, feminist, historical critical, queer, African American, etc.). We'll discuss how the New Testament is used today in politics and culture—by political candidates, in debates about sexuality, in arguments about the environment. HU

RLST 145b / HUMS 133b / JDST 110b, The Bible  Christine Hayes
The writings common to both Jewish and Christian scripture examined as diverse and often conflicting expressions of the religious life and thought of ancient Israel. The works' cultural and historical setting in the ancient Near East; the interpretive history of selected passages influential in Western culture. Introduction to a wide range of critical and literary approaches to biblical studies. Students view course lectures, which survey the entire Bible, on line; class time focuses on specific biblical passages and their subsequent interpretation in Jewish and Christian culture. HU

RLST 148a / ER&M 219a / HIST 219a / JDST 200a / MMES 149a, Jewish History and Thought 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 non-Western distributional credit within the History major, upon application to the director of undergraduate studies. HU RP

RLST 149b / HIST 220b / JDST 201b, Introduction to Modern Jewish History  David Sorkin
A broad introduction to the history of Jewish culture from the late Middle Ages until the present. Emphasis on the changing interaction of Jews with the larger society as well as the transformation of Judaism in its encounter with modernity. HU

RLST 160a / HIST 280a / ITAL 315a, The Catholic Intellectual Tradition  Staff
Introductory survey of the interaction between Catholicism and Western culture from the first century to the present, with a focus on pivotal moments and crucial developments that defined both traditions. Key beliefs, rites, and customs of the Roman Catholic Church, and the ways in which they have found expression; interaction between Catholics and the institution of the Church; Catholicism in its cultural and sociopolitical matrices. Close reading of primary sources. HU o Course cr

* RLST 174b, Gender and Religion since the 19th Century  Amanda Griffin
How did emotion, homemaking, and spirituality come to be associated with femininity? What relationship do these terms have to religion and politics? How are categories of race and class mobilized to answer these questions? Christian thought
has been integral to the formulation of such questions, and to their proposed answers. Yet, that religious grammar remains underappreciated. This course offers a critical approach to the constitutive links between modern conceptions of gender and a particular Christian imagination through the study of sentimentality. Sentimentalism is a nineteenth-century literary and cultural genre with ongoing significance for queer, feminist, racial, trans, and U.S. national politics today, as well as for histories of Christian thought and material culture in the U.S. and Britain. Topics include struggles over definitions of womanhood and family, especially as these relate to racialized, classed, queer, and trans (dis)identifications; the role of capitalism in political representation and reproductive politics; conceptualizations of the human in Black studies; fantasies of U.S. national belonging and empire; and the relationship between affect and politics, especially the potential and limits of sympathy and compassion for solidarity across difference. HU

* RLST 177a, Reason and Religion  Jack Hanson
This course examines the relationship between reason and religion in the modern West. With readings in philosophy, social theory, literature, and film, from the eighteenth century to the present, we see how these two terms, though often considered in opposition to one another, have been inextricably linked in a variety of ways. HU

* RLST 195a / HSHM 410a / WGSS 195a, Meanings of Life  Evan Goldstein
What are the meanings of life? That is, what are we talking about when we talk about life, and how did we come to talk about it in this way? Is life religious or secular? What does Christianity (still) have to do with the politics of life and death? This course takes up these questions, among others. We trace the history of life as a concept in Western thought, with a particular emphasis on the afterlife of the Christian tradition in secular modernity. Beginning with the theories of biopolitics developed by Hannah Arendt and Michel Foucault, we explore the implications of life’s centrality for modern formations of race, sexuality, and death. This course is not a survey of how different religious traditions define life; rather, by engaging with thinkers from Religious Studies, Black Studies, queer theory, science and technology studies, among other fields, we explore the theological and political dimension of life in modern Western societies. After spending several weeks covering some of the canonical theorists of biopolitics, we take on a series of more recent case studies and thinkers who have addressed some of the urgent issues of our time through a critical scrutiny of the meanings of life. Topics include secularization and sovereignty, the biopolitics of race and sexuality, the precarious status of life in pandemic times, and death. Readings are primarily composed of twentieth-century theorists, including Giorgio Agamben, Donna Haraway, Lauren Berlant, and Talal Asad, as well as relevant historical precursors and examples. No prior experience is presumed, and all texts will be read in translation. HU

* RLST 201a / HIST 232Ja / HUMS 443a / JDST 270a / MMES 342a, Medieval Jews, Christians, and Muslims In Conversation  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. Counts
toward either European or Middle Eastern distributional credit within the History major, upon application to the director of undergraduate studies. WR, HU

**RLST 202b / HIST 345b / JDST 265b / MMES 148b, Jews in Muslim Lands from the Seventh to the Sixteenth Centuries**  Ivan Marcus

Jewish culture and society in Muslim lands from the time of the Prophet Muhammad to that of Suleiman the Magnificent. Topics include Islam and Judaism; Jerusalem as a holy site; rabbinic leadership and literature in Baghdad; Jewish courtiers, poets, and philosophers in Muslim Spain; and the Jews in the Ottoman Empire. HU

* **RLST 203a / JDST 339a / LITR 418a / MMES 418a, The Classics of Modern Hebrew Literature**  Hannan Hever

Overview of the Poetics, Culture, History, and Political dynamics of Modern Hebrew Literature as national literature over the last 300 years. The course traces the literary development of its diasporic condition in Europe through the Hebrew Literature that is created in the Israeli Jewish sovereignty. The course is taught in Hebrew and the readings of literary texts are also in Hebrew. No background in Jewish literature, Hebrew literature, or Jewish culture is required. HU

* **RLST 214b / HIST 248Jb / JDST 293b, Introduction to Modern Jewish Thought**  Elli Stern

An overview of Jewish philosophical trends, movements, and thinkers from the seventeenth century to the twenty-first. Topics include enlightenment, historicism, socialism, secularism, religious radicalism, and Zionism. HU

* **RLST 219b, Disability and Religion**  Calli Micale

This interdisciplinary course considers the category of disability through interlocking discourses of religion, race, and gender. With a particular focus on Jewish and Christian traditions, we examine how religious images and motifs shape perceptions of disability. Exploring how disability challenges and informs religious narratives, we ask questions like: Does attending to the relationship between race and access to care complicate ideas about the spiritual benefits of suffering? How has religion/irreligion provided frameworks for narrating experiences of depression? Is there a connection between strategies of disabled activists and religious sensibilities regarding future hope? Course materials range in genre, including critical theory, theology, memoir, and activist-literature. Readings may include: Friedrich Nietzsche, Franz Fanon, Donna Haraway, Eli Clare, Jasbir Puar, Martha Nussbaum, Nancy Eiesland, Julia Watts Belser, Monica Coleman, Alison Kafer, Laura Levitt, Sharon Betcher, Teri Alyce Pickens, Stephanie Hunt Kennedy, Jeremy Schipper. HU

* **RLST 231b / HIST 226Jb / JDST 370b, Jews and Christians in the Formation of Europe, 500-1500**  Ivan Marcus

Students study how Jews and Christians interacted on a daily basis as medieval Europe became more restrictive and antisemitic, a contributing factor to the Holocaust. In this writing seminar, students discuss a variety of primary sources in class—laws, stories, chronicles, images—while researching and writing their own seminar paper structured by sessions on topics, bibliographies, and outlines. WR, HU

* **RLST 242a, Language and Religion**  Naila Razzaq

This seminar invites students to consider how narratives about language, group identity, and religion have been negotiated, augmented, manipulated, and erased from antiquity to the present. What role has language—real or imagined—played in
theological discourses and how has it been defined? How have myths about language origin, purity, and superiority influenced notions of religious authority, authenticity, competition, and access to knowledge production or geographic autonomy? What are the implications of kinship, maternal and/or militaristic metaphors used to describe language in various contexts? What new critical insights might we gain by centering and problematizing the question of language in discussions of “identity” broadly, and “religious identity” in particular? We focus on new theoretical frameworks drawn from scholarship in religious studies, postcolonial theory, socio-linguistics, and philosophy, among other fields, and four modules, organized chronologically. The course primarily centers on the Mediterranean region as it has often been discussed as the birthplace of language and religion, the “cradle of civilization”, though we also look at other contexts. We think about ancient and medieval texts, look at art pieces, read bilingual inscriptions, poetry and (ancient) graffiti, watch documentaries and films, and think critically about how the relations between linguistic and religious identities have been presented in the media, in university curricula, and by scholars.

**RLST 245a / ARCG 244a / NELC 109a, The Age of Akhenaton**  
Staff Study of the period of the Egyptian pharaoh Akhenaton (reigned 1353–1336 B.C.E.), often termed the Amarna Revolution, from historical, literary, religious, artistic, and archaeological perspectives. Consideration of the wider Egyptian, ancient Near Eastern, African, and Mediterranean contexts. Examination of the international diplomacy, solar theology, and artistic developments of the period. Reading of primary source material in translation. HU

* **RLST 251b / AFST 128b / ARCG 128b / EGYP 128b / NELC 129b, Magic and Ritual in Ancient Egypt and the Near East**  
John Darnell Introduction to ancient Egyptian magic and rituals with an overview on the use of magic and discussion of the different rituals and festivals attested in Ancient Egypt and the Near East. HU

* **RLST 265a / HUMS 211a / LITR 386a, Fate and Chance in Art and Experience**  
Noreen Khawaja This seminar is co-taught with Sheila Heti. It discusses shifts in how the unchosen is conceived and how it is valued, across a range of contemporary fields and historical models–from Greek tragedy to contemporary performance art, from Protestant aesthetics of fate and grace to the I Jing and its interpreters, from mathematical and physical approaches to chance to the rise of astrology. Students consider when and where we ourselves operate with a belief in something like fate. The goal to explore whether and how a contemporary concept of fate may come into focus. HU

**RLST 268b / HIST 281b, 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 272b, Mapping Black Christianity**  
Nicole Turner This course merges research in African American religious history with the creation of an interpretive archive using digital mapping and deep mapping practices. We explore the politics of mapping, geography, and race before delving into a place-based exploration of black religious communities during the late 19th century. The course aims to investigate the extant archives of black Christian communities of the post-
emancipation South: newspapers, convention and church minutes, encyclopedias and autobiographies and narratives, while applying strategies of historical analysis to explore the nature of the formation and transformation of African American religious community. The course also examines concepts of race, place, and power and how religion inflects these conceptions. The main project is to create a contribution to the mapping of black religion by exploring a single primary source in depth and then developing both summary text, curating supporting archival images, reports and other digital material culture, and a map. Emphasis on method: archival research, digital humanities, spatial analysis and politics of space and place.

**RLST 287a / MMES 391a, Islamic Theology and Philosophy** Staff
Historical survey of major themes in Muslim theology and philosophy, from teachings of the Qur'an up to the end of the per-modern period around 1800. The systematic character of Muslim thought and of the arguments given by thinkers; reason vs. revelation; the emergence of Sunnism and Shi’ism; falsafa, Sufism and Illuminationism as well as post-classical thought. **HU o Course cr**

* **RLST 295b / JDST 272b / PHIL 264b / PHIL 295b, Al-Ghazali and Maimonides**
  Frank Griffel
The lives and thought of the philosopher theologians Al-Ghazali and Maimonides. Comparison of their lives and writings, focusing on their integration of Aristotelian philosophy into the theology of Islam and Judaism. **HU**

* **RLST 303a / PHIL 311a, The End of Metaphysics** Nancy Levene
Exploration of metaphysics in light of the supposition that it is at an end. Readings from classics and critics in philosophy, religion, and literature. **WR, HU**

* **RLST 321a / SAST 362a, Hindus and Muslims in South Asia** Supriya Gandhi
Study of engagements between Hindu and Muslim traditions in South Asia from medieval to modern times. Exploration of historical case studies of Hindu-Muslim relations and the formation of religious identities, as well as how memories of the past intersect with modern discourses on religion and politics. **HU**

* **RLST 342b / HIST 268Jb / JDST 351b / PLSC 466b, The Global Right: From the French Revolution to the American Insurrection** Eli Stern
This seminar explores the history of right-wing political thought from the late eighteenth century to the present, with an emphasis on the role played by religious and pagan traditions. This course seeks to answer the question, what constitutes the right? What are the central philosophical, religious, and pagan, principles of those groups associated with this designation? How have the core ideas of the right changed over time? We do this by examining primary tracts written by theologians, political philosophers, and social theorists as well as secondary literature written by scholars interrogating movements associated with the right in America, Europe, Middle East and Asia. Though touching on specific national political parties, institutions, and think tanks, its focus is on mapping the intellectual overlap and differences between various right-wing ideologies. While the course is limited to the modern period, it adopts a global perspective to better understand the full scope of right-wing politics. **HU, SO**
about the relationship between spirituality, formal religion, secular psychology and the self-help industry. HU, SO

RLST 347a / SOCY 331a / WGSS 291a, Sexual Minorities from Plato to the Enlightenment  Igor De Souza
This interdisciplinary course surveys the history of homosexuality from a cross-cultural, comparative perspective. Students study contexts where homosexuality and sodomy were categorized, regulated, and persecuted and examine ancient and medieval constructions of same-sex desire in light of post-modern developments, challenging ideas around what is considered normal and/or natural. Ultimately, we ask: what has changed, and what has remained the same, in the history of homosexuality? What do gays and lesbians today have in common with pre-modern sodomites? Can this history help us ground or rethink our sexual selves and identities? Primary and secondary historical sources, some legal and religious sources, and texts in intellectual history are studied. Among the case studies for the course are ancient attitudes among Jews, early Christians, and Greeks; Christian theologians of the Middle Ages; Renaissance Florence; the Inquisition in Iberia; colonial Latin America; and the Enlightenment’s condemnation of sodomy by Montesquieu and Voltaire, and its defense by Bentham. HU 0 Course cr

RLST 402b / PHIL 326b, The Philosophy of Religion  John Pittard
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 0 Course cr

* RLST 422b / EGYP 147b, Egyptian Monastic Literature in Coptic  Stephen Davis
Readings in the early Egyptian classics of Christian asceticism in Sahidic Coptic, including the desert Fathers and Shenute. Prerequisite: EGYP 127 or equivalent. Counts as L4 if taken after EGYP 137 or equivalent. L3

* RLST 423a / EGYP 137a, Gnostic Texts in Coptic  Ramona Teepe
Reading, translation, and analysis of Gnostic and Valentinian literature from Nag Hammadi, in several dialects of Coptic. Prerequisite: EGYP 127 or equivalent. Counts as L4 if taken after EGYP 147 or equivalent. L3

* RLST 435b / AFAM 402b, Black Religions in Slavery and Freedom  Nicole Turner
This course explores how enslaved and free black people created and sustained religious communities in the United States during the eras of slavery and freedom. It explores the resonances of African traditions, the role of conjure, Islam and Christianity in sustaining Black people through slavery and the transformations that developed after emancipation. The course challenges the paradigm of black religion as always pointing toward freedom while exploring how the transition in status from enslaved to free was reflected in and influenced by black religious practices and communities. This course explores the religious communities of the “slave quarters,” underground railroad, independent black churches on the political landscape of freedom through the end of the 19th century. This course aims to provide participants with a deeper exploration of the developments within the period from the 19th century through 1915 and the advent of Jim Crow and U.S. imperialism.

