Department of Cognitive Sciences

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949-824-3771
http://www.cogsci.uci.edu/

Overview

The Department of Cognitive Sciences is committed to the investigation of the abstract, complex structures that underlie human cognition: language, thought, memory, learning, sensorimotor integration, and perception. The main areas of research strength within the department are visual and auditory perception, experimental psychology, cognitive psychology, mathematical psychology, and cognitive neuroscience.

Undergraduate Program

Students should be aware that psychology courses are offered in several different departments and programs. Students interested in general psychology including the areas of development, clinical, perception, learning, memory, cognitive processes and neuroscience are advised to consult the course listings for the B.A. in Psychology section for the Department of Cognitive Sciences. The courses in this major are designed to provide students with a strong foundation in general psychology. Students specifically interested in a program with a quantitative approach to theory and research in any of the areas of Cognitive Neuroscience; Experimental Psychology (emphasizing Sensation, Perception, Attention and Memory); Language Science; or Computational Cognitive Science should consult the course listings for the B.S. in Cognitive Sciences also here in this section. Students interested in other areas of psychology are advised to consult the course listings in the School of Social Ecology and the School of Biological Sciences sections.

NOTE: Students may complete either the B.A. in Psychology or B.S. in Cognitive Sciences but not both.

B.S. in Cognitive Sciences

Requirements for the B.S. in Cognitive Sciences

The B.S. in Cognitive Sciences is structured to provide students with a challenging introduction to the broad field of Cognitive Sciences that is strongly grounded in theory and an empirical approach emphasizing experimental/computational methods. To ensure an intellectually coherent experience, students in the major are able to choose courses from areas including: (a) Cognitive Neuroscience; (b) Experimental Psychology–Sensation, Perception, Attention, and Memory; (c) Language Science; and (d) Computational Cognitive Science. In addition, students are required to acquire a background in (a) calculus, (b) statistics, (c) introductory computer programming, and (d) some combination of the natural sciences, logic and philosophy of science, linguistics, or more advanced computer science or mathematics.

All students must meet the University Requirements.

All students must meet the School Requirements.

Departmental Requirements for the Major

School requirements must be met and must include courses as specified below:

A. Complete the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 2A- 2B</td>
<td>Single-Variable Calculus and Single-Variable Calculus</td>
</tr>
<tr>
<td>COGS 110</td>
<td>Quantitative Methods for Cognitive Sciences Research</td>
</tr>
<tr>
<td>or STATS 110</td>
<td>Statistical Methods for Data Analysis I</td>
</tr>
<tr>
<td>PSYCH 114M</td>
<td>MATLAB Programming</td>
</tr>
<tr>
<td>or I&amp;C SCI 31</td>
<td>Introduction to Programming</td>
</tr>
<tr>
<td>PSYCH 9A- 9B- 9C</td>
<td>Psychology Fundamentals and Psychology Fundamentals</td>
</tr>
<tr>
<td>COGS 109</td>
<td>Cognitive Sciences Research Seminar</td>
</tr>
<tr>
<td>PSYCH H101A</td>
<td>Honors Seminar in Psychology I</td>
</tr>
<tr>
<td>PSYCH H111A</td>
<td>Honors Experimental Psychology</td>
</tr>
<tr>
<td>PSYCH 111BW- H111B</td>
<td>Honors Advanced Experimental Psychology and Honors Advanced Experimental Psychology Laboratory</td>
</tr>
<tr>
<td>PSYCH H111C</td>
<td>Honors Research in Experimental Psychology</td>
</tr>
<tr>
<td>STATS 7</td>
<td>Basic Statistics</td>
</tr>
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</table>

B. Select three courses from the following list:

<table>
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<tr>
<th>Course</th>
<th>Description</th>
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<tbody>
<tr>
<td>BIO SCI 35</td>
<td>The Brain and Behavior</td>
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<tr>
<td>Department of Cognitive Sciences</td>
<td></td>
</tr>
<tr>
<td>----------------------------------</td>
<td></td>
</tr>
<tr>
<td><strong>BIO SCI 36</strong></td>
<td>Drugs and the Brain</td>
</tr>
<tr>
<td><strong>BIO SCI 37</strong></td>
<td>Brain Dysfunction and Repair</td>
</tr>
<tr>
<td><strong>BIO SCI 38</strong></td>
<td>Mind, Memory, Amnesia, and the Brain</td>
</tr>
<tr>
<td><strong>BIO SCI 93</strong></td>
<td>From DNA to Organisms</td>
</tr>
<tr>
<td><strong>BIO SCI 94</strong></td>
<td>From Organisms to Ecosystems</td>
</tr>
<tr>
<td><strong>I&amp;C SCI 31</strong></td>
<td>Introduction to Programming</td>
</tr>
<tr>
<td><strong>I&amp;C SCI 32</strong></td>
<td>Programming with Software Libraries</td>
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<tr>
<td><strong>I&amp;C SCI 33</strong></td>
<td>Intermediate Programming</td>
</tr>
<tr>
<td><strong>PHYSICS 3A-3B-3C</strong></td>
<td>Basic Physics I and Basic Physics II and Basic Physics III</td>
</tr>
</tbody>
</table>

or

| **PHYSICS 7C-7D-7E** | Classical Physics and Classical Physics |

with labs PHYSICS 7LC and PHYSICS 7LD

**NOTE:** Careful selection should be made in order to satisfy general education requirements and prerequisites for upper-division courses.