* RLST 488a and RLST 489b, Individual Tutorial  Staff
For students who wish, under faculty supervision, to investigate an area in religious studies not covered by regular departmental offerings. The course may be used for
research or for directed reading. A long essay or several short ones are required. To apply, students should present a prospectus with bibliography of work they propose to undertake to the director of undergraduate studies together with a letter of support from the faculty member who will direct the work.

* RLST 490b, Religion and Society  Maria Doerfler
Seminar on religion and society. Topics covered vary by year, but may include one or more of the following: ritual and its social functions, different concepts of social life, the operation of violence in social relationships, religion as both champion and critic of society, and theoretical models of religion and society.

* RLST 491a and RLST 492b, The Senior Essay  Staff
Students writing their senior essays meet periodically in the fall and weekly in the spring for a 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.

Romanian (ROMN)

Russian (RUSS)

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.  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 Heritage Learners 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  Staff
A course to improve functional competence in all four language skills (speaking, writing, reading, and listening comprehension). 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  Staff
Continuation of RUSS 130. After RUSS 130 or equivalent.  L4 RP 1½ Course cr
* RUSS 142b, Russian for Heritage Learners 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 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 172a, Russian History through Literature and Film  Irina Dolgova
Study of important events in Russian history, from the medieval times to the present, through authentic reading materials in various genres and through feature and documentary films. The course is designed to advance students’ speaking proficiency in Russian and to develop their reading, listening, and writing skills. Texts include Russian fairy tales; fragments from The Primary Chronicles; A. Tolstoy’s Peter I; D. Merezhkovsky’s Antichrist; N. Eidelman’s Decembrists; P. Chaadaev’s Philosophical Letters; N. Leskov’s Enchanted Wanderer (fragments); and I. Goncharov’s Oblomov (fragments). Films include A. Tarkovsky’s Andrei Rublev; N. Mikhailov’s Several Days from Oblomov’s Life; A. Askoldov’s Comissar; Todorovsky’s Stiliagi; K. Muratova’s Asthenic Syndrome; and A. Zviagintsev’s Loveless. All written assignments, texts, and discussions are in Russian. RUSS 142 or 151, or permission of instructor.  L5, HU

* RUSS 179a, The Grotesque in Victor Pelevin  Constantine Muravnik
Novels and short stories by a contemporary Russian writer, Victor Pelevin. Focus on Pelevin’s major novel, Chapaev i Pustota, the theory of the grotesque, and on the relationship between imagination and reality. Diverse conceptions of the grotesque; the ethical and aesthetic significance of the conflict between the real and the fantastic; Pelevin’s place in the specifically Russian grotesque tradition of Gogol and Nabokov. Prerequisite: RUSS 142, 151 or permission of instructor.  L5, HU  RP

* RUSS 252a, Modernism and Revolution  Jinyi Chu
In the early 20th century the Russian Empire of the tsars transformed into the Stalinist state. The course traces this transition by exploring brilliant literary creations of
writers such as Bely, Bulgakov, Babel, and Platonov. How did the social tumult of this era give birth to Russian modernism and revolutionary culture? Topics include the radical changes in the lives of Russian gentry and peasants, terrorist and revolutionary movements, civil war, Soviet internationalism, Stalinist terror, a transition to socialist economy, and the Russia’s identity between Europe and Asia. Probing into the salient literary responses to devastations and upheavals, students gain an in-depth understanding of 20th-century Russia’s artistic and political ferment. All readings and class discussions in English. WR, HU TR

* RUSS 305a / FREN 363 / HUMS 358a, Modernist Paris and Moscow  Katerina Clark
This interdisciplinary, comparative course unsettles the notion of Moscow’s marginality and Paris’s centrality from the viewpoint of early 20th century literature, visual art, film, performance, and architecture. The course demonstrates the ways in which Modernist movements in Moscow and Paris were intimately connected and mutually influenced through decades of artistic exchange and competition. Paradigm-shifting artists, writers, and cultural figures like Natalia Goncharova, Mikhail Larionov, Paul Robeson, Vladimir Mayakovksy, Le Corbusier, Langston Hughes, Marina Tsvetaeva, W.E.B. Du Bois, and Walter Benjamin are only a few points of contact between these two epicenters of European modernism. Both Moscow and Paris, sometimes at odds and at other times in collaboration, confronted political and aesthetic questions related to imperial conquest and exoticism, revolution and abstraction in art and language, liberations from race and gender, the march of war and technology, new conceptions of the body, urban imaginaries, and life lived as art. In this course, we explore these very topics in modernism through close reading and visual analysis of works by and/or related to Paul Gauguin, Pablo Picasso, Charles Baudelaire, Symbolists, Walter Benjamin, Futurists, Kazimir Malevich, Meyerhold, the Ballets Russes, Josephine Baker, Jane and Paulette Nardal, Constructivists, Alexander Rodchenko, Surrealists, Aimé Césaire, Négritude, Alexandra Kollontai, Sonia Delaunay, and Varvara Stepanova, among others. No knowledge of Russian is required. HU

RUSS 312a / HIST 260a / HUMS 255a / LITR 253a / RSEE 312a, Tolstoy’s War and Peace TR  Staff
The course is a semester-long study of the quintessential big Russian novel, Leo Tolstoy’s War and Peace, about Napoleon’s failed 1812 war against Russia. War and Peace (1865-1869) is a sweeping panorama of nineteenth-century Russian society, a novel of profound philosophical questions, and an unforgettable gallery of artfully drawn characters. Reading the novel closely, we pose the following questions. In what ways is this patriotic war epic also an imperial novel? What myths does it destroy and construct? How does it combine fiction and history? What forces drive history, as it unfolds in the present? What are the limits of individual agency, and how much do emperors and generals control the fates of nations and armies? Finally, a question that is never too broad for Tolstoy: what is a meaningful, well-lived life? We explore these questions while refining our tools of literary analysis and situating the novel in its historical context and in our contemporary world. Secondary materials include Tolstoy’s letters, contemporary reviews, maps, and historical sources, as well as readings in political theory, philosophy, international relations, and literary criticism. All readings and class discussions in English. No prerequisites required. Both WR and non-WR sections are offered. HU TR o Course cr
* RUSS 314b, Science and Literature in Russia  Jinyi Chu
We often view science and the humanities as incompatible and even hostile fields. But are they actually as distinct as we think they are? Would it be possible to study science through literature and literature through science? What happens when artists think about science and technology in a country and age that reveres empirical knowledge? This course dives deep into these questions, interrogating how different scientific disciplines were represented in and enriched by Russian and Slavic culture. We look at various fields of scientific knowledge, such as medicine, engineering, physics, and chemistry, in connection to great works of literature, asking what role Russian writers played in shaping them and, conversely, in what ways science affected these fictional pieces. Through science and Russian literature of the 19th to the 20th century, we examine the profound impact of artistic production on different modes of knowledge production and circulation, and trace its resonance in our perceptions of the physical world to this day.  HU

* RUSS 338a / FILM 351a / SLAV 351a, Documentary, Fiction, Docufiction  John MacKay
A seminar on the relationship between nonfictional and fictional media practice, with a particular focus on the “docufiction” form. Topics to be discussed include debates over the coherence of the notion of “documentary”; the epistemological and political claims of fiction and documentary; and the relationship of documentary and fictional practice to questions of nationhood, ethnicity, and gender. Films by directors such as Vertov, Eisenstein, Shub, Flaherty, Ivens, Visconti, Varda, Makavejev, Trinh Minh-ha, Costa, and Kiarostami. HU

* RUSS 380b / FILM 360b / LITR 301b / RSEE 380b, Putin's Russia and Protest Culture  Marijeta Bozovic
Survey of Russian literature and culture since the fall of communism. The chaos of the 1990s; the solidification of power in Putin’s Russia; the recent rise of protest culture. Sources include literature, film, and performances by art collectives. Readings and discussion in English; texts available in Russian. WR, HU

Russian, East European, and Eurasian Studies (RSEE)

* RSEE 222b / HIST 223Jb, 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

RSEE 225a / HIST 290a, Russia from the Ninth Century to 1801  Staff
The mainstream of Russian history from the Kievan state to 1801. Political, social, and economic institutions and the transition from Eastern Orthodoxy to the Enlightenment. HU 0 Course cr
* RSEE 240b / CZEC 246b / FILM 364b, Milos Forman and His Films  Karen von Kunes
An in-depth examination of selected films by Milos Forman and representatives of the New Wave, *cinéma vérité* in Czech filmmaking. Special attention to Forman’s artistic and aesthetic development as a Hollywood director in such films as *Hair, One Flew over the Cuckoo’s Nest, Ragtime,* and *Amadeus.* Screenings and discussion in English.  HU

* RSEE 241a / HIST 240Ja, Government, Law, and Society in Modern Russia, 1853-1953  Sergei Antonov
Russian political culture from the Crimean War to the death of Stalin. Special attention to continuities, as well as changes, across the revolutionary divide of 1917, and to comparing official policies with daily experiences of ordinary Russians. Changing ideologies and ruling styles of tsars and early Soviet leaders (esp. Lenin, Trotsky, and Stalin) and relations with aristocratic and bureaucratic elites; political dissent and protest, including popular and state-imposed violence; the problem of legality and the rule of law. All discussions and readings in English.  WR, HU, TR

RSEE 266a / HIST 265a, Soviet Russia 1917-1991  Staff
Overview of the rise and fall of the Soviet Union. Topics include political culture and ideology of the Bolshevik/Communist Party; social and economic changes; foreign policy and the role of WWII; major artistic and cultural movements. Paper assignments involve close readings of memoir and oral history accounts.  HU 0 Course cr

RSEE 268b / ER&M 263b / 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 0 Course cr

RSEE 271a / HIST 271a / HUMS 339a, European Intellectual History since Nietzsche  Staff
Major currents in European intellectual history from the late nineteenth century through the twentieth. Topics include Marxism-Leninism, psychoanalysis, expressionism, structuralism, phenomenology, existentialism, antipolitics, and deconstruction.  HU 0 Course cr

RSEE 312a / HIST 260a / HUMS 255a / LITR 253a / RUSS 312a, Tolstoy’s War and Peace TR  Staff
The course is a semester-long study of the quintessential big Russian novel, Leo Tolstoy’s *War and Peace,* about Napoleon’s failed 1812 war against Russia. *War and Peace* (1865-1869) is a sweeping panorama of nineteenth-century Russian society, a novel of profound philosophical questions, and an unforgettable gallery of artfully drawn characters. Reading the novel closely, we pose the following questions. In what ways is this patriotic war epic also an imperial novel? What myths does it destroy and construct? How does it combine fiction and history? What forces drive history, as it unfolds in the present? What are the limits of individual agency, and how much do emperors and generals control the fates of nations and armies? Finally, a question that is never too broad for Tolstoy: what is a meaningful, well-lived life? We explore these questions while refining our tools of literary analysis and situating the novel
in its historical context and in our contemporary world. Secondary materials include Tolstoy’s letters, contemporary reviews, maps, and historical sources, as well as readings in political theory, philosophy, international relations, and literary criticism. All readings and class discussions in English. No prerequisites required. Both WR and non-WR sections are offered. WR, HU

* RSEE 380b / FILM 360b / LITR 301b, Putin’s Russia and Protest Culture Marijeta Bozovic
Survey of Russian literature and culture since the fall of communism. The chaos of the 1990s; the solidification of power in Putin’s Russia; the recent rise of protest culture. Sources include literature, film, and performances by art collectives. Readings and discussion in English; texts available in Russian. WR, HU

Sanskrit (SKRT)

* SKRT 110a / LING 115a, Introductory Sanskrit I Aleksandar Uskokov
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. L 1½ Course cr

SKRT 130a / LING 138a, Intermediate Sanskrit I Aleksandar Uskokov
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. L 3

* SKRT 160a, Advanced Sanskrit: Readings in Poetry and Drama Aleksandar Uskokov
The purpose of this course is to introduce the jargon of classical Sanskrit literature, specifically the interrelated genres of mahā-kāvya or court epic; nātaka or drama; and hagiography or carita. Special attention is given to matters of style and advanced morphology and syntax. Additionally, the course introduces scholastic techniques of text interpretation. Finally, the course looks at the phenomenon of retelling stories from Vedas, the epics, or the Buddhist sūtras in classical Sanskrit literature, combining thus advanced language instruction with learning cultural content. Prerequisites: previous terms of Sanskrit to L 4 or equivalent. L 5 RP

Science (SCIE)

* SCIE 010a, Perspectives on Biological Research Sandy Chang
The goal of this two course series is to teach Science, Technology, and Research Scholars 1 (STARS1) passionate about conducting research in the life sciences the skills necessary for all scientists and the outstanding research opportunities available at Yale. During the first semester, students read primary research papers on the COVID19 pandemic and emerge from this course with an appreciation for how rapidly scientific knowledge can be utilized to combat a deadly disease. Students learn how to (1) read the primary scientific literature, (2) present this material to the class and, (3) write a group grant proposal. During the second semester, students are required to identify a research lab that they will work in and learn how to write an independent grant proposal for funding to conduct summer research. Credit for SCIE 010 only on completion of SCIE 011; one course credit, one SC credit, and guaranteed summer
research funding is awarded for successful completion of the grant proposal and one year's work. Prerequisite: Score of 5 on AP biology test or equivalent on IB biology exam. Enrollment limited to first-year students. Preregistration required; see under First-Year Seminar Program. WR, SC ½ Course cr

* SCIE 099b / MB&B 099b / MCDB 099b / MENG 099b / PHYS 099b, Introduction to Research Methods in Physics and Biology: Preparing for a First Research Experience  Staff

Spanning both the classroom and laboratory, this seminar course provides an immersive introduction to scientific research. Students build practical laboratory skills, computational competency, and begin to build fluency in the structures and modes of communication that define modern research. The course also facilitates identification of a laboratory mentor and devising a research proposal (with mentorship) for competitive summer research fellowship applications. This class is open to first-year students, interested in any STEM major, who have no prior research experience. This course does not count toward major requirements. Enrollment limited to first-year students. Preregistration required; see under First-Year Seminar Program.

Sinhala (SNHL)

Slavic Languages and Literature (SLAV)

* SLAV 230a / HIST 353a / RLST 387, The Slavic World Between Christendom East and West  John Mikitish

The Orthodox Church figures large in both Western and Russian accounts of Putin’s Russia; church politics and inter-Christian conflicts play a major role in the politics of contemporary Ukraine. In many ways, these are just the latest chapters in an ongoing process of religious encounter, conflict, and exchange on the Slavic borderlands of Eastern and Western Christendom. Drawing on the disciplinary tools and conclusions of literary studies, history, and religious studies, this course proposes to explore this continuing story through texts, images, and other media. WR, HU

* SLAV 351a / FILM 351a / RUSS 338a, Documentary, Fiction, Docufiction  John MacKay

A seminar on the relationship between nonfictional and fictional media practice, with a particular focus on the “docufiction” form. Topics to be discussed include debates over the coherence of the notion of “documentary”; the epistemological and political claims of fiction and documentary; and the relationship of documentary and fictional practice to questions of nationhood, ethnicity, and gender. Films by directors such as Vertov, Eisenstein, Shub, Flaherty, Ivens, Visconti, Varda, Makavejev, Trinh Minh-ha, Costa, and Kiarostami. HU

Sociology (SOCY)

* SOCY 081a / ER&M 081a / MUSI 081a, Race and Place in British New Wave, K-Pop, and Beyond  Grace Kao

This seminar introduces you to several popular musical genres and explores how they are tied to racial, regional, and national identities. We examine how music is exported via migrants, return migrants, industry professionals, and the nation-state (in the case of Korean Popular Music, or K-Pop). Readings and discussions focus primarily on the
British New Wave (from about 1979 to 1985) and K-Pop (1992-present), but we also discuss first-wave reggae, ska, rocksteady from the 1960s-70s, British and American punk rock music (1970s-1980s), the precursors of modern K-Pop, and have a brief discussion of Japanese City Pop. The class focuses mainly on the British New Wave and K-Pop because these two genres of popular music have strong ties to particular geographic areas, but they became or have become extremely popular in other parts of the world. We also investigate the importance of music videos in the development of these genres. Enrollment limited to first year students. Pre-registration required: see under First Year Seminar Program.  

**SOCY 101b, Introduction to Sociology**  Philip Smith  
The class opens a doorway to sociology as an academic discipline. This is the systematic and rigorous study of society at all levels from the interpersonal, through institutions, organizations, and groups, to the level of the nation and world system. We cover the major research methods, forms of explanation, core concepts, and theoretical models. Substantive topics include inequality, race, gender, networks, culture, deviance, social change, and social behaviors among others.  

**SOCI 112a / EDST 110a, Foundations in Education Studies**  Staff  
Introduction to key issues and debates in the U.S. public education system. Focus on the nexus of education practice, policy, and research. Social, scientific, economic, and political forces that shape approaches to schooling and education reform. Theoretical and practical perspectives from practitioners, policymakers, and scholars.  

**SOCY 126a / Hlut 140a, Health of the Public**  Nicholas Christakis  
Introduction to the field of public health. The social causes and contexts of illness, death, longevity, and health care in the United States today. How social scientists, biologists, epidemiologists, public health experts, and doctors use theory to understand issues and make causal inferences based on observational or experimental data. Biosocial science and techniques of big data as applied to health.  

**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.  

**SOCY 138a / ANTH 140a / ER&M 241a, The Corporation**  Douglas Rogers  
Survey of the rise, diversity, and power of the capitalist corporation in global contexts, with a focus on the 20th and 21st centuries. Topics include: the corporation as legal entity and the social and cultural consequences of this status; corporations in the colonial era; relationships among corporations, states, and non-governmental organizations in Western and non-Western contexts; anti-corporate critique and response; corporate social responsibility; and race, gender, and indigeneity.  

**SOCY 151a / PLSC 290a, Foundations of Modern Social Theory**  Philip Gorski  
Major works of social thought from the beginning of the modern era through the 190s. Attention to social and intellectual concepts, conceptual frameworks and methods, and contributions to contemporary social analysis. Writers include W.E.B. Du Bois, Simone
De Beauvoir, Adam Smith, Thomas Hobbes, Jean-Jacques Rousseau, Immanuel Kant, Emile Durkheim, Max Weber, and Karl Marx.  so o Course cr

* SOCY 152b, Topics in Contemporary Social Theory  Philip Gorski
In-depth introduction to recent developments in social theory, with particular emphasis on the last twenty years. Focus on three distinct areas of study: the building blocks and contrasting understandings of human persons and social action; the competing theories of the social structure of markets, institutions, cultures, social fields, and actor-networks; and the theoretical controversies concerning nations, states and empires, ethnic and racial identity, and the relation between facts and values in social research. Authors include Judith Butler, Michel Foucault, Jurgen Habermas, Pierre Bourdieu and Bruno Latour. None. Though "Foundations of Modern Social Theory" or equivalent is strongly recommended.  wr, so

* SOCY 162a / EDST 162a, Methods in Quantitative Sociology  Staff
Introduction to methods in quantitative sociological research. Topics include: data description; graphical approaches; elementary probability theory; bivariate and multivariate linear regression; regression diagnostics. Students use Stata for hands-on data analysis.  qr, so o Course cr

* SOCY 169a, Visual Sociology  Philip Smith
Introduction to themes and methods in visual sociology. The role and use of visual information in social life, including images, objects, settings, and human interactions. Ethnographic photography, the study of media images, maps and diagrams, observation and coding of public settings, unobtrusive measures, and the use of internet resources.  so

SOCY 170a / AFAM 186a / LAST 214a / PLSC 378a, Contesting Injustice  Staff
Exploration of why, when, and how people organize collectively to challenge political, social, and economic injustice. Cross-national comparison of the extent, causes, and consequences of inequality. Analysis of mobilizations for social justice in both U.S. and international settings. Intended primarily for freshmen and sophomores.  so o Course cr

* SOCY 172a / EP&E 241a / PLSC 415a, Religion and Politics in the World  Katharine Baldwin
A broad overview of the relationship between religion and politics around the world, especially Christianity and Islam. Religions are considered to constitute not just theologies but also sets of institutions, networks, interests, and sub-cultures. The course's principal aim is to understand how religion affects politics as an empirical matter, rather than to explore moral dimensions of this relationship.  so

* SOCY 202b, Cultural Sociology  Jeffrey Alexander
Study of "irrational" meanings in supposedly rational, modern societies. Social meanings are symbolic, sensual, emotional, and moral. They affect every dimension of social life, from politics and markets to race and gender relations, class conflict, and war. Examination of century old counter-intuitive writings of Durkheim and Weber, breakthroughs of semiotics and anthropology in mid-century, creation of modern cultural sociology in the 1980s, and new thinking about social performance and material icons today. Topics include: ancient and modern religion, contemporary capitalism, professional wrestling, the Iraq War, impeachment of Bill Clinton,
Barack Obama’s first presidential campaign, and the new cult of vinyl records. SO

* SOCY 204a, Empire, Nation, and Decolonization  Jonathan Wyrtzen
What is an empire? What is a nation? How do these interact in moments of crisis like decolonization? This course examines how spatial boundaries and social boundaries interact as empires expand, both over land and over seas, and as empires contract. Our central focus is how the “nation” works as a contested notion, and a contented boundary, within the broader frame of empire. We trace struggles over national identities as metropolitan cores and colonial peripheries have been produced in the Americas (including the Caribbean), Europe, Asia, the Middle East, and Africa. The two main empire-nation cases the course focuses on are the United States and France, but we also consider the British, Russian/Soviet, Hapsburg, Japanese and other empires. HU, SO

* SOCY 307b / ER&M 376b / MGRK 304b / PLSC 376b, Extreme and Radical Right Movements  Paris Aslanidis
Extreme and radical right movements and political parties are a recurrent phenomenon found in most parts of the world. Discussion of their foundational values and the causes of their continuous, even increasing, support among citizens and voters. SO

* SOCY 314a, The Social Meaning of Money  Rourke O’Brien
This course provides an introduction to the sociological analysis of economic behavior. We begin by introducing various theoretical models for understanding economic behavior, from homo economicus to the socially embedded actor. The course then turns to consider sociological perspectives on different aspects of economic life including transactions, credit, consumption, compensation, household work and intimate economies. SO

SOCY 331a / RLST 347a / WGSS 291a, Sexual Minorities from Plato to the Enlightenment  Igor De Souza
This interdisciplinary course surveys the history of homosexuality from a cross-cultural, comparative perspective. Students study contexts where homosexuality and sodomy were categorized, regulated, and persecuted and examine ancient and medieval constructions of same-sex desire in light of post-modern developments, challenging ideas around what is considered normal and/or natural. Ultimately, we ask: what has changed, and what has remained the same, in the history of homosexuality? What do gays and lesbians today have in common with pre-modern sodomites? Can this history help us ground or rethink our sexual selves and identities? Primary and secondary historical sources, some legal and religious sources, and texts in intellectual history are studied. Among the case studies for the course are ancient attitudes among Jews, early Christians, and Greeks; Christian theologians of the Middle Ages; Renaissance Florence; the Inquisition in Iberia; colonial Latin America; and the Enlightenment’s condemnation of sodomy by Montesquieu and Voltaire, and its defense by Bentham. HU, SO

* SOCY 342a / AFAM 329a, Managing Blackness in a "White Space"  Elijah Anderson
"White space" is a perceptual category that assumes a particular space to be predominantly white, one where black people are typically unexpected, marginalized when present, and made to feel unwelcome—a space that blacks perceive to be informally “off-limits” to people like them and where on occasion they encounter
racialized disrespect and other forms of resistance. This course explores the challenge black people face when managing their lives in this white space.  

* SOCY 352a or b / HUMS 247a or b, Material Culture and Iconic Consciousness  
Jeffrey Alexander  
How and why contemporary societies continue to symbolize sacred and profane meanings, investing these meanings with materiality and shaping them aesthetically. Exploration of "iconic consciousness" in theoretical terms (philosophy, sociology, semiotics) and further exploration of compelling empirical studies about food and bodies, nature, fashion, celebrities, popular culture, art, architecture, branding, and politics.  

* SOCY 389a / GLBL 215a / LAST 386a / MGRK 237a / PLSC 375a, Populism  
Paris Aslanidis  
Investigation of the populist phenomenon in party systems and the social movement arena. Conceptual, historical, and methodological analyses are supported by comparative assessments of various empirical instances in the US and around the world, from populist politicians such as Donald Trump and Bernie Sanders, to populist social movements such as the Tea Party and Occupy Wall Street.  

* SOCY 390a / ER&M 360a / HLTH 370a / HSHM 432a / WGSS 390a, Politics of Reproduction  
Rene Almeling  
Reproduction as a process that is simultaneously biological and social, involving male and female bodies, family formation, and powerful social institutions such as medicine, law, and the marketplace. Sociological research on reproductive topics such as pregnancy, birth, abortion, contraception, infertility, reproductive technology, and aging. Core sociological concepts used to examine how the politics of reproduction are shaped by the intersecting inequalities of gender, race, class, and sexuality.  

* SOCY 491a and SOCY 492b, Senior Essay and Colloquium for Nonintensive Majors  
Emily Erikson  
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 SOCY 494b, Senior Essay and Colloquium for Intensive Majors  
Emily Erikson  
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.  

South Asian Studies (SAST)  

* SAST 061a / AMST 095a / ER&M 095a / THST 095a, South Asian American Theater and Performance  
Shilarna Stokes  
South Asian Americans have appeared on U.S. stages since the late nineteenth century, yet only in the last quarter century have plays and performances by South Asian Americans begun to dismantle dominant cultural representations of South Asian and South Asian American communities and to imagine new ways of belonging. This seminar introduces you to contemporary works of performance (plays, stand-up sets,
multimedia events, and more) written and created by U.S.-based artists of South Asian descent as well as artists of the South Asian diaspora whose works have had an impact on U.S. audiences. With awareness that the South Asian American diaspora comprises multiple, contested, and contingent identities, we investigate how artists have worked to manifest complex representations of South Asian Americans onstage, challenge institutional and professional norms, and navigate the perils and pleasures of becoming visible. Enrollment limited to first-year students. Preregistration required; see under First-Year Seminar Program.  

**SAST 224a / HIST 396a, India and Pakistan since 1947**  
Introduction to the history of the Indian subcontinent from 1947 to the present. Focus on the emergence of modern forms of life and thought, the impact of the partition on state and society, and the challenges of democracy and development. Transformations of society, economy, and culture; state building; economic policy.  

**SAST 261a / PHIL 118a / RLST 127a, Buddhist Thought: The Foundations**  
This class introduces the fundamentals of Buddhist thought, focusing on the foundational doctrinal, philosophical, and ethical ideas that have animated the Buddhist tradition from its earliest days in India 2500 years ago down to the present, in places such as Tibet, China, and Japan. Though there will be occasional discussion of the social and practical contexts of the Buddhist religion, the primary focus of this course lies on how traditional Buddhist thinkers conceptualize the universe, think about the nature of human beings, and propose that people should live their lives. Our main objects of inquiry are therefore the foundational Buddhist ideas, and the classic texts in which those ideas are put forth and defended, that are broadly speaking shared by all traditions of Buddhism. In the later part of the course, we take up some of these issues in the context of specific, regional forms of Buddhism, and watch some films that provide glimpses of Buddhist religious life on the ground.  

**SAST 303a / ANTH 383a, In Ordinary Fashion**  
Clothing fashions not only our bodies but also our experiences in and claims about the world. It has been used to define the nature and radical possibilities of indigeneity, anti-colonial nationalism, counter-cultural narratives, and capitalist critiques. At the same time, dress—and its social and legal regulation—also creates and reinforces social hierarchies, systems of morality, and forms of exclusion. This course centers these competing social realities and histories using clothing as a way into understanding the poetics and politics of everyday life. Readings include ethnographies and social histories of textiles, fashion, and the manufacture of garments including cases from India, Guatemala, Italy, China, Sri Lanka, Bangladesh, Trinidad, and the United States.  

**SAST 306b / ANTH 322b / EVST 324b, Environmental Justice in South Asia**  
Study of South Asia’s nation building and economic development in the aftermath of war and decolonization in the 20th century. How it generated unprecedented stress on natural environments; increased social disparity; and exposure of the poor and minorities to environmental risks and loss of homes, livelihoods, and cultural resources. Discussion of the rise of environmental justice movements and policies in the region as the world comes to grips with living in the Anthropocene.  

* SAST 303a / ANTH 383a, In Ordinary Fashion  
  Jane Lynch  
  Clothing fashions not only our bodies but also our experiences in and claims about the world. It has been used to define the nature and radical possibilities of indigeneity, anti-colonial nationalism, counter-cultural narratives, and capitalist critiques. At the same time, dress—and its social and legal regulation—also creates and reinforces social hierarchies, systems of morality, and forms of exclusion. This course centers these competing social realities and histories using clothing as a way into understanding the poetics and politics of everyday life. Readings include ethnographies and social histories of textiles, fashion, and the manufacture of garments including cases from India, Guatemala, Italy, China, Sri Lanka, Bangladesh, Trinidad, and the United States.  