C. Three additional courses must be taken in Biology, Physics, Computer Science, Linguistics, Logic and Philosophy of Science, Mathematics, or Statistics. They can be chosen either from the list above or from the following list:

| LINGUIS 1 | Languages of the World |
| LINGUIS 3 | Introduction to Linguistics |
| LINGUIS 10 | Introduction to Phonology |
| LINGUIS 20 | Introduction to Syntax |
| LINGUIS 51 | Acquisition of Language |
| LINGUIS 68 | Introduction to Language and Culture |
| LPS 30 | Introduction to Symbolic Logic |
| LPS 31 | Introduction to Inductive Logic |
| MATH 2D | Multivariable Calculus |
| MATH 2E | Multivariable Calculus |
| MATH 3A | Introduction to Linear Algebra |
| MATH 3D | Elementary Differential Equations |
| MATH 4 | Mathematics for Economists |
| PHYSICS 15 | Physics of Music |
| PSYCH 56L | Acquisition of Language |
| STATS 111 | Statistical Methods for Data Analysis II |
| STATS 112 | Statistical Methods for Data Analysis III |

D. Three core courses must be selected from this list:

| PSYCH 120A | Abnormal Psychology |
| PSYCH 120D | Developmental Psychology |
| PSYCH 120H | History of Psychology |
| PSYCH 120P | Personality Theories |
| PSYCH 130A | Perception and Sensory Processes |
| PSYCH 140C | Cognitive Science |
| PSYCH 140L | Principles of Learning Theory |
| PSYCH 140M | Human Memory |
| PSYCH 150 | Psychology of Language |
| PSYCH 160A | Introduction to Cognitive Neuroscience |
| PSYCH 160D | Brain Disorders and Behavior |

E. Four core electives must be selected from this list:

| COMPSCI 171 | Introduction to Artificial Intelligence |
| COMPSCI 178 | Machine Learning and Data-Mining |
| COMPSCI 183 | Introduction to Computational Biology |
| LINGUIS 102 | Formal Languages and Automata |
LINGUIS 111  Intermediate Phonology
LINGUIS 121  Intermediate Syntax
PSYCH 112R- 112LR  Cognitive Robotics and Cognitive Robotics Laboratory
PSYCH 131A  Vision
PSYCH 131B  Hearing
PSYCH 156A  Acquisition of Language II
PSYCH 161  Language and the Brain
PSYCH 161H  Hearing and the Brain
PSYCH 162B  Human Memory Disorders
PSYCH 162N  Human Neuropsychology

F. Six additional electives must be selected from the lists under requirements D and E only.  

G. All courses for the above major requirements must be taken with a grade of B- or better. Students must maintain an overall grade point average of 3.0 for courses within the major.

1  If not used to satisfy Introductory Programming Requirement.
2  If accepted into the Honors Program, four additional electives (under requirement F) are needed.

Honors Program in Cognitive Sciences

Honors in Cognitive Sciences

The two-year Honors Program in Cognitive Sciences is open to selected juniors who are majoring in cognitive sciences. It provides an opportunity for outstanding cognitive sciences majors to pursue advanced work in independent research via participating and earn Honors in Cognitive Sciences upon graduation. Admission to the program is based on a formal application that is normally submitted in the spring quarter of the sophomore year. Applicants must have an overall grade point average of 3.2 and a grade point average of at least 3.5 in cognitive sciences major courses.

Students who participate in the program must complete the Honors Seminar in Psychology (PSYCH H101B-PSYCH H101C) in the fall and spring quarters of their senior year.

To graduate with Honors in Cognitive Sciences, a student must successfully complete the requirements for the B.S. degree in Cognitive Sciences with an overall grade point average of 3.2 and a grade point average of at least 3.5 in Cognitive Sciences major courses. In addition, honors students must successfully complete a senior honors thesis as part of the senior-year course work.

Sample Program - Interest in Cognitive Neuroscience

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<tbody>
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<td>PSYCH 9B</td>
<td>PSYCH 9C</td>
</tr>
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<td>MATH 2B</td>
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<td>PSYCH 111BW</td>
<td>PSYCH H111C</td>
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<td>PSYCH 114M</td>
<td>PSYCH H111B</td>
<td>COGS 110</td>
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<td>Addl. science course</td>
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Sample Program — Honors

Freshman

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<td>PSYCH 9B</td>
<td>PSYCH 9C</td>
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<td>MATH 2B</td>
<td>STATS 7</td>
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Sophomore

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<tbody>
<tr>
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<td>PSYCH 111BW</td>
<td>PSYCH H111C</td>
</tr>
<tr>
<td>PSYCH 114M</td>
<td>PSYCH H111B</td>
<td>COGS 110</td>
</tr>
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<td>BIO SCI 36</td>
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<td>General Education</td>
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<tr>
<td></td>
<td></td>
<td>BIO SCI 37</td>
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</table>

Junior

<table>
<thead>
<tr>
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<th>Winter</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core course</td>
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<td>Core course</td>
</tr>
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<td>PSYCH H101A</td>
<td>General Education</td>
<td>General Education</td>
</tr>
<tr>
<td>Addl. science course</td>
<td>Addl. science course</td>
<td>Addl. science course</td>
</tr>
<tr>
<td>Elective</td>
<td>Core elective</td>
<td>Elective</td>
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</table>