* SAST 306b / ANTH 322b / EVST 324b, Environmental Justice in South Asia  
  Kalyanakrishnan Sivaramakrishnan  
  Study of South Asia's nation building and economic development in the aftermath of war and decolonization in the 20th century. How it generated unprecedented stress on natural environments; increased social disparity; and exposure of the poor and minorities to environmental risks and loss of homes, livelihoods, and cultural resources. Discussion of the rise of environmental justice movements and policies in the region as the world comes to grips with living in the Anthropocene.
* SAST 362a / RLST 321a, Hindus and Muslims in South Asia  Supriya Gandhi
Study of engagements between Hindu and Muslim traditions in South Asia from medieval to modern times. Exploration of historical case studies of Hindu-Muslim relations and the formation of religious identities, as well as how memories of the past intersect with modern discourses on religion and politics.  HU

* SAST 474a / ENGL 368a / HIST 341Ja, The Novel and the Nation: Reading India in Vikram Seth’s *A Suitable Boy*  Priyasha Mukhopadhyay and Rohit De
This course pairs two interconnected phenomena: the rise of the Indian Republic and the birth of the postcolonial novel. Over the course of the semester, we read a single primary text: Vikram Seth’s *A Suitable Boy* (1993). Set in the 1950s in the aftermath of India’s Independence and Partition, Seth’s encyclopaedic novel is the story of four families brought together by a mother’s search for a “suitable boy” for her daughter to marry. In the process, it builds a microcosm of an Indian society coming to terms with postcolonial statehood and weighing the aftereffects of British colonialism. Entwined in its plot about marriage, love, and relationships are some of the most urgent cultural and political concerns facing the new nation: legislative changes and land reforms, the violent aftermath of the Partition, secularism tainted by communal tensions, the disintegration of courtly forms of sociality, the reconstruction of city life, and the fate of the English novel in the postcolonial classroom. We read *A Suitable Boy* as literary critics and historians, pairing close readings of language and literary form with historical scholarship. Over the course of our discussions, we address the following questions: what is the relationship between the nation, the novel, and identity in the postcolonial world? How do we read narratives of “nation building” as literary and cultural constructions? What do we make of “literature” and “history” as disciplinary categories and formations? The seminar introduces students to methods of literary criticism and textual studies, and teaches them how to read a range of primary sources, from legislative debates, bureaucratic reports, newspapers, poetry, cinema, and radio.  HU

* SAST 486a, Directed Study  Staff
A one-credit, single-term course on topics not covered in regular offerings. To apply for admission, a student should present a course description and syllabus to the director of undergraduate studies, along with written approval from the faculty member who will direct the study.

* SAST 491a, Senior Essay  Staff
A yearlong research project completed under faculty supervision and resulting in a substantial paper. Credit for SAST 491 only on completion of SAST 492. ½ Course cr

Spanish (SPAN)

* SPAN 060a, First-Year Colloquium: Literary Studies in Spanish  Noel Valis
Introduction to the study of literature in general and to some of the most important texts in Hispanic literature. Selected texts in Spanish include short stories, essays, lyric, and theater. Open to students who have placed into L5 courses. Counts toward the requirements of the Spanish major with permission of the director of undergraduate studies. Enrollment limited to first-year students. Preregistration required; see under First-Year Seminar Program.  L5, HU
* SPAN 100a, Spanish for Reading  María Pilar Asensio-Manrique
Overview of fundamental grammar structures and basic vocabulary through comprehensive reading and translation of texts in various fields (primarily humanities and social sciences, and others as determined by student interest). No previous knowledge of Spanish needed. Conducted in English. No preregistration required. Does not satisfy the Yale College language requirement.

* SPAN 110a or b, Elementary Spanish I  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.  

SPAN 120a or b, Elementary Spanish II  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.  

* SPAN 125a, Intensive Elementary Spanish  María-Lourdes Sabe 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.  

SPAN 130a or b, Intermediate Spanish I  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. Prerequisites: Conducted in Spanish. Admits to SPAN 140.  

* 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. This course meets during Reading Period: the period between the last week of classes and finals week. Admission in accordance with placement results.  

SPAN 140a or b, Intermediate Spanish II  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.  

L1 RP 1½ Course cr
L2 RP 1½ Course cr
L3 RP 1½ Course cr
L4 RP 1½ Course cr
* SPAN 142b, Spanish for Heritage Speakers II  
Staff
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  RP

* SPAN 145b, Intensive Intermediate Spanish  
Luna Najera
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 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. Enrollment limited to 18.
A maximum of one course in the 200-230 range may count as an elective toward the
Spanish major.  L5

* SPAN 223a or b / LAST 223a or b, Spanish in Film: An Introduction to the New
Latin American Cinema  
Margherita Tortora
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. Enrollment limited to 18.  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. Enrollment limited to 18.  L5

* SPAN 227b / LAST 227b, Creative Writing  
Maria Jordan
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. Enrollment limited to 18. A maximum of one course in the
200-230 range may count as an elective toward the Spanish major.  L5

* SPAN 228a / LAST 228a, Borders & Globalization in Hispanophone Cultures  
Luna
Najera
The borders that constitute the geographical divisions of the world are contingent,
but they can have enormous ordering power in the lives of people and other beings.
Human-made borders can both allow and disallow the flow of people and resources.
Like geographical borders, social borders such as race, caste, class, and gender can
form and perpetuate privileged categories of humans that restrict access of excluded
persons to natural resources, education, security, and social mobility. Thus, bordering
can differentially value human lives. Working with the premise that borders are sites
of power, in this course we study bordering and debordering practices in the Hispanic
cultures of Iberia, Latin America, and North America, from the 1490s to the present.
Through analyses of a wide range of texts students will investigate the multiple ways
in which social, cultural, and spatial borders are initiated, expressed, materialized, and
contested. Some of the questions that will guide our conversations are: What are social borders and what are the processes through which they perdure? How do the effects of local practices that transcend borders (e.g., environmental pollution, deforestation) change our understanding of borders? How does globalization change discourse about borders? (To be conducted in Spanish.) Prerequisite: SPAN 140 or 145, or in accordance with placement results. A maximum of one course in the 200-230 range may count as an elective toward the Spanish major. Permission is managed through the YCS registration system. L5

* SPAN 243a or b / LAST 243a or b, Advanced Spanish Grammar (Staff)
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. Enrollment limited to 18. L5

SPAN 244a or b / LAST 244a or b, Writing in Spanish (Margherita Tortora)
Intensive instruction and practice in writing as a means of developing critical thinking. Recommended for students considering courses in literature. Analysis of fiction and nonfiction forms, techniques, and styles. Classes conducted in a workshop format. L5

SPAN 246b, Introduction to the Cultures of Spain (Staff)
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 247a / LAST 247a, Introduction to the Cultures of Latin America (Aníbal González-Pérez)
A chronological study of Latin American cultures through their expressions in literature and the arts, beginning in the pre-Columbian period and focusing on the period from the nineteenth century to the present. Emphasis on crucial historical moments and on distinctive rituals such as fiestas. Open to students who have placed into L5 courses or who have successfully completed an L4 course in Spanish. Counts toward the major in Spanish. L5, HU

SPAN 261a / LAST 261a, Studies in Spanish Literature I (Staff)
An introduction to Spanish prose, drama, and lyric poetry from their medieval multicultural origins through the Golden Age in the seventeenth century. Readings include El Cid, La Celestina, Conde Lucanor, and works by Miguel de Cervantes and Calderón de la Barca. Open to students who have placed into L5 courses or who have successfully completed an L4 course in Spanish. Counts toward the major in Spanish. L5, HU

* SPAN 262b / LAST 262b, Studies in Spanish Literature II (Staff)
An introduction to Spanish prose, drama, and lyric poetry from the eighteenth century to the present, centered on the conflict between modernity and tradition and on the quest for national identity. Texts by Gustavo Adolfo Bécquer, Emilia Pardo Bazán, Antonio Machado, Federico García Lorca, Ramón Sender, and Ana María Matute, among others. Open to students who have placed into L5 courses or who have successfully completed an L4 course in Spanish. L5, HU

* SPAN 266a / LAST 266a, Studies in Latin American Literature I (Staff)
Cultural encounters in the New World as interpreted by authors of native American (Aztec and Inca) cultural traditions, the Spanish conquistadors and friars who
encountered them and their heirs, and the Mexican creole nun (the now-world-famous Sor Juana Inés de la Cruz) who gave voice to some of their traditions as she created a space for her own writing in the literary world. Their resonance and legacy today.

* **SPAN 324a, Lorca: Poetry and Plays**  Noel Valis  
A reading of several Lorca plays and selected poetry and an examination of the Lorca legend. Topics include Lorca’s place in Spanish and world literature; myths and realities of Lorca as a cultural icon; sexuality and gender in the plays and poetry; and social issues and aesthetic practices. Open to students who have placed into L5 courses or who have successfully completed an L4 course in Spanish. Counts toward the Spanish major.

* **SPAN 325a, Ethics and Politics in the Spanish American Short Story**  Anibal González-Pérez  
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.

* **SPAN 404a / ANTH 264a / ARCG 264a, Aztec Archaeology and Ethnohistory**  Oswaldo Chinchilla Mazariegos  
An anthropological and ethnohistorical examination of the Aztec civilization that dominated much of Mexico from the fourteenth century until the Spanish Conquest of 1521.

* **SPAN 431a / HUMS 229a / LAST 431a / LITR 431a, Latin American Languages of Liberation: The Long Sixties**  Staff  
This is a multi-media seminar that studies the Latin American cultural and political discourses of liberation throughout the sixties, with an eye at assessing their legacy today. While the language that characterized the foundation of the nation-states in the 19th century was emancipation, in the second part of the twentieth century, and particularly around 1968, Latin America embraced the world discourse of liberation. This seminar examines languages of liberation in an array of disciplines and artistic practices from South and Central America as well as the Caribbean. We explore regional debates that were also inserted in the larger discourse of the anti-colonial struggles of the global South. Topics include Philosophy of liberation (Dussel), Theology of liberation (the 1968 Council of Bishops in Medellin, Colombia), Theater of the oppressed (Boal), Pedagogy of the oppressed (Freire), Cinema of liberation (manifestos of Third Cinema), the New Song protest movements across the region (both Spanish and Portuguese American music), anti-colonialism in the Caribbean (Césaire, Fanon), anti-neocolonialism (dependency theory, internal colonialism), Indigenous liberation (from the Barbados declarations to the Lacandon jungle declarations), experimental “boom” literature (Cortázar) etc.

* **SPAN 478a, Directed Readings and/or Individual Research**  Noel Valis  
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, The Senior Essay**  Noel Valis
A research project completed under faculty supervision and resulting in a paper of considerable length, in Spanish.

**Special Divisional Major (SPEC)**

**Statistics and Data Science (S&DS)**

**S&DS 101a / E&EB 210a, Introduction to Statistics: Life Sciences**  Jonathan Reuning-Scherer
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

**S&DS 102a / EP&E 203a / PLSC 452a, Introduction to Statistics: Political Science**  Jonathan Reuning-Scherer
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

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

**S&DS 105a, Introduction to Statistics: Medicine**  Jonathan Reuning-Scherer
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

**S&DS 106a, Introduction to Statistics: Data Analysis**  Jonathan Reuning-Scherer
An introduction to probability and statistics with emphasis on data analysis.  QR

**S&DS 108a, Introduction to Statistics: Advanced Fundamentals**  Jonathan Reuning-Scherer
Introductory statistical concepts beyond those covered in high school AP statistics. Includes additional concepts in regression, an introduction to multiple regression, ANOVA, and logistic regression. This course is intended as a bridge between AP statistics and courses such as S&DS 230, Data Exploration and Analysis. Meets for the second half of the term only. Prerequisites: A previous statistics course in high school. May not be taken after S&DS 100, S&DS 101–106, PSYC 100, or any other full semester Yale introductory statistics courses. Students should consider S&DS 103 or both S&DS 108, 109. ½ Course cr

**S&DS 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 S&DS 100 or 101–106. ½ Course cr

* **S&DS 160b / AMTH 160b / MATH 160b, The Structure of Networks**  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

* S&DS 172a / EP&E 328a / PLSC 347a, YData: Data Science for Political Campaigns
  Joshua Kalla
Political campaigns have become increasingly data driven. Data science is used to inform where campaigns compete, which messages they use, how they deliver them, and among which voters. In this course, we explore how data science is being used to design winning campaigns. Students gain an understanding of what data is available to campaigns, how campaigns use this data to identify supporters, and the use of experiments in campaigns. This course provides students with an introduction to political campaigns, an introduction to data science tools necessary for studying politics, and opportunities to practice the data science skills presented in S&DS 123, YData.

QR

S&DS 230a or b, Data Exploration and Analysis  Staff
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. Prerequisite: a 100-level Statistics course or equivalent, or with permission of instructor. QR

S&DS 238a, Probability and Statistics  Staff
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 or concurrently with MATH 118 or 120. QR

S&DS 240a, An Introduction to Probability Theory  Elisa Celis
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. This course counts towards the Data Science certificate but not the Statistics and Data Science major. Prerequisite: MATH 115. QR

S&DS 241a / MATH 241a, Probability Theory  Yihong Wu
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

S&DS 242b / MATH 242b, Theory of Statistics  Zhou Fan
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 S&DS 241 and concurrently with or after MATH 222 or 225, or equivalents. QR
S&DS 262b / AMTH 262b / CPSC 262b, Computational Tools for Data Science  Roy Lederman
Introduction to the core ideas and principles that arise in modern data analysis, bridging statistics and computer science and providing students the tools to grow and adapt as methods and techniques change. Topics include principal component analysis, independent component analysis, dictionary learning, neural networks and optimization, as well as scalable computing for large datasets. Assignments include implementation, data analysis and theory. Students require background in linear algebra, multivariable calculus, probability and programming. Prerequisites: after or concurrently with MATH 222, 225, or 231; after or concurrently with MATH 120, 230, or ENAS 151; after or concurrently with CPSC 100, 112, or ENAS 130; after S&DS 100-108 or S&DS 230 or S&DS 241 or S&DS 242. Enrollment is limited; requires permission of the instructor. QR

S&DS 265a, Introductory Machine Learning  John Lafferty
This course covers the key ideas and techniques in machine learning without the use of advanced mathematics. Basic methodology and relevant concepts are presented in lectures, including the intuition behind the methods. Assignments give students hands-on experience with the methods on different types of data. Topics include linear regression and classification, tree-based methods, clustering, topic models, word embeddings, recurrent neural networks, dictionary learning and deep learning. Examples come from a variety of sources including political speeches, archives of scientific articles, real estate listings, natural images, and several others. Programming is central to the course, and is based on the Python programming language. Prerequisites: Two of the following courses: S&DS 230, 238, 240, 241 and 242; previous programming experience (e.g., R, Matlab, Python, C++), Python preferred. QR

S&DS 312a, Linear Models  Staff
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 S&DS 242 and MATH 222 or 225. QR

S&DS 351b / EENG 434b / MATH 251b, Stochastic Processes  Amin Karbasi
Introduction to the study of random processes including linear prediction and Kalman filtering, Poison counting process and renewal processes, Markov chains, branching processes, birth-death processes, Markov random fields, martingales, and random walks. Applications chosen from communications, networking, image reconstruction, Bayesian statistics, finance, probabilistic analysis of algorithms, and genetics and evolution. Prerequisite: S&DS 241 or equivalent. QR

S&DS 352b / MB&B 452b / MCDB 452b, Biomedical Data Science, Mining and Modeling  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
S&DS 361b / AMTH 361b, Data Analysis  Brian Macdonald
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. After S&DS 242 and MATH 222 or 225, or equivalents.  QR

S&DS 363b, 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

S&DS 364b / AMTH 364b / EENG 454b, Information Theory  Yihong Wu
Foundations of information theory in communications, statistical inference, statistical mechanics, probability, and algorithmic complexity. Quantities of information and their properties: entropy, conditional entropy, divergence, redundancy, mutual information, channel capacity. Basic theorems of data compression, data summarization, and channel coding. Applications in statistics and finance. After STAT 241.  QR

S&DS 365a, Intermediate Machine Learning  John Lafferty
S&DS 365 is a second course in machine learning at the advanced undergraduate or beginning graduate level. The course assumes familiarity with the basic ideas and techniques in machine learning, for example as covered in S&DS 265. The course treats methods together with mathematical frameworks that provide intuition and justifications for how and when the methods work. Assignments give students hands-on experience with machine learning techniques, to build the skills needed to adapt approaches to new problems. Topics include nonparametric regression and classification, kernel methods, risk bounds, nonparametric Bayesian approaches, graphical models, attention and language models, generative models, sparsity and manifolds, and reinforcement learning. Programming is central to the course, and is based on the Python programming language and Jupyter notebooks. Prerequisites: a background in probability and statistics at the level of S&DS 242; familiarity with the core ideas from linear algebra, for example through Math 222; and computational skills at the level of S&DS 265 or CPSC 200.  QR

S&DS 400a / MATH 330a, Advanced Probability  Sekhar Tatikonda
Measure theoretic probability, conditioning, laws of large numbers, convergence in distribution, characteristic functions, central limit theorems, martingales. Some knowledge of real analysis assumed.  QR

S&DS 410a, Statistical Inference  Zhou Fan
A systematic development of the mathematical theory of statistical inference covering methods of estimation, hypothesis testing, and confidence intervals. An introduction to statistical decision theory. Prerequisite: level of S&DS 241.

S&DS 425a or b, Statistical Case Studies  Brian Macdonald
Statistical analysis of a variety of statistical problems using real data. Emphasis on methods of choosing data, acquiring data, assessing data quality, and the issues posed by extremely large data sets. Extensive computations using R statistical software. Prerequisites: prior course work in probability and statistics, and a data analysis course
at the level of STAT 361, 363, or 365 (or STAT 220, 230 if supported by other course work).

**QR**

**S&DS 431a / AMTH 431a, Optimization and Computation**  Staff

This course is designed for students in Statistics & Data Science who need to know about optimization and the essentials of numerical algorithm design and analysis. It is an introduction to more advanced courses in optimization. The overarching goal of the course is teach students how to design algorithms for Machine Learning and Data Analysis (in their own research). This course is not open to students who have taken S&DS 430. Prerequisites: Knowledge of linear algebra, multivariate calculus, and probability. Linear Algebra, by MATH 222, 223 or 230 or 231; Graph Theory, by MATH 244 or CPSC 365 or 366; and comfort with proof-based exposition and problem sets, such as is gained from MATH 230 and 231, or CPSC 366.

**S&DS 432b, Advanced Optimization Techniques**  Sekhar Tatikonda

This course covers fundamental theory and algorithms in optimization, emphasizing convex optimization. Topics covered include convex analysis; duality and KKT conditions; subgradient methods; interior point methods; semidefinite programming; distributed methods; stochastic gradient methods; robust optimization; and an introduction to nonconvex optimization. Applications accepted from statistics & data science, economics, engineering, and the sciences. Prerequisites: Knowledge of linear algebra, such as MATH 222, 225; multivariate calculus, such as MATH 120; probability, such as S&DS 241/541; optimization, such as S&DS 431/631; and, comfort with proof-based exposition and problem sets.

* **S&DS 480a or b, Individual Studies**  Sekhar Tatikonda

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.

**S&DS 491a and S&DS 492b, Senior Project**  Staff

Individual research that fulfills the senior requirement. Requires a faculty adviser and DUS permission. The student must submit a written report about results of the project.

**Study of the City (STCY)**
Theater and Performance Studies (THST)

* THST 085a, Anatomy and Movement  Renee Robinson
This course traces connections between the study of human anatomy and dance practices of the late 20th century to the present. Over the past century, a group of pioneering practitioners sought to combine advances in human anatomical and neuromuscular science with the felt, practically applied knowledge of dance artists. Their research has spawned an array of new methods for training dance and theater artists, including ideokinesis, somatics, and body-mind centering. Immersing students in a studio-based, practical exploration, this course introduces students to key ideas and thinkers in the field of dance science. Major topics include the study of functional and kinesthetic anatomy; the neuromuscular reeducation of alignment, posture and balance; the use of imagery as a motivator of movement; and the cultivation of enhanced mind-body awareness through physical practice. Enrollment limited to first-year students. Preregistration required; see under First-Year Seminar Program. No prior experience in dance or theater necessary. This course is open to students of all physical abilities and backgrounds. The instructor will work with students with special needs or specific physical disabilities to adapt the movement exercises to meet their capabilities.  

* THST 095a / AMST 095a / ER&M 095a / SAST 061a, South Asian American Theater and Performance  Shilarna Stokes
South Asian Americans have appeared on U.S. stages since the late nineteenth century, yet only in the last quarter century have plays and performances by South Asian Americans begun to dismantle dominant cultural representations of South Asian and South Asian American communities and to imagine new ways of belonging. This seminar introduces you to contemporary works of performance (plays, stand-up sets, multimedia events, and more) written and created by U.S.-based artists of South Asian descent as well as artists of the South Asian diaspora whose works have had an impact on U.S. audiences. With awareness that the South Asian American diaspora comprises multiple, contested, and contingent identities, we investigate how artists have worked to manifest complex representations of South Asian Americans onstage, challenge institutional and professional norms, and navigate the perils and pleasures of becoming visible. Enrollment limited to first-year students. Preregistration required; see under First-Year Seminar Program.  

* THST 098a, Composing and Performing the One Person Play  Hal Brooks
First-year actors, playwrights, directors, and even students who have never considered taking a theater class, create their own work through a combination of reading, analysis, writing, and on-your-feet exercises. Students read texts and view performances that are generated by one actor in an attempt to discover the methodology that works best for their own creations. The course culminates with a midterm and final presentation created and performed by the student. Enrollment limited to first-year students. Preregistration required; see under First-Year Seminar Program.  

THST 110a, Collaboration  Elise Morrison and Emily Coates
This foundational course introduces collaborative techniques at the core of topics, domains, and practices integral to the major in Theater and Performance
Studies. We explore the seeds of performance from its basic essence as human expression, to movement, text, and storytelling, gradually evolving into collectively created works of performance. Techniques and readings may be drawn from improvisation, dance, music, design and spoken word contexts, and will encourage cohort building, critical reflection, and the join of individual and collective artistic expression. Guests from within and outside performance disciplines enhance the potential to investigate crossover between different media.  

* THST 129a or b / ENGL 129a or b / HUMS 127a or b / LITR 168a or b, Tragedy in the European Literary Tradition  

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 might include Aristotle's *Poetics* or Homer's *Iliad* and plays by Aeschylus, Sophocles, Euripides, Seneca, Hrotsvitha, Shakespeare, Lope de Vega, Calderon, Racine, Büchner, Ibsen, Strindberg, Chekhov, Wedekind, Synge, Lorca, Brecht, Beckett, Soyinka, Tarell Alvin McCraney, and Lynn Nottage. Focus on textual analysis and on developing the craft of persuasive argument through writing.  

* WR, HU  

* THST 200a, Introduction to Theatrical Violence  

Michael Rossmy and Kelsey Rainwater  
Engagement in a theoretical and practical exploration of depicting violence in theater. Actors learn to execute the illusions of violence on stage both safely and effectively, and the skills of collaboration, partner awareness, concentration, and impulse response. Preference given to Theater Studies majors.  

* THST 210a, Performance Concepts  

Hal Brooks  
A studio introduction to the essential elements of acting. Coursework includes improvisation, performance exercises, scene study, and analysis grounded in the work of practitioners and theorists from Stanislavski to the present. This course is a prerequisite for several upper-level courses in Theater and Performance Studies including THST 211 and THST 300. It is open to students in all years of study, with the permission of the instructor.  

* RP  

* THST 214b / ENGL 241b, English Comic Drama, 1660-1800  

Jill Campbell  
An exploration of the distinctive wit, social functions, conditions of theatrical production, and changing forms of comic drama in Britain from the reopening of the theaters in 1660 to 1800. Particular attention to the construction of gender and sexuality in these plays, including the figures of the effeminate fop and male and female libertines; sexual harassment and coercion; same-sex and opposite-sex eroticism; and the interplay between sexual and verbal pleasures. Other topics to include representations of labor and social class; the shaping force of imperial trade on life in London; and 18th-century theories of laughter. Plays by William Wycherley, Aphra Behn, William Congreve, John Gay, Henry Fielding, Hannah Cowley, Oliver Goldsmith, and Richard Sheridan.  

* WR, HU  

* THST 215a / ENGL 434a, Writing Dance  

Brian Seibert  
The esteemed choreographer Merce Cunningham once compared writing about dance to trying to nail Jello-O to the wall. This seminar and workshop takes on the challenge. Taught by a dance critic for the New York Times, the course uses a close reading of exemplary dance writing to introduce approaches that students then try themselves,
in response to filmed dance and live performances in New York City, in the widest possible variety of genres. No previous knowledge of dance is required. WR, HU

* THST 216a / ART 216a, The Body as Stage: Experiments in Performance Art
Shilarna Stokes

Your (Body + Space + Time + Labor + Inquiry + Experience) = Performance Art?
Working through experiences of oppression, isolation, illness, and individual/collective trauma, how do artists use their immediate material conditions to investigate and document their own survival as well as to imagine new forms of resistance and collective flourishing? Alternating between seminar discussions (remote) and performance-based experiments (in-person) this course explores the theory and practice of performance art. Beginning with an examination of the ground-breaking bodies of work created by Antonin Artaud and Marina Abramovic, we go on to consider works by more than a dozen twentieth- and twenty-first century artists including Carolee Schneemann, Dread Scott, Rirkrit Tiravanija, Ana Mendieta, Stelarc, Yoko Ono, Aliza Shvarts, and others. We investigate topics including ritual, gesture, duration, suffering, dwelling, prosthesis, citation, relationality, protest, intermediality, and interactivity, and we interrogate performance art’s accessibility, efficacy, and marketing.

Students create several small studies over the course of the semester, sharing them in safe, informal settings and are guided in the development of a culminating work of performance-based research. All physical capabilities are welcome, no prior experience in theater, visual art, or performance is required, and all assignments will be adaptable to the remote environment. HU RP

* THST 224a / MUSI 228a, Musical Theater Performance I
Dan Egan and Maria-Christina Oliveras

The structure, meaning, and performance 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. This semester’s course also embraces the online format to address performing and recording virtually as a vital tool in the current field of musical theater. The course combines weekly synchronous learning and private coaching sessions. For singers, music directors, and directors. Admission by audition and application only. Auditions/interviews will be scheduled during the first two weeks of August. May be repeated for credit. For audition information contact dan.egan@yale.edu. HU RP

THST 225a / FREN 244a / LITR 383a, The French Stage: History and Performance of French Theater from Molière to Césaire
Staff

From Molière to Marie Ndiaye, via Augustin de Beaumarchais, Olympe de Gouges, George Sand and Wouajdi Mouhawad, theater is at the center of French artistic and political culture. This course covers four centuries of theater history, from the age of Versailles to the beginning of the twenty-first century. We discover the plays, their relationship to current events, their political and aesthetic dimensions, the history of their staging, and the material aspects of their productions. HU 0 Course cr

* THST 226b / MUSI 229b, Musical Theater Performance II
Staff

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. May be repeated for credit. For audition information e-mail dan.egan@yale.edu. RP
* THST 227a, Queer Caribbean Performance  Emily Coates
With its lush and fantastic landscape, fabulous carnivalesque aesthetics, and rich African Diaspora Religious traditions, the Caribbean has long been a setting where New World black artists have staged competing visions of racial and sexual utopia and dystopia. However, these foreigner-authored fantasies have often overshadowed the lived experience and life storytelling of Caribbean subjects. This course explores the intersecting performance cultures, politics, and sensual/sexual practices that have constituted queer life in the Caribbean region and its diaspora. Placing Caribbean queer of color critique alongside key moments in twentieth and twenty-first century performance history at home and abroad, we ask how have histories of the plantation, discourses of race and nation, migration, and revolution led to the formation of regionally specific queer identifications. What about the idea of the “tropics” has made it such as fertile ground for queer performance making, and how have artists from the region identified or dis-identified with these aesthetic formations? This class begins with an exploration of theories of queer diaspora and queer of color critique’s roots in black feminisms. We cover themes of exile, religious rites, and organizing as sights of queer political formation and creative community in the Caribbean.   HU

* THST 228b / ENGL 423b / FILM 397b, Writing about the Performing Arts  Margaret Spillane
Introduction to journalistic reporting on performances as current events, with attention to writing in newspapers, magazines, and the blogosphere. The idea of the audience explored in relation to both a live act or screening and a piece of writing about such an event. Students attend screenings and live professional performances of plays, music concerts, and dance events. Formerly ENGL 244.  WR, HU