Senior

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>PSYCH H101B</td>
<td>Core elective</td>
<td>PSYCH H101C</td>
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<tr>
<td>Core elective</td>
<td>Core elective</td>
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<td>Addl. elective</td>
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<tr>
<td>Addl. elective</td>
<td>Addl. elective</td>
<td>Elective</td>
</tr>
</tbody>
</table>

B.A. in Psychology

Requirements for the B.A. in Psychology

All students must meet the University Requirements.
All students must meet the School Requirements.
Departmental Requirements for the Major

School requirements must be met and must include 18 courses (70 units) as specified below:

A. Complete the following:

| PSYCH 9A- 9B- 9C | Psychology Fundamentals and Psychology Fundamentals |

B. Two introductory courses (eight units) in the social sciences selected from:

<table>
<thead>
<tr>
<th>ANTHRO 2A</th>
<th>Introduction to Sociocultural Anthropology</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANTHRO 2B</td>
<td>Introduction to Biological Anthropology</td>
</tr>
<tr>
<td>ANTHRO 2D</td>
<td>Introduction to Language and Culture</td>
</tr>
<tr>
<td>ECON 1</td>
<td>Introduction to Economics</td>
</tr>
<tr>
<td>LINGUIS 3</td>
<td>Introduction to Linguistics</td>
</tr>
<tr>
<td>POL SCI 6C</td>
<td>Introduction to Political Science: Micropolitics</td>
</tr>
<tr>
<td>SOC SCI 5A</td>
<td>Introduction to Human Geography</td>
</tr>
<tr>
<td>SOCIOL 1</td>
<td>Introduction to Sociology</td>
</tr>
<tr>
<td>SOCIOL 2</td>
<td>Globalization and Transnational Sociology</td>
</tr>
<tr>
<td>SOCIOL 3</td>
<td>Social Problems</td>
</tr>
</tbody>
</table>

or one or two quarters of the following when topic is not psychology:

| SOC SCI H1E- H1F- H1G | Honors: Critical Issues on the Social Sciences and Honors: Critical Issues on the Social Sciences and Honors: Critical Issues on the Social Sciences |

C. A one-quarter course and laboratory in experimental psychology or research methods selected from the following:

<table>
<thead>
<tr>
<th>PSYCH 112A- 112LA</th>
<th>Experimental Psychology and Experimental Psychology Laboratory</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYCH 112D- 112LD</td>
<td>Effective Graphical Presentation of Data and Effective Graphical Presentation of Data Lab</td>
</tr>
</tbody>
</table>
PSYCH 112M- 112LM
Research Methods in Psychology
and Research Methods in Psychology Laboratory

PSYCH 112R- 112LR
Cognitive Robotics
and Cognitive Robotics Laboratory

NOTE: These courses have as prerequisites PSYCH 9A, PSYCH 9B, PSYCH 9C and one year of mathematics/statistics (see course listings). These prerequisites are strictly enforced. PSYCH 112A, PSYCH 112LA are the first quarter of a multi-quarter sequence that satisfies the upper-division writing requirement and allows students to plan and conduct research projects. Students taking these courses should plan to continue in them through at least the second quarter. Students who intend to fulfill the upper-division writing requirement in some other way should consider taking PSYCH 112D and PSYCH 112LD, PSYCH 112M and PSYCH 112LM, or PSYCH 112R and PSYCH 112LR to fulfill the laboratory requirement.

D. Select four upper-division Psychology core courses (16 units). These courses are designated with an ending number "0" and include the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYCH 120A</td>
<td>Abnormal Psychology</td>
</tr>
<tr>
<td>PSYCH 120D</td>
<td>Developmental Psychology</td>
</tr>
<tr>
<td>PSYCH 120H</td>
<td>History of Psychology</td>
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<td>PSYCH 120P</td>
<td>Personality Theories</td>
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<td>PSYCH 130A</td>
<td>Perception and Sensory Processes</td>
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<tr>
<td>PSYCH 140C</td>
<td>Cognitive Science</td>
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<td>PSYCH 140D</td>
<td>Principles of Learning Theory</td>
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<td>PSYCH 140H</td>
<td>Human Memory</td>
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<td>PSYCH 150</td>
<td>Psychology of Language</td>
</tr>
<tr>
<td>PSYCH 160A</td>
<td>Introduction to Cognitive Neuroscience</td>
</tr>
<tr>
<td>PSYCH 160D</td>
<td>Brain Disorders and Behavior</td>
</tr>
</tbody>
</table>

E. Select seven additional courses (four or more units each) with emphasis in psychology, distributed as follows:

1. No more than one of the seven may be lower-division. PSYCH 7A may not be used to fulfill this requirement.

2. Three of the upper-division courses used to satisfy requirements D and E must be taken from one of the following modules: Psychology 110–119 (Research Methodologies), 120–129 (General Psychology), 130–139 (Perception and Sensory Processes), 140–149 and 150–159 (Learning and Cognition and Language Sciences combined), 160–169 (Cognitive Neuroscience), and 170–179 (Interdisciplinary Studies).

3. Certain courses offered in the School of Biological Sciences and the School of Social Ecology may be used in partial satisfaction of this requirement. A total of three of these courses (12 units) may be used in this way with a maximum of two from either of these Schools.