* THST 234a, Politics and Protest in Dance History  Emily Coates
In the wake of COVID-19, the future of Dance Studies seems more unclear and destabilized than ever, as the very act of gathering to dance or watch live performance carries new political meanings and risks. Does dance even matter in our current moment in United State history? To rephrase the question, can the tools of dance history and performance studies—with its attention not only to how individual bodies move but how we form relationships and solidarities by moving together—inform how we respond to the politics of today? This class introduces students to the intersections between dance and politics in 20th/21st century United States and its migratory spheres. Students watch filmed performance and attend live shows to understand how dancers use embodiment to make arguments, enact cultural diplomacy, and shift the grounds of activism. We analyze how our society has made meaning out of dancing bodies that move across stages, dance clubs, and film screens. We use movement analysis and choreography as a lens to understand strategies of organizing and protest. Focusing mainly on new trends in Dance Studies, we center queer theory, performance theory, critical race theory, and transnational history methodologies. By the end of the semester, students are equipped to identify key moments in American concert dance and social dance history, as well as their relation to broader political moments and social movements for class equality and racial/gender/sexual liberation, develop the descriptive and analytical tools to write about movement-based performance, design and create their own work of dance ethnography.  HU
* THST 236a / MUSI 185a, American Musical Theater History  
  Dan 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. Limited enrollment. Interested students should contact dan.egan@yale.edu for application requirements.  
  WR, HU

* THST 277b / GMAN 277b / HUMS 248b / LITR 447b, I and Thou – Dialogue and Miscommunication in Theory and Literature  
  Shira Miron
  Dialogue constitutes an integral part of human experience and culture ever since antiquity. Whether as a rhetorical or a dramatic device, written or oral, fictional or not – dialogue substantiates the core of any intersubjective communication, building bridges between the self and the Other while maintaining them as two separate entities. This seminar explores the form and function of dialogue through a wide range of theoretical and literary texts, focusing on a set of social, hermeneutical, poetical, and political questions. Specific attention is given to literary cases of failed dialogues and miscomprehension, aiming at the unique ability of the literary text to draw our attention beyond the limits of human communication and language. Readings include texts by Plato, Schlegel, Novalis, Bachtin, Levinas, Buber, Gadamer, Parsons, Kleist, Beckett, Melville, Schnitzler, Celan, Bachmann,, and others.  
  HU

* THST 300a, The Director and the Text I  
  Toni Dorfman
  Practicing fundamentals of the art of directing: close reading and deep text analysis in search of physical action; rehearsal preparation; mixing the elements of composition (scenography, light, sound & music, projections, movement, language); and most crucially—the work with the actor. Weekly assignments (some labor intensive), discussion of same, and regular on-the-floor experiments. While concentrating on basic practices, the course is designed for students to seek out an initial understanding of individual, even idiosyncratic, artistic directorial voice. Prerequisite: THST 210.  
  HU

* THST 305a, 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 307a, Improvisation, Études, and Devising  
  David Chambers
  This course, intended for actors, directors, playwrights, and others interested, moves through three related cycles of improvisational performance. While there are readings and viewings of extant materials, this class should be considered as performance research; it mostly takes place experientially, “on the floor.” The goal is to immerse students in role models and practical techniques of improvisation, études, and devising, ideas that are already popular in campus theatrical works and benefit from an applied course to underpin, challenge, and expand their efforts.  

* THST 317a / ENGL 224a / LITR 349a, Tragedy and Drama of Reconciliation  
  Jan Hagens
  Close reading of dramas of reconciliation from the Western canon that have traditionally been categorized as tragedies. Ways in which the recategorization of such plays lends additional complexity and meaning to their endings and allows for new interpretations of the texts, their authors, and the history of drama.  
  HU
* THST 318b / MUSI 340b, Analyzing, Directing, and Performing Early Opera  
  Grant Herreid and Toni Dorfman
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, instrumentalists, and directors. Admission by audition only. May be repeated for credit. For audition information e-mail grant.herreid@yale.edu.  

* THST 319a / AFAM 313a, Embodying Story  
  Renee Robinson
The intersection of storytelling and movement as seen through historical case studies, cross-disciplinary inquiry, and studio practice. Drawing on eclectic source materials from different artistic disciplines, ranging from the repertory of Alvin Ailey to journalism, architectural studies, cartoon animation, and creative processes, students develop the critical, creative, and technical skills through which to tell their own stories in movement. No prior dance experience necessary.  

* THST 320a / ENGL 453a, Playwriting  
  Donald Margulies
A seminar and workshop on reading for craft and writing for the stage. In addition to weekly prompts and exercises, readings include modern American and British plays by Pinter, Mamet, Churchill, Kushner, Nottage, Williams, Hansberry, Hwang, Vogel, and Wilder. Emphasis on play structure, character, and conflict.  

* THST 322a / ENGL 481a, Advanced Playwriting  
  Deborah 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.  

* 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.  

* THST 340a, Ballet Now  
  Daniel Ulbricht
A practical investigation of seminal ballets in the repertory of New York City Ballet. Tracing a sweeping history of artistic innovation from the early twentieth century to the present, this course covers the technique and aesthetic details that constitute New York City Ballet’s style and follow the ways that these stylistic strengths are applied and transformed in the contemporary ballets of the 21st century. Repertory excerpts move through foundational works by George Balanchine and Jerome Robbins to ballets created in the past fifteen years by some of the most prominent ballet choreographers working today. Prior dance training required. Admission is by audition during the first class meeting.
* THST 343a, Public Speaking  Elise Morrison
Development of skills in public speaking and in critical analysis of public discourse. Key aspects of rhetoric and cultural communication; techniques for formulating and organizing persuasive arguments, engaging with an audience, and using the voice and body effectively.

* THST 401a, Conceptual Sound Design for Theater  Nathan Roberts
Theoretical and practical considerations for conceptual sound design, the creation of aural content and imagery in support of dramatic action. The use of sound to communicate meaning and intention effectively in a theatrical setting. Auditory culture and the phenomenology of hearing; the role of technology in sound design; development of critical listening skills and of a foundational vocabulary for the medium. Projects focus on the generation of content and ideas in support of a text.  HU

* THST 413a, Structures of Comic Performance  Deborah Margolin
Relations between the theory and practice of comic performance. A historical dramaturgical investigation of what makes something funny; practical, performative experiments in comedy. Prerequisites: THST 210 and 211.  HU

* THST 414a, Lyric Writing for Musical Theater  Michael Korie
The craft of lyric writing in musical theater, opera, and crossover works. Both historical models and new composition used as objects of study. Analysis of song form and placement, and of lyric for character, tone, and diction. Creation of lyrics in context. Noted composers and lyricists of produced musical theater works join the class periodically to comment on the work created. Students also have the opportunity to conceive an original work of musical theater, a crossover work, or an opera libretto, and create portions of the score with original lyrics and music by student composers, with whom the writers will collaborate. Limited enrollment. Interested students should write to dan.egan@yale.edu for application requirements. May not be repeated for credit.  HU  RP

* THST 452a, Acting: Constructing a Character  Gregory Wallace
A practical exploration of the internal and external preparation an actor must undergo to effectively render the moment-to-moment life of a given character. Focusing on monologues, scenes, and group explorations of text the class engages in a rigorous investigation of how the actor uses the self as the foundation for transformation. Course consists of close readings, research presentations, rehearsals and in-class scene presentations. Preference to senior and juniors. Open to non-majors. Limited enrollment. Admission by audition. See Syllabus page on Canvas for audition information and requirements.  HU

* THST 453b / ENGL 462b / FILM 401b, Writing Screenplay Adaptations  Donald Margulies
A workshop on the art of screenplay adaptation. Students read short stories, novels, and non-fiction; the screenplays based on that source material; and view and analyze the final product, the films themselves. Instruction focuses on the form, economy, and structure specific to screenwriting. Weekly writing exercises supplement the creation of a final project: a short screenplay based on source material of the student’s choosing. Previous experience in writing for film or stage would be advantageous but is not required. Restricted to juniors and seniors, or by permission of the instructor.  HU
* THST 457a / AMST 463a / EVST 463a / FILM 455a, Documentary Film Workshop
   Charles Musser
   A yearlong workshop designed primarily for majors in Film and Media Studies or American Studies who are making documentaries as senior projects. Seniors in other majors admitted as space permits. RP

* THST 471a, Directed Independent Study
   Shilarna Stokes
   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 fifteen 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 ten 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 twenty pages. A playwriting project normally requires twenty 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, Senior Project in Theater Studies
   Nathan Roberts and Dan Egan
   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.

**Tibetan (TBTN)**

**Turkish (TKSH)**

**TKSH 110a, Elementary Modern Turkish I** Meryem Yalcin
Integration of basic listening, reading, speaking, and writing skills through a variety of functional, meaningful, and contextual activities. Students become active users of modern Turkish and gain a deeper understanding of Anatolian culture through lessons based on real-life situations and authentic materials. 1 L1 ½ Course cr

**TKSH 120b, Elementary Modern Turkish II** Meryem Yalcin
Continuation of TKSH 110. Prerequisite: TKSH 110 or permission of instructor. 1 L2 ½ Course cr
TKSH 130a, Intermediate Turkish I  Meryem Yalcin
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  1½ Course cr

TKSH 140b, Intermediate Turkish II  Meryem Yalcin
Continuation of TKSH 130. Prerequisite: TKSH 130.  L4  1½ Course cr

TKSH 150a, Advanced Turkish I  Meryem Yalcin
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

Twi (TWI)

Ukrainian (UKRN)

UKRN 110a, Elementary Ukrainian I  Staff
The first half of a two-term introduction to Ukrainian for students with no previous knowledge of the language. Emphasis on speaking, reading, listening, and writing skills. Topics, vocabulary, and grammar lessons based on everyday linguistic interactions. Course taught through distance learning using videoconferencing technology from Columbia University. Enrollment limited; interested students should e-mail minjin.hashbat@yale.edu for more information.  L1  RP  1½ Course cr

* UKRN 120b, Elementary Ukrainian II  Staff
The second half of a two-term introduction to Ukrainian for students with no previous knowledge of the language. Emphasis on speaking, reading, listening, and writing skills. Topics, vocabulary, and grammar lessons based on everyday linguistic interactions. Prerequisite: UKRN 110. Course taught through distance learning using videoconferencing technology from Columbia University. Enrollment limited; interested students should e-mail minjin.hashbat@yale.edu for more information.  L2  1½ Course cr

* UKRN 130a, Intermediate Ukrainian I  Staff
Review and reinforcement of grammar fundamentals and of core vocabulary pertaining to common aspects of daily life. Special attention to verbal aspect and verbs of motion. Emphasis on continued development of oral and written communication skills on topics such as the self, family, studies and leisure, travel, and meals. Prerequisite: UKRN 120 or equivalent. Course taught through distance learning using videoconferencing technology from Columbia University. Enrollment limited; interested students should e-mail minjin.hashbat@yale.edu for more information.  L3  RP  1½ Course cr

* UKRN 140b, Intermediate Ukrainian II  Staff
Continued review and reinforcement of grammar fundamentals and of core vocabulary pertaining to common aspects of daily life. Special attention to verbal aspect and verbs of motion. Emphasis on further development of oral and written communication skills on topics such as the self, family, studies and leisure, travel, and meals. UKRN 130 or equivalent. Course taught through distance learning using videoconferencing
technology from Columbia University. Enrollment limited; interested students should e-mail minjin.hashbat@yale.edu for more information.  L4  RP  1½ Course cr

* UKRN 150a, Advanced Ukrainian I  Staff
The course is for students who wish to develop their mastery of Ukrainian. Original texts and other materials drawn from classical and contemporary Ukrainian literature, press, electronic media, film, and the Internet are designed to give students familiarity with linguistic features typical of such functional styles as written and spoken, formal and informal, scientific and newspaper language, jargon, slang, etc. Ukrainian 140, or equivalent. Course taught through distance learning using videoconferencing technology from Columbia University. Enrollment limited; interested students should e-mail minjin.hashbat@yale.edu for more information.  L5  RP

UKRN 160b, Advanced Ukrainian II  Staff
The course is for students who wish to develop their mastery of Ukrainian. Original texts and other materials drawn from classical and contemporary Ukrainian literature, press, electronic media, film, and the Internet are designed to give students familiarity with linguistic features typical of such functional styles as written and spoken, formal and informal, scientific and newspaper language, jargon, slang, etc. UKRN 150, or equivalent. Course taught through distance learning using videoconferencing technology from Columbia University. Enrollment limited; interested students should e-mail minjin.hashbat@yale.edu for more information.  RP

Urban Studies (URBN)

URBN 280a / AMST 197a / ARCH 280a / HSAR 219a, American Architecture and Urbanism  Elihu Rubin
Introduction to the study of buildings, architects, architectural styles, and urban landscapes, viewed in their economic, political, social, and cultural contexts, from precolonial times to the present. Topics include: public and private investment in the built environment; the history of housing in America; the organization of architectural practice; race, gender, ethnicity and the right to the city; the social and political nature of city building; and the transnational nature of American architecture.  HU

* URBN 319b / EVST 290b, 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.

* URBN 327a / ARCH 327a, Difference and the City  Justin Moore
Four hundred and odd years after colonialism and racial capitalism brought twenty and odd people from Africa to the dispossessed indigenous land that would become the United States, the structures and systems that generate inequality and white supremacy persist. Our cities and their socioeconomic and built environments continue to exemplify difference. From housing and health to mobility and monuments, cities small and large, north and south, continue to demonstrate intractable disparities. The disparate impacts made apparent by the COVID-19 pandemic and the reinvigorated and global Black Lives Matter movement demanding change are remarkable. Change, of course, is another essential indicator of difference in urban environments, exemplified by the phenomena of disinvestment or gentrification. This course explores how issues
like climate change and growing income inequality intersect with politics, culture, gender equality, immigration and migration, technology, and other considerations and forms of disruption.

**URBN 345a / ARCH 345a, Civic Art: Introduction to Urban Design**  Alan Plattus
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.  

* **URBN 360a / ARCH 360a, Urban Lab: An Urban World**  Joyce Hsiang
Understanding the urban environment through methods of research, spatial analysis, and diverse means of representation that address historical, social, political, and environmental issues that consider design at the scale of the entire world. Through timelines, maps, diagrams, collages and film, students frame a unique spatial problem and speculate on urbanization at the global scale. Prerequisites: For non-majors: permission of the instructor is required. For ARCH majors: ARCH 150, 200, and 280.  

**URBN 363a / ARCH 363a, Urban Lab: Stories and Counterstories**  Anne Barrett
How do our constructed environments embody, maintain, and/or intensify dominant power structures and embedded biases, and how might we uncover fuller and more heterogeneous—if possibly discordant or uneasy—understandings of place? This is a multidisciplinary design-research seminar in which students learn and utilize visual methods of research and analysis to interrogate, exhume, examine, record, represent, and speculatively re-frame the social, political, architectural, ecological, economic, infrastructural, and material stories of place. We consider urban, suburban, and rural environments at multiple scales, from street names to planning resolutions, as we explore both visible and invisible spatial characteristics. Students select and work on their own research site, and respond to assignments organized around four conceptual themes/representational techniques (*Monuments/Mappings*; *Spaces/Collage*; *Characters/Diagramming*; *Boundaries/Section*). Work evolves cumulatively over the semester to produce the final project: a “visual anthology” of student sites.  

* **URBN 382b / EVST 349b / HIST 449Jb / HSHM 449b, Critical Data Visualization: History, Theory, and Practice**  Bill Rankin
Critical analysis of the creation, use, and cultural meanings of data visualization, with emphasis on both the theory and the politics of visual communication. Seminar discussions include close readings of historical data graphics since the late eighteenth century and conceptual engagement with graphic semiotics, ideals of objectivity and honesty, and recent approaches of feminist and participatory data design. Course assignments focus on the research, production, and workshop of students’ own data graphics; topics include both historical and contemporary material. No prior software experience is required; tutorials are integrated into weekly meetings. Basic proficiency in standard graphics software is expected by the end of the term, with optional support for more advanced programming and mapping software.  

* **URBN 490a / ARCH 490a, Senior Research Colloquium**  Marta Caldeira
Research and writing colloquium for seniors in the Urban Studies and History, Theory, and Criticism tracks. Under guidance of the instructor and members of the Architecture faculty, students define their research proposals, shape a bibliography, improve research
skills, and seek criticism of individual research agendas. Requirements include proposal drafts, comparative case study analyses, presentations to faculty, and the formation of a visual argument. Guest speakers and class trips to exhibitions, lectures, and special collections encourage use of Yale’s resources.

**Vietnamese (VIET)**

**VIET 110a, Elementary Vietnamese I**  Quang 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. Intended for students with no previous knowledge of Vietnamese.  L1  1½ Course cr

**VIET 120b, Elementary Vietnamese II**  Quang Van
Continuation of VIET 110.  L2  1½ Course cr

* **VIET 132a, Accelerated Vietnamese**  Quang Van
This course follows a community-based language model designed for heritage students or speakers who comprehend and speak informal Vietnamese on topics related to everyday situations but do not read or write Vietnamese. Study of interpersonal, interpretive, and presentational communicative modes, as well as standard foreign language education (communication, cultures, connections, comparisons, and communities). Students will engage with Vietnamese American communities in New Haven and beyond. Admits to VIET 140.  L3

* **VIET 142b, Accelerated Vietnamese II**  Quang Van
An accelerated course designed for heritage students who wish to build a higher level of proficiency and develop sociocultural competence in speaking, reading, and writing. Topics include health care, rituals, community, linguistic landscape, education, mass communication, literature, history, values, and traditional and pop cultures. VIET 132 or equivalent.  L4

**VIET 150a, Advanced Vietnamese**  Quang 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 220b / ER&M 209b / LITR 279b, Introduction to Vietnamese Culture, Values, and Literature**  Quang Van
Introduction to Vietnamese culture and values. Topics include cultural and national identity, aesthetics, the meaning of life, war, and death. Selected readings from Zen poems, folklore, autobiographies, and religious and philosophical writings. Course is taught in English and is an alternative to Western perspectives. Readings in translation. No previous knowledge of Vietnamese required.  HU  TR

* **VIET 470a and VIET 471b, Independent Tutorial**  Quang 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.
Wolof (WLOF)

Women's Gender and Sexuality Studies (WGSS)

* WGSS 027a / HUMS 027a / LITR 027a, Six Pretty Good Selves  Marta Figlerowicz and Ayesha Ramachandran
Through the prism of thinking about the self, this course provides first-year students with an intensive introduction to studying the humanities at Yale. The course is anchored around six trans-historical models of thinking about selfhood: the ideal self, the lover, the revolutionary, the convert, the solipsist, and the social climber. We range widely across genres, media, periods, and geographies: from Plato's *Symposium* to Machado de Assis's *Epitaph for a Small Winner*, from the ghazals of Hafez to the *Kamasutra*. We also make extensive use of Yale's rich manuscript archives, historical object collections, and art galleries and devote sustained attention to improving students' academic writing skills. Friday sessions will alternate between writing workshops and field trips to Yale collections. Enrollment limited to first-year students. Preregistration required; see under First-Year Seminar Program. WR, HU 1½ Course cr

* WGSS 030b, Neoliberalism and Sexuality  Evren Savci
Sexuality is often imagined as a private and intimate affair, experienced individually, marked by personal histories and preferences. This course argues otherwise. Specifically, we consider the intersections between the current dominant political economic mode, referred to as neoliberal capitalism, and sexuality as a field of power. We analyze how subjectivities are formed under this current system, how desires are produced and discourses incited, and how the particular *moralization* of economic behavior has implications for a range of issues including reproductive justice, definitions of kinship, sexual liberation movements, and contemporary states of war and emergency. Thinking of sexuality as a field of power that is predicated on notions of normality and abnormality enables us to see what other “undesirable” subjects are produced under conditions of neoliberal capitalist modernity with whom sexual others are always in kinship. Enrollment limited to first-year students. Preregistration required; see under First-Year Seminar Program. SO

* WGSS 032b, History of Sexuality  Maria Trumpler
Exploration of scientific and medical writings on sexuality over the past century. Focus on the tension between nature and culture in shaping theories, the construction of heterosexuality and homosexuality, the role of scientific studies in moral discourse, and the rise of sexology as a scientific discipline. Enrollment limited to first-year students. Preregistration required; see under First-Year Seminar Program. WR, HU

* WGSS 034b / ENGL 034b, Transgender, Queer, & Feminist #Activism Now  Jill Richards
This course focuses on the art and politics of the present, through a selection of trans, queer, feminist, and antiracist #activisms ongoing right now. Organized as a series of interlocking episodes, the course highlights the emergence of #BlackLivesMatter, the Dakota Access Pipeline Protests (#NoDAPL), #AbolishICE, and the #MeToo movement. A significant portion of the class follows contemporary legislative battles surrounding transgender rights, including bathroom bills, access to gender affirming healthcare, and the legal status of trans kids. Course materials are various, including
recent zines, graphic novels, memoir, poetry, science fiction, film, and television, including selections from *Euphoria* and *I May Destroy You*. Enrollment limited to first-year students. Preregistration required; see under First-Year Seminar Program. HU

**WGSS 125a / AFAM 115a, “We Interrupt this Program: The Multidimensional Histories of Queer and Trans Politics”** Staff

In 1991, the arts organizations Visual AIDS and The Kitchen collaborated with video artist and filmmaker Charles Atlas to produce the live television broadcast "We Interrupt this Program." Part educational presentation, part performance piece, the show was aired in millions of homes across the nation. The program, in The Kitchen's words, "sought to feature voices that had often been marginalized within many discussions of AIDS, in particular people of color and women." This course builds upon and is inspired by this aspect of Atlas’s visionary presentation, an aspect that used the show to produce a critically multicultural platform that could activate cultural histories and critical traditions from various communities. In effect, the course uses this aspect as a metonym for the racial, gender, sexual, and class heterogeneity of queer art and organizing. It conducts its investigation by looking at a variety of primary materials that illustrate the heterogeneous makeup of queer and trans politics. The course also draws on more recent texts and visual works that arose from the earlier contexts that the primary texts helped to illuminate and shape. HU RP O Course cr

**WGSS 163b / ENGL 163b, Vampires, Castles, and Werewolves** Heather Klemann

Study of eighteenth- and nineteenth-century gothic fiction and the persistence, resurgence, and adaptation of gothic tropes in twentieth- and twenty-first-century film, television, and prose. Readings include *Frankenstein*, *Northanger Abbey*, *The Strange Case of Dr. Jekyll and Mr. Hyde*, and *Dracula*. Films and TV include *Inception*, *Black Swan*, Alfred Hitchcock's *Rebecca*, and episodes from *Buffy the Vampire Slayer*. Formerly ENGL 136. Prerequisite: First years must have taken a WR seminar course in the fall term. WR, HU O Course cr

* **WGSS 195a / HSHM 410a / RLST 195a, Meanings of Life** Evan Goldstein

What are the meanings of life? That is, what are we talking about when we talk about life, and how did we come to talk about it in this way? Is life religious or secular? What does Christianity (still) have to do with the politics of life and death? This course takes up these questions, among others. We trace the history of life as a concept in Western thought, with a particular emphasis on the afterlife of the Christian tradition in secular modernity. Beginning with the theories of biopolitics developed by Hannah Arendt and Michel Foucault, we explore the implications of life's centrality for modern formations of race, sexuality, and death. This course is not a survey of how different religious traditions define life; rather, by engaging with thinkers from Religious Studies, Black Studies, queer theory, science and technology studies, among other fields, we explore the theological and political dimension of life in modern Western societies. After spending several weeks covering some of the canonical theorists of biopolitics, we take on a series of more recent case studies and thinkers who have addressed some of the urgent issues of our time through a critical scrutiny of the meanings of life. Topics include secularization and sovereignty, the biopolitics of race and sexuality, the precarious status of life in pandemic times, and death. Readings are primarily composed of twentieth-century theorists, including Giorgio Agamben, Donna Haraway, Lauren Berlant, and Talal Asad, as well as relevant historical precursors and
examples. No prior experience is presumed, and all texts will be read in translation.

* WGSS 203b / ENGL 201b, The Victorian Problem Novel  
  Ruth Yeazell and Colton Valentine

This seminar invites you to see the Victorian novel anew: to experience it as provocative and radical, unexpected, and disquieting. To this end, we take a deep dive into four major works of Victorian fiction that challenged readers at the time—and often continues to do so—both substantively and formally. What, we ask, justifies thinking of these novels as “problems,” and how, if at all, have those problems changed over the last hundred and fifty years? What should we make of these works’ conflicting attitudes toward gender and class? How should we best approach their struggles with national, ethnic, and religious identity? In what ways do they challenge readers’ expectations about narrative voice, the structure of the plot, or the limits of realism? To think more concretely about how readers other than ourselves have responded to these works, our principal texts are supplemented by commentaries from Victorian reviewers and modern literary critics. Prior acquaintance with some Victorian fiction, including other novels by our writers, is recommended but not required.

* WGSS 205b, Bodies and Pleasures, Sex and Genders  
  Regina Kunzel

This seminar engages cultural analyses of embodiment, its pleasures—and by extension its pains—to interrogate sex, sexuality, and gender as analytical categories. Its aim is to critically evaluate formative concepts and theories that have been subject to debates within gender studies, psychoanalysis, philosophy, anthropology, critical race studies, and history. Readings by Freud, Foucault, Berlant, Butler, Rubin, and others help explain how terms like “women” and “men,” “femininity” and “masculinity,” as well as “homosexuality” and “heterosexuality,” “gender” and “transgender” have structured people's experiences and their perceptions of their bodies. The potential our bodies have for “hanging on to ourselves” occupies a central position within scholarly canons, revealing also how these canons are always already imbricated in racialized hierarchies.

* WGSS 206a / ER&M 257a, Transnational Approaches to Gender & Sexuality  
  Evren Savci

Examination of transnational debates about gender and sexuality as they unfold in specific contexts. Gender as a category that can or cannot travel; feminist critiques of liberal rights paradigms; globalization of particular models of gender/queer advocacy; the role of NGOs in global debates about gender and sexuality.

* WGSS 207a / PLSC 298a, Gender, Justice, Power, Institutions  
  Staff

Examination of how inequalities based on gender, race, caste, class, sexuality as well as a host of other identities are embedded in institutions that make up our social world. From the family and the home to the workplace, from the University, and the Corporation, to the Military and Media, we track how inequalities emerge and are sustained by power and institutional structures. We also see how they are challenged and what sorts of instruments are needed to challenge them. In particular, we focus on sexual politics and sexual violence as a key issue to understanding the gendered workings of institutions, in order to examine structures that sustain inequality. Through the semester, we hope to consider many domains of life—bedrooms and boardrooms, international borders and feminist movements—to understand the
stubborn and sticky forms and hierarchies of power that are challenged and contested by activists, scholars, and communities.  

* WGSS 209b / CLCV 216b / LITR 239b / MGRK 216b, Dionysus in Modernity  
George Syrimis

Modernity's fascination with the myth of Dionysus. Questions of agency, identity and community, and psychological integrity and the modern constitution of the self. Manifestations of Dionysus in literature, anthropology, and music; the Apollonian-Dionysiac dichotomy; twentieth-century variations of these themes in psychoanalysis, surrealism, and magical realism.  

HU

* WGSS 220a / PLSC 220a / PLSC S220a, Women & Politics  
Andrea Aldrich

Exploration of theoretical and empirical work in political science to study the relationship between women and politics in the United States and around the world. Topics include women's descriptive and substantive representation in legislative and executive branch politics in democratic regimes; the impact of gender stereotypes on elections and public opinion; conditions that impact the supply and demand of candidates across genders; and the underrepresentation of women in political institutions.  

WR, SO

* WGSS 222b / AMST 206b / ER&M 221b, Introduction to Critical Refugee Studies  
Quan Tran

Reconfiguring refugees as fluid subjects and sites of social, political, and cultural critiques. Departing from dominant understandings of refugees as victims, consideration instead of refugees as complex historical actors, made visible through processes of colonization, imperialism, war, displacement, state violence, and globalization, as well as ethical, social, legal, and political transformations. Focus on second-half of the twentieth century.  

SO

* WGSS 233a / FILM 341a / MGRK 238a, Weird Greek Wave Cinema  
George Syrimis

The course examines the cinematic production of Greece in the last fifteen years or so and looks critically at the popular term “weird Greek wave” applied to it. Noted for their absurd tropes, bizarre narratives, and quirky characters, the films question and disturb traditional gender and social roles, as well as international viewers' expectations of national stereotypes of classical luminosity – the proverbial “Greek light” – Dionysian exuberance, or touristic leisure. Instead, these works frustrate not only a wholistic reading of Greece as a unified and coherent social construct, but also the physical or aesthetic pleasure of its landscape and its ‘quaint’ people with their insistence on grotesque, violent, or otherwise disturbing images or themes (incest, sexual otherness and violence, aggression, corporeality, and xenophobia). The course also pays particular attention on the economic and political climate of the Greek financial crisis during which these films are produced and consumed and to which they partake. None  

HU

* WGSS 238a, Foucault and the Sexual Self  
Igor De Souza

This course explores the main ideas and influence of Foucault's History of Sexuality. Alongside the methods and conclusions of the HS, we examine the implications of the HS for feminist studies and queer theory, and the approach of the HS towards ancient Greek sexuality.  

HU
* WGSS 251a / ENGL 251a, Experiments in the Novel: The Eighteenth Century  Jill Campbell
The course provides an introduction to English-language novels of the long eighteenth century (1688-1818), the period in which the novel has traditionally been understood to have "risen." Emphasizing the experimental nature of novel-writing in this early period of its history, the course foregrounds persistent questions about the genre as well as a literary-historical survey: What is the status of fictional characters? How does narrative sequence impart political or moral implications? How do conventions of the novel form shape our experience of gender? What kind of being is a narrator? Likely authors include Aphra Behn, Daniel Defoe, Samuel Richardson, Henry Fielding, Laurence Sterne, Maria Edgeworth, Jane Austen, Jennifer Egan, Colson Whitehead, and Richard Powers.  WR, HU

* WGSS 260a, Food, Identity and Desire  Maria Trumpler
Exploration of how food — ingredients, cooking practices, and appetites — can intersect with gender, ethnicity, class, and national origin to produce profound experiences of identity and desire. Sources include memoir, cookbooks, movies, and fiction.