4. No more than three of the courses (each of four or more units) may be numbered 190–199.

NOTE: Psychology majors are strongly encouraged to take BIO SCI 1A and BIO SCI 35 toward satisfaction of the science and technology portion of the general education requirement (category II). Furthermore, it is strongly recommended that students who intend to pursue post-baccalaureate work in psychology take the PSYCH 112A-PSYCH 112B-PSYCH 112C sequence. Most psychology graduate programs require statistics (which, at UCI, may be satisfied by taking PSYCH 10A-PSYCH 10B-PSYCH 10C or SOC SCI 10A-SOC SCI 10B-SOC SCI 10C), but some require calculus (which, at UCI, may be satisfied by taking MATH 2A-MATH 2B).

General

<table>
<thead>
<tr>
<th>Year</th>
<th>Fall</th>
<th>Winter</th>
<th>Spring</th>
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<tbody>
<tr>
<td>Freshman</td>
<td>PSYCH 9A</td>
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<td>PSYCH 9C</td>
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<tr>
<td></td>
<td>SOC SCI 3A</td>
<td></td>
<td>Intro. Soc. Sci. course</td>
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</tbody>
</table>

| Sophomore| PSYCH 10A | Psych. Core course ¹ | Psych. Core course ¹ | Psych. Core course ¹ |
|          | General Education | General Education | General Education | General Education |

<table>
<thead>
<tr>
<th>Senior</th>
<th>Fall</th>
<th>Winter</th>
<th>Spring</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Psych. Core course ¹</td>
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<td>U-D Psych. course¹</td>
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<td></td>
<td>Module ²</td>
<td>Module ²</td>
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<td>Experimental ³</td>
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<td>U-D Psych. course</td>
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<tr>
<td>Senior</td>
<td>Winter</td>
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<tr>
<td>U-D Psych. course</td>
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</table>

1. Psychology core course, an upper-division course with the ending number “0.”

2. Select three courses from one module sequence: Psychology 110–119 (Research Methodologies), 120–129 (General Psychology), 130–139 (Perception and Sensory Processes), 140–149 and 150–159 (Learning and Cognition and Language Sciences combined), 160–169 (Cognitive Neuroscience), and 170–179 (Interdisciplinary Studies).

3. For Experimental course select one course and lab course: PSYCH 112A, PSYCH 112D, PSYCH 112M, PSYCH 112R.

Sample Program — Graduate School Track

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<th>Freshman</th>
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<td>PSYCH 9C</td>
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<td>HUMAN 1B</td>
<td>HUMAN 1C</td>
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<tr>
<td>HUMAN 1AS</td>
<td>HUMAN 1BS</td>
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Sample Program — Transfer Psychology Track

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<tbody>
<tr>
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<tbody>
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<td>Electives</td>
</tr>
</tbody>
</table>

1. Psychology core course, an upper-division course with the ending number “0.”

Honors Program in Psychology

The two-year Honors Program in Psychology is open to selected juniors who are majoring in psychology. It provides thorough grounding in research methods and culminates with the opportunity for basic research in some area of psychology under faculty supervision. The program has a limited
number of openings and seeks to attract outstanding students who plan to undertake postgraduate education in some field of the psychological sciences. Admission to the program is based on a formal application that is normally submitted in the spring quarter of the sophomore year. Applicants should have an overall grade point average of at least 3.2 and a grade point average of at least 3.5 in psychology courses, although this requirement may be waived in unusual cases.

During the junior year, students who participate in the program are expected to enroll in Honors Experimental Psychology (PSYCH H111A - PSYCH 111BW - PSYCH H111C), and in the fall quarter of the Honors Seminar in PSYCH H101A. As seniors, following successful completion of these junior-year requirements, psychology honors students are enrolled in the Honors Seminar in Psychology (PSYCH H101B - PSYCH H101C) in the fall and spring quarters. Participants in the honors program are expected to complete course work beyond the general education requirement in one or more of the following areas: biological sciences, mathematics, computer science, physical science, linguistics, philosophy. The honors seminar may be used to satisfy two of the courses required by Part E of the psychology major requirements. To graduate with honors in psychology, a student must successfully complete the requirements for the B.A. degree in psychology with an overall grade point average of 3.2 and a grade point average of at least 3.5 in psychology courses. In addition, honors students must successfully complete a senior honors thesis as part of the senior-year course work.

### Sample Program — Honors

<table>
<thead>
<tr>
<th></th>
<th>Fall</th>
<th>Winter</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freshman</td>
<td></td>
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<tr>
<td>PSYCH 9A</td>
<td>PSYCH 9A</td>
<td>PSYCH 9B</td>
<td>PSYCH 9C</td>
</tr>
<tr>
<td>HUMAN 1A</td>
<td>HUMAN 1A</td>
<td>HUMAN 1B</td>
<td>HUMAN 1C</td>
</tr>
<tr>
<td>HUMAN 1AS</td>
<td>HUMAN 1AS</td>
<td>HUMAN 1BS</td>
<td>HUMAN 1CS</td>
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<tr>
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<td>MATH 2A</td>
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<td>STATS 7</td>
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<tr>
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<td>PSYCH 10A</td>
<td>PSYCH 10A</td>
<td>PSYCH 10B</td>
<td>PSYCH 10C</td>
</tr>
<tr>
<td>Psych. Core course¹</td>
<td>Psych. Core course¹</td>
<td>General Education</td>
<td>General Education</td>
</tr>
<tr>
<td>Intro. Soc. Sci. course</td>
<td>Intro. Soc. Sci. course</td>
<td>General Education</td>
<td>General Education</td>
</tr>
<tr>
<td>1 Computer Tech. course</td>
<td>General Education</td>
<td>General Education</td>
<td>General Education</td>
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<tr>
<td>Junior</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PSYCH H101A</td>
<td>PSYCH 111BW</td>
<td>PSYCH H111C</td>
<td></td>
</tr>
<tr>
<td>PSYCH H111A</td>
<td>U-D Psych. course</td>
<td>General Education</td>
<td>General Education</td>
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<tr>
<td>Psych. Core course¹</td>
<td>General Education</td>
<td>General Education</td>
<td>General Education</td>
</tr>
<tr>
<td>Senior</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PSYCH H101B</td>
<td>PSYCH 199</td>
<td>PSYCH H101C</td>
<td></td>
</tr>
<tr>
<td>PSYCH 199</td>
<td>Electives</td>
<td>Electives</td>
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<tr>
<td>Electives</td>
<td>Electives</td>
<td>Electives</td>
<td>Electives</td>
</tr>
</tbody>
</table>

¹ Psychology core course, an upper-division course with the ending number “0.”

### Additional Information

#### Change of Major

Information about change-of-major requirements, procedures, and policies is available in the School of Social Sciences Undergraduate Student Affairs Office and at the UCI Change of Major Criteria website (http://www.changeofmajor.uci.edu).

#### Excellence in Psychological Research

Psychology majors doing independent research under PSYCH 199 may be eligible for participation in the Undergraduate Research Opportunities Program (UROP). Participants can obtain research funding and have the opportunity to have their research papers published in a peer-reviewed student journal or to present them at a special conference of UCI student research. Guidelines for the program are available from the Department of Cognitive Sciences office.

#### Minor in Psychology

**Psychology Minor Requirements**

Requirements for the minor in psychology are met by taking seven or eight psychology courses (28 or 32 units) as specified below:

A. Complete the following:
PSYCH 7A
or
PSYCH 9A- 9B- 9C

Introduction to Psychology (for the 28-unit minor)

Psychology Fundamentals
and Psychology Fundamentals
and Psychology Fundamentals (for the 32-unit minor)

B. Select three upper-division psychology courses from the following:

PSYCH 120A
Abnormal Psychology

PSYCH 120D
Developmental Psychology

PSYCH 120H
History of Psychology

PSYCH 120P
Personality Theories

PSYCH 130A
Perception and Sensory Processes

PSYCH 140C
Cognitive Science

PSYCH 140L
Principles of Learning Theory

PSYCH 140M
Human Memory

PSYCH 150
Psychology of Language

PSYCH 160A
Introduction to Cognitive Neuroscience

PSYCH 160D
Brain Disorders and Behavior

C. Complete one of the following:

For students who took PSYCH 7A: Select three additional psychology courses (four or more units each) no more than one of which is a lower-
division course.

For students who took PSYCH 9A, PSYCH 9B, PSYCH 9C: select two additional upper-division psychology courses (four or more units each).

PSYCH 190–199 cannot be used to fulfill this requirement.

D. In addition, the school mathematics and computer science requirement (school requirement 1) must be satisfied.

Minor in Hearing and Speech Sciences

A minor in Hearing and Speech Sciences will provide in-depth training for undergraduates interested in becoming scientists and/or clinicians in
health-related fields. This minor will help stimulate students’ interest in hearing and speech as well as increase their opportunities to be admitted to
postgraduate programs in audiology, speech-language pathology, biomedical engineering, psychology, neuroscience, medicine and other allied areas.

Hearing and Speech Sciences Minor Requirements

A. Complete the following:

BIO SCI N110
Neurobiology and Behavior

or PSYCH 160A
Introduction to Cognitive Neuroscience

B. Statistic course(s) selected from the following: ¹

STATS 120A- 120B- 120C
Introduction to Probability and Statistics I
and Introduction to Probability and Statistics II
and Introduction to Probability and Statistics III

PSYCH 10A- 10B- 10C
Probability and Statistics in Psychology I
and Probability and Statistics in Psychology II
and Probability and Statistics in Psychology III

SOC SCI 10A- 10B- 10C
Probability and Statistics in Social Sciences I
and Probability & Statistics in Social Sciences II
and Probability & Statistics in Social Sciences III

STATS 7
Basic Statistics

STATS 8
Introduction to Biological Statistics

PUBHLTH 7
Introduction to Public Health Statistics

C. Complete the following:

BIO SCI N147
Hearing and the Brain

D. Complete four courses from the following categories, with at least one course from each category:

Category I:

MATH 3A
or MATH 113A
Introduction to Linear Algebra
Mathematical Modeling in Biology

PSYCH 114M
MATLAB Programming

or I&C SCI 31
Introduction to Programming

An additional statistics or probability course beyond Requirement B (listed above).
Category II:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>LINGUIS 3</td>
<td>Introduction to Linguistics</td>
</tr>
<tr>
<td>LINGUIS 10</td>
<td>Introduction to Phonology</td>
</tr>
<tr>
<td>PSYCH 56L</td>
<td>Acquisition of Language (same as LINGUIS 51)</td>
</tr>
<tr>
<td>PSYCH 150</td>
<td>Psychology of Language (same as LINGUIS 155)</td>
</tr>
</tbody>
</table>

Category III:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIO SCI N152</td>
<td>Developmental Neurobiology</td>
</tr>
<tr>
<td>PSYCH 131B</td>
<td>Hearing</td>
</tr>
<tr>
<td>PSYCH 161</td>
<td>Language and the Brain</td>
</tr>
</tbody>
</table>

E. Research Requirement - one quarter of research experience mentored by a CHR member (others may be allowed with prior approval). One year of research is highly recommended.¹

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BME 199</td>
<td>Individual Study</td>
</tr>
<tr>
<td>BIO SCI 199</td>
<td>Independent Study in Biological Sciences Research</td>
</tr>
<tr>
<td>MATH 199A</td>
<td>Special Studies in Mathematics</td>
</tr>
<tr>
<td>or MATH 199B</td>
<td>Special Studies in Mathematics</td>
</tr>
<tr>
<td>or MATH 199C</td>
<td>Special Studies in Mathematics</td>
</tr>
<tr>
<td>PSYCH 190</td>
<td>Senior Thesis</td>
</tr>
<tr>
<td>or PSYCH 199</td>
<td>Independent Study</td>
</tr>
</tbody>
</table>

¹ For students with majors within the School of Social Sciences, one statistics course in addition to the School requirement must be completed. For students with majors outside of the School of Social Sciences, at least one statistics course is required. Other statistics courses may be approved for substitution.

² Note: BIO SCI 194S is a prerequisite to BME 199 and BIO SCI 199.

Residency Requirement: A minimum of five courses required for the minor must be completed at UCI. Approved courses taken in the Education Abroad Program are considered to be in-residence courses.

Graduate Study in the Cognitive Sciences

The Department of Cognitive Sciences offers a Ph.D. program in psychology, with a specialization in cognitive science, to prepare students for research and teaching careers in academia, industry, and government. The emphasis is on modern techniques of experimentation and theory construction. Special attention is given to providing hands-on research experience and equipping students with sophisticated mathematical and computing skills. The department faculty, which includes two members of the National Academy of Sciences, has many who serve as editors or editorial board members of leading professional journals, and as members of NSF and NIH study panels. Many cognitive sciences faculty are also members of UCI’s Institute for Mathematical Behavioral Sciences, and the department is generally regarded as one of the world’s leading centers for mathematically oriented research in cognitive psychology. The department is also allied closely to the school’s Center for Cognitive Neuroscience and Engineering and the Center for Language Science.

Admission

In addition to meeting the general requirements for admission, applicants should have acquired a background in mathematics equivalent to at least one year of calculus. Advanced course work in some of the following fields is highly desirable: psychology, computer science, mathematics, physical sciences, engineering, biology, logic, and linguistics. Standard requirements for admission include Graduate Record Examination (GRE) scores for tests taken within the past five years, official transcripts of all college course work, and at least three letters of recommendation. Applicants whose primary language is not English are required to demonstrate proficiency in English for admission consideration. Information about this requirement is available at http://www.grad.uci.edu/admissions/applying-to-uci/english-proficiency.html.

To receive full consideration for fellowship and assistantship awards, applications must be received by December 1. Admissions decisions are made in March. Application materials are available online at the Graduate Division website (http://www.grad.uci.edu/).html).

Master’s Degrees

NOTE: Although the Department does not have a terminal master’s program, students may earn an optional master’s degree as part of the Ph.D. program.

Requirements for the M.A. in Psychology

Students enrolled in the Psychology program may earn an M.A. in Psychology by completing the following requirements: The student must: 1) complete the required course work as outlined below; 2) present a talk and submit an approved paper, both based on empirical/theoretical research, as described below; and 3) fulfill a computer-programming language requirement by completing satisfactorily the computational research methods sequence.
PSYCH 205A-PSYCH 205B or by demonstrating proficiency in use of a programming language for cognitive sciences research as assessed by two faculty members and approved by the Graduate Director.

Requirements for the M.S. in Cognitive Neuroscience

Students enrolled in the concentration program in Cognitive Neuroscience may earn an M.S. in Cognitive Neuroscience by completing the following requirements: The student must 1) complete the required course work as outlined below; 2) pass the second year examination, which requires both a written critical review of literature in the student’s area of interest and an oral examination by the student’s committee members; and 3) fulfill a computer-programming language requirement by satisfactorily completing the computational research methods sequence PSYCH 205A-PSYCH 205B, or by demonstrating proficiency in use of a programming language for cognitive sciences research as assessed by two faculty members and approved by the Graduate Director.

Ph.D. in Psychology

Requirements

Course work. Students must complete 12 courses distributed as follows: the cognitive and brain sciences core courses, PSYCH 210A-PSYCH 210B; three quantitative courses drawn from PSYCH 203A, and two of PSYCH 203B, PSYCH 203C, or PSYCH 203D or PSYCH 214; two computational methods courses PSYCH 205A and either PSYCH 205B or PSYCH 205C; two cognitive science core courses drawn from the PSYCH 211–219 module; and three electives.

Students must fulfill the Ph.D. program's computer-programming language requirement.

Students are expected to enroll in the Cognitive Sciences Research Seminar PSYCH 201A-PSYCH 201B-PSYCH 201C during all quarters in residence prior to passage of the advancement-to-candidacy examination. During the fall of the first year in the program, students should enroll in the Seminar in Professional Development (PSYCH 204A) and the Proseminar in the Cognitive Sciences (PSYCH 202A).

Second-year examination. During the first year, in consultation with their advisor, the student should establish an advisory committee consisting of three faculty members, including the advisor and at least one other cognitive sciences faculty member. The committee should meet with the student during spring quarter of the first year to determine the student’s area(s) of research interest and to identify the published literature with which the student must be familiar. At the beginning of the fall quarter of their second year, students will be required to take a second-year examination. It will involve (1) a critical review of work in the student's area of research interest, and (2) an oral examination by the student's committee members. Should the student fail the second-year exam, the student will be allowed to repeat the exam in the winter quarter. A subsequent failure results in the student exiting the program.

Pre-advancement talk. Prior to advancement, usually in the third year, each student will give a talk to the department faculty and students in the Cognitive Sciences Research Seminar PSYCH 201A-PSYCH 201B-PSYCH 201C. Each student is expected to carry out theoretical/empirical research during the first two years. By the start of the third year, each student should have completed a research project of a scope and nature that is potentially publishable in a professional journal. (Another forum for the pre-advancement talk may be substituted with the written approval of the Graduate Director.) This talk is required prior to the student’s advancement to candidacy.

Advancement examination. The advancement examination consists of a written research proposal in NIH NRSA Predoctoral Fellowship format and an oral defense of the proposed research. The requirements for advancement are detailed below.

Dissertation. Students must submit a dissertation describing original publishable research and present a public defense of the dissertation as the final requirement of the Ph.D. program as detailed below.

Ph.D. in Psychology with a Concentration in Cognitive Neuroscience

Students can also pursue a Ph.D. in psychology with a concentration in cognitive neuroscience. This is an interdisciplinary field which studies the relation between mind and brain. With the development of non-invasive functional brain imaging techniques during the last two decades, the integration of cognitive and neural models of information processing has become a major focus in the field, and a major growth area within the department’s academic plan.

The program concentration is administered by the Department of Cognitive Sciences and coordinated by the cognitive neuroscience graduate director. Commensurate with the multidisciplinary nature of cognitive neuroscience, the department expects to admit students with a variety of undergraduate educational backgrounds. These include, but are not necessarily limited to, undergraduate degrees in psychology/cognitive science, neuroscience, biology, computer science, mathematics and engineering.

Requirements

Course work. Students must complete 12 courses distributed as follows: the cognitive and brain sciences core courses, PSYCH 210A-PSYCH 210B; two quantitative courses drawn from PSYCH 203A and one of PSYCH 203B, PSYCH 203C, or PSYCH 203D or PSYCH 214; one computational course drawn from the PSYCH 205A-PSYCH 205B-PSYCH 205C sequence; two neuroscience methods courses drawn from PSYCH 236, PSYCH 265, PSYCH 268A; two neuroscience courses drawn from the PSYCH 261–269 module; and three electives.

Students must fulfill the Ph.D. program’s computer-programming language requirement.
Students are expected to enroll in the Cognitive Sciences Research Seminar PSYCH 201A-PSYCH 201B-PSYCH 201C during all quarters in residence prior to passage of the advancement-to-candidacy examination. During the fall of the first year in the program, students should enroll in the Seminar in Professional Development (PSYCH 204A) and the Proseminar in the Cognitive Sciences (PSYCH 202A).

Second-year examination. During the first year, the student in consultation with their advisor should establish an advisory committee consisting of three faculty members, including the advisor and at least one other cognitive sciences faculty member. The committee should meet with the student during spring quarter of the first year to determine the student's area(s) of research interest and to identify the published literature with which the student must be familiar. At the beginning of the fall quarter of their second year, students will be required to take a second-year examination. It will involve (1) a critical review of work in the student's area of research interest, and (2) an oral examination by the student's committee members. Should the student fail the second-year exam, the student will be allowed to repeat the exam in the winter quarter. A subsequent failure results in the student leaving the program.

Pre-advancement talk. Prior to advancement, usually in the third year, each student will give a talk to the department faculty and students in the Cognitive Sciences Research Seminar PSYCH 201A-PSYCH 201B-PSYCH 201C. Each student is expected to carry out theoretical/empirical research during the first two years. By the start of the third year, each student should have completed a research project of a scope and nature that is potentially publishable in a professional journal. (Another forum for the pre-advancement talk may be substituted with the written approval of the graduate director.) This talk is required prior to the student's advancement to candidacy.

Advancement examination. The advancement examination consists of a written research proposal in NIH NRSA Predoctoral Fellowship format and an oral defense of the proposed research. The requirements for advancement are detailed below.

Dissertation. Students must submit a dissertation describing original publishable research and present a public defense of the dissertation as the final requirement of the Ph.D. program as detailed below.

Joint M.S. in Statistics and Ph.D. in Psychology Program

Students must be admitted into the Ph.D. program in Psychology or the Ph.D. program in Psychology with a concentration in Cognitive Neuroscience in order to be eligible for the joint program. During their first year, Ph.D. students interested in pursuing the joint program must enroll in STATS 210 and either STATS 202 or STATS 211, which fulfills the quantitative requirement in the Ph.D. program.

Admissions

In the winter quarter of their first year, interested Ph.D. students may submit an application to the joint M.S./Ph.D. program. The application consists of:

1. A copy of the original application to the Department of Cognitive Sciences' Ph.D. program, including transcripts, GRE scores, and letters of recommendation.
2. A letter from the Cognitive Sciences Department Chair recommending the student for the joint program in Statistics/Cognitive Science.
3. A letter of approval from the School of Social Sciences' Associate Dean for Research and Graduate Studies.

The Department of Statistics reviews the application to determine whether the student is adequately prepared for the M.S. in Statistics component.

Upon admission into the joint program, the student is expected to pass a comprehensive exam covering the material in either STATS 210-STATS 211-STATS 212 or STATS 210-STATS 202-STATS 203, following the spring quarter. In the fall of the second year, the student enrolls as an M.S. in Statistics student through the Department of Statistics and completes the remaining coursework and comprehensive exam. During this year, the student continues to receive financial support from the School of Social Sciences, as outlined in the original admissions letter.

After successfully completing one year in the Statistics program, the student will enroll in the Cognitive Sciences Ph.D. program in year three, and complete the normal requirements for the Ph.D.

Requirements for the M.S. in Statistics

A. Complete the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>STATS 202</td>
<td>Statistical Methods for Data Analysis II 📊</td>
</tr>
<tr>
<td>STATS 203</td>
<td>Statistical Methods for Data Analysis III 📊</td>
</tr>
<tr>
<td>STATS 210</td>
<td>Statistical Methods I: Linear Models</td>
</tr>
<tr>
<td>STATS 205</td>
<td>Introduction to Bayesian Data Analysis</td>
</tr>
</tbody>
</table>

B. Complete three quarters of STATS 280

C. Select two elective graduate courses offered by the Department of Statistics 📊

D. Select three electives from the Ph.D. program in Cognitive Sciences. The three electives must be selected from the following two areas: 📊

Computational Methods

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYCH 203C</td>
<td>Algorithmic Statistics</td>
</tr>
</tbody>
</table>
### PSYCH 205A
Computational and Research Methods with MATLAB

### PSYCH 205B
Running Experiments Using MATLAB

### PSYCH 205C
Computational Statistics

### PSYCH 214
Bayesian Cognitive Modeling

### PSYCH 237
Advanced Bayesian Cognitive Modeling

#### Neuroscience Methods

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYCH 236</td>
<td>Multivariate Time Series Analysis</td>
</tr>
<tr>
<td>PSYCH 265</td>
<td>Introduction to Functional MRI</td>
</tr>
<tr>
<td>PSYCH 268A</td>
<td>Computational Neuroscience</td>
</tr>
</tbody>
</table>

1. STATS 211 and STATS 212 may be substituted for STATS 202 and STATS 203.
2. At most, one of the two electives courses may be STATS 299, and only with prior approval from the Department's Graduate Committee.
3. These three courses fulfill requirements for both programs.

The entire program of courses must be approved by the Statistics Department Graduate Committee. Students with previous graduate training in statistics may petition the Committee to substitute other courses for a subset of the required courses. Students are required to pass a written comprehensive examination ordinarily at the end of the first year covering the material in either STATS 202, STATS 203, and STATS 210 or STATS 210, STATS 211, and STATS 212. At the end of the second year, the student must pass a written comprehensive examination covering the material from STATS 200A-STATS 200B-STATS 200C.

### Requirements for the Ph.D. in Psychology

A. Complete the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYCH 210A-210B</td>
<td>Introduction to Cognitive and Brain Sciences I: Perception and Introduction to Cognitive and Brain Sciences II: Cognition</td>
</tr>
<tr>
<td>PSYCH 205A</td>
<td>Computational and Research Methods with MATLAB</td>
</tr>
</tbody>
</table>

B. Select one of the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYCH 205B</td>
<td>Running Experiments Using MATLAB</td>
</tr>
<tr>
<td>PSYCH 205C</td>
<td>Computational Statistics</td>
</tr>
<tr>
<td>PSYCH 214</td>
<td>Bayesian Cognitive Modeling</td>
</tr>
</tbody>
</table>

C. Select two Cognitive Science core courses from PSYCH 211-219.

D. Complete three electives (one technical elective is required).

The technical elective must be selected from the following two technical areas:

#### Computational Methods

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYCH 203C</td>
<td>Algorithmic Statistics</td>
</tr>
<tr>
<td>PSYCH 205A</td>
<td>Computational and Research Methods with MATLAB</td>
</tr>
<tr>
<td>PSYCH 205B</td>
<td>Running Experiments Using MATLAB</td>
</tr>
<tr>
<td>PSYCH 205C</td>
<td>Computational Statistics</td>
</tr>
<tr>
<td>PSYCH 214</td>
<td>Bayesian Cognitive Modeling</td>
</tr>
<tr>
<td>PSYCH 237</td>
<td>Advanced Bayesian Cognitive Modeling</td>
</tr>
</tbody>
</table>

#### Neuroscience Methods

<table>
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<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>PSYCH 236</td>
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<td>Introduction to Functional MRI</td>
</tr>
<tr>
<td>PSYCH 268A</td>
<td>Computational Neuroscience</td>
</tr>
</tbody>
</table>

Students must fulfill the Ph.D. program’s computer-programming language requirement.

Students are expected to enroll in the Cognitive Sciences Research Seminar PSYCH 201A-PSYCH 201B-PSYCH 201C during all quarters in residence prior to passage of the advancement to candidacy examination. During the fall of the first year in the program, students should enroll in PSYCH 202A (Proseminar in the Cognitive Sciences).

**Second-year examination.** During the first-year in the Ph.D. program, the student in consultation with their advisor should establish an advisory committee consisting of three faculty members, including the advisor and at least on other cognitive sciences faculty member. The committee should meet with the student during the spring quarter of the first year to determine the student’s area(s) of research interest and to identify the published literature with which the student must be familiar. At the beginning of the fall quarter