WGSS 270b / AFAM 170b / HIST 479b / HSHM 241b, Sickness and Health in African American History  Carolyn Roberts
A history of American medicine through the African American experience covering the period of slavery through #BlackLivesMatter. Oriented around the complex dynamics of medical abuse and medical resistance, key themes include medicine and slavery; gender and reproduction; medical experimentation and ethics; the rise of racial science; lynching and vigilante violence; segregation and public health; African-descended approaches to health and healing; the rise of the African American medical profession; and black health activism from slavery to #BlackLivesMatter.  HU

WGSS 291a / RLST 347a / SOCY 331a, Sexual Minorities from Plato to the Enlightenment  Igor De Souza
This interdisciplinary course surveys the history of homosexuality from a cross-cultural, comparative perspective. Students study contexts where homosexuality and sodomy were categorized, regulated, and persecuted and examine ancient and medieval constructions of same-sex desire in light of post-modern developments, challenging ideas around what is considered normal and/or natural. Ultimately, we ask: what has changed, and what has remained the same, in the history of homosexuality? What do gays and lesbians today have in common with pre-modern sodomites? Can this history help us ground or rethink our sexual selves and identities? Primary and secondary historical sources, some legal and religious sources, and texts in intellectual history are studied. Among the case studies for the course are ancient attitudes among Jews, early Christians, and Greeks; Christian theologians of the Middle Ages; Renaissance Florence; the Inquisition in Iberia; colonial Latin America; and the Enlightenment’s condemnation of sodomy by Montesquieu and Voltaire, and its defense by Bentham.  HU

* WGSS 293b / CLCV 319b / HIST 242Jb / MGRK 300b, The Olympic Games, Ancient and Modern  George Syrimis
Introduction to the history of the Olympic Games from antiquity to the present. The mythology of athletic events in ancient Greece and the ritual, political, and social ramifications of the actual competitions. The revival of the modern Olympic movement in 1896, the political investment of the Greek state at the time, and specific games as
they illustrate the convergence of athletic cultures and sociopolitical transformations in the twentieth century. HU

* WGSS 297b / HIST 418J, Gender Expression Before Modernity  Igor De Souza
What are the historical forms of gender non-conformity? This course investigates expressions of gender that were considered non-conforming within their historical contexts. Our point of departure is the idea that gender constitutes a “useful category of historical analysis” (Joan Scott). In this course we ask how deviant gender expression can be a category of historical analysis. How do we write history from the perspective of gender fluidity, non-binarism, and gender transgression? How can this history give us the tools to critique regnant norms of gender expression, then and now? How does this historical approach relate to trans* and non-binary people & movements today? The course is historically wide-ranging, from Antiquity to the Early Modern period, and geographically diverse, including Europe, the Middle East, and the colonial Americas. The breath of contexts enable us to consider broad patterns, continuities, and discontinuities. At the same time, we discuss the specificities of particular contexts, emphasizing the connection between gender fluidity/non-conformity, on the one hand, and local cultural norms around gender and sex, on the other. We investigate intellectual and cultural trends, as well as the lives of gender fluid/non-conforming individuals. We analyze sources drawn from law, medicine, religion, philosophy, visual arts & literature, biographies, and memoirs. All readings are in English translation. No prior background is required. However, it will be helpful to have taken either WGSS 291/HIST 287J or WGSS 306 before or in concurrence with this course. HU

* WGSS 318a / AFAM 309a / ER&M 318a, Race as Spectacle  Fatima El-Tayeb
In this course, we analyze how race is both naturalized and deconstructed through visual media. We center one aspect: race as spectacle—the multiple ways in which race is produced as a visual mass culture commodity. This happens in political campaigns, music videos, local news reports, fashion, kids’ cartoons, mug shots, and countless other sites. We explore the modes of production of these racialized images as well as the conditions of their reception and political and philosophical analyses of this process—particularly those relating to questions of gender, class, sexuality, religion, and nation. We also explore counterstrategies, which rather than rejecting visual mass culture attempt to use it to undermine dominant images. HU, SO

* WGSS 381b / AFAM 397b / ER&M 380b, New Developments in Global African Diaspora Studies  Fatima El-Tayeb
This course traces recent developments in African Diaspora Theory, among them Afropessimism, Queer of Color Critique, Black Trans Studies and Afropolitanism. We pay particular attention to interactions between theory, art, and activism. The scope is transnational with a focus on, but not restricted to, the Anglophone Diaspora Texts. Each session roughly follows this structure: One theoretical text representing a recent development in African diaspora studies, one earlier key text that the reading builds on, one theoretical text that does not necessarily fall under the category of diaspora studies but speaks to our topic and one text that relates to the topic but uses a non-theoretical format. Students are expected to develop their own thematically related project over the course of the semester. Preference give to juniors and seniors. Email instructor for more information. HU, SO
* WGSS 383a / ENGL 386a, Queer Writing Before Stonewall  Michael Warner
The focus of this course is gay, lesbian, and queer writing from the period between Whitman and Stonewall. How did queer writers find an audience in the years before the emergence of a gay/lesbian public? What languages of identity and sexuality did they develop? The course begins with Walt Whitman and Emily Dickinson, writing before the idea of sexual minorities took hold. We read some late 19C writers in their wake, including Charles Warren Stoddard, and the literary culture of the “Boston marriage,” before turning to the conjunction of sexual culture and modernism. Queer modernism has been much studied in recent years, including such figures as Wilde, Freud, Joyce, Woolf, Stein, Barnes, Firbank, Crane, Thurman, Hughes, and Proust; in the same years, a language of homosexual rights began to develop with such works as Imre, by Edward Prime Stevenson. Many of the writers in the period explored unsettled sexualities and worlds of abjection, in ways that can still disturb readers. They influenced one another across the Atlantic and across genres. We touch on the British and Irish writers who came of age after WWI (Isherwood, Auden, Spender, Ackerley, Barnes), as well as the paradigmatically queer writing of those for whom queerness was linked to a language of criminality – notably Jean Genet, Patricia Highsmith, and William Burroughs. Students are encouraged to pursue research projects in each of these moments, reaching up to the Beats (Burroughs, Ginsberg, Kerouac), the New York poets (O’Hara, Ashbery, Schuyler) the San Francisco Renaissance (Spicer, Duncan, Broughton), Southern queer writers (McCullers, Capote, Williams), black queer writing after the Harlem Renaissance (Baldwin, Hansberry), and other figures of the 60s from both high literary and underground backgrounds (Nabokov, Elizabeth Bishop, Joe Orton, and Vidal, but also Jack Smith, Jane Rule, and Iceberg Slim). Along the way we talk about the various ways that these writers charted a queer take on the world, including their engagements with criminality and psychopathology— the main connotations of queerness in the period— as well as the development of a queer language of abjection and its advantages for life. Students are encouraged to delve into the rich holdings of the Beinecke for research projects not limited to the writers on the syllabus, including the lesbian pulp fiction collection and holdings in the related fields of photography, film, and other arts.  WR, HY

* WGSS 388b / AFAM 349b / AMST 326b / HIST 115Jb, Civil Rights and Women’s Liberation  Staff
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.  HY

* WGSS 390a / ER&M 360a / HLTH 370a / HSHM 432a / SOCY 390a, Politics of Reproduction  Rene Almeling
Reproduction as a process that is simultaneously biological and social, involving male and female bodies, family formation, and powerful social institutions such as medicine, law, and the marketplace. Sociological research on reproductive topics such as pregnancy, birth, abortion, contraception, infertility, reproductive technology, and aging. Core sociological concepts used to examine how the politics of reproduction are shaped by the intersecting inequalities of gender, race, class, and sexuality.  WR, SO
* WGSS 398b, Junior Research Seminar  Kalindi Vora
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, SO

* WGSS 407b / ANTH 308b, Feminist & Queer Ethnographies: Family, Community,
  Nation  Eda Pepi
This seminar centers the analytics and methods that feminist and queer ethnographic
analyses have brought to the fore to revisit a cluster of topical issues, this year
assembled around the theme: *Family, Community, Nation*. As a site in which personhood
is distributed and contested, the “family” is one of the building blocks of social scientific
analysis—along with “community” and “nation.” Seen as ideological lynchpins for the
reproduction of the social order, processes of family-making—like marriage, divorce,
childbirth, and intergenerational flows—have been codified differently across historical
and cultural contexts. This course engages the feminist and queer ethnographies
that revealed the political hierarchies that emerge from seemingly natural categories
and distinctions of kinship. We trace the gendered, sexualized, class-making, and
racialized concepts, processes, and implicit understandings of family-making that
chart the public and private spheres of community and national terrains. Students
grapple with the processes of naturalization and denaturalization through which the
“political” is mobilized and dyads like kin/kith, blood/soil, human/nonhuman, citizen/
noncitizen, us/them, are made to appear. We also engage with feminist and queer
methodologies that conjure up speculative fabulations for, what Saidiya Hartman
has called, “the radical hope for living otherwise.” We do so at a time when the global
Covid-19 pandemic has demanded the resurgence of the state, tested community ties,
transformed family arrangements, and isolated most of the world’s population within
domestic domains.  HU, SO

* WGSS 408a / AMST 345a / ER&M 409a, Latinx Ethnography  Ana Ramos-Zayas
Consideration of ethnography within the genealogy and intellectual traditions of
Latinx Studies. Topics include: questions of knowledge production and epistemological
traditions in Latin America and U.S. Latino communities; conceptions of migration,
transnationalism, and space; perspectives on “(il)legality” and criminalization; labor,
wealth, and class identities; contextual understandings of gender and sexuality;
thorizations of affect and intimate lives; and the politics of race and inequality under
white liberalism and conservatism in the United States.  SO

* WGSS 426b / ENGL 344b, 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

* WGSS 427b / AMST 427b / PLSC 269b, Politics of Gender and Sexuality in the
  United States  Dara Strolovitch
The 2016 Presidential election made clear that gender matters a great deal in American
politics, but it also revealed that how gender matters is far from obvious. This course
explores the ways in which gender and sexuality shape and are shaped by American
politics and public policy. We explore the history, findings, and controversies in
research about gender and sexuality in American politics from a range of approaches, examining what political science research helps us understand about questions such as: Does gender influence political campaigns and whether people will vote for particular candidates? Once elected, are gender and sexuality related to legislators’ behavior in office? How are norms related to race, class, gender, and sexuality reflected in and constructed by public policy? We also explore feminist, queer, and intersectional theories and methodologies and important work from other disciplines and interdisciplines, paying particular attention to the implications of intersectionality for understanding gender, sexuality, and politics. We also analyze the ways in which gender and sexuality intersect with other politically salient categories, identities, and forms of marginalization, including race, ethnicity, class, and ideological and partisan identification, paying particular attention to their implications for the 2016, 2018, and 2020 elections.

* WGSS 430a / ANTH 441a / MMES 430a, Gender and Citizenship in the Middle East  
  Eda Pepi

This seminar explores the gendered and ethnic-based social processes and forms of power that citizenship, statelessness, and migration crises fuel, and are fueled by, in the Middle East and North Africa. The history of gender and citizenship in the region is imbricated in ethnosexual and orientalist colonial legacies that articulate a racialized problematic of “modernity.” Part of these legacies involve obscuring the role that women, sexual minorities, and gender, more broadly, have played in framing citizenship and statehood in the Middle East in global, regional, and local imaginations not only as border policing and legal doctrine, but as signifier — and reifier — of culture, race, and ethnicity. By examining the gendered and sexual dimensions of war, conflict, and partition, and the formation of modern citizenship in the Middle East, the seminar presents ethnographic, historical, literary and visual scholarship that theorizes the role of kinship and citizenship in gendered and racialized narratives of the nation and political sovereignty.

* WGSS 432a / PHIL 444a, Social Ontology  
  Robin Dembroff

Study of conceptual and methodological foundations of social ontology, as well as particular topics within social ontology, such as the nature of gender and race. Prerequisites: at least one, but preferably two philosophy courses.

* WGSS 448a / HIST 177Ja / HSHM 448a, 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.

* WGSS 459b / ANTH 455b, Masculinity and Men’s Health  
  Marcia Inhorn

Ethnographic approaches to masculinity and men’s health around the globe. Issues of ethnographic research design and methodology; interdisciplinary theories of masculinity; contributions of men’s health studies from Western and non-Western sites to social theory, ethnographic scholarship, and health policy.
* WGSS 463b / AMST 462b / ER&M 462b, The Study of Privilege in the Americas
Ana Ramos-Zayas
Examination of inequality, not only through experiences of the poor and marginal, but also through institutions, beliefs, social norms, and everyday practices of the privileged. Topics include: critical examination of key concepts like "studying up," "elite," and "privilege," as well as variations in forms of capital; institutional sites of privilege (elite prep schools, Wall Street); living spaces and social networks (gated communities, private clubs); privilege in intersectional contexts (privilege and race, class, and gender); and everyday practices of intimacy and affect that characterize, solidify, and promote privilege.  

* WGSS 471a or b, Independent Directed Study  
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.

* WGSS 490a, The Senior Colloquium  
Dara Strolovitch
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 491b, The Senior Essay  
Staff
Independent research on, and writing of, the senior essay.

Yoruba (YORU)

YORU 110a, 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. L1
1½ Course cr

YORU 120b, 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, 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, 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, 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.  1.5

YORU 160b, 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.  1.5

YORU 170a, 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.  1.5, HU

Zulu (ZULU)

ZULU 110a, Beginning isiZulu I  Nandipa Sipengane
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.  1.1  1½ Course cr

ZULU 120b, Beginning isiZulu II  Nandipa Sipengane
Development of communication skills through dialogues and role play. Texts and songs are drawn from traditional and popular literature. Students research daily life in selected areas of South Africa. Prerequisite: ZULU 110.  1.2  1½ Course cr

ZULU 130a, Intermediate isiZulu I  Nandipa Sipengane
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.  1.3  1½ Course cr

ZULU 140b, Intermediate isiZulu II  Nandipa Sipengane
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.  1.4  1½ Course cr

* ZULU 150a, Advanced isiZulu I  Nandipa Sipengane
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. Course includes students from Cornell University via videoconference.  1.5
* ZULU 160b, Advanced isiZulu II  Nandipa Sipengane
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. Course includes students from
Cornell University via videoconference.  1.5
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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.
Yale College
Programs of Study
Fall and Spring Terms
2022–2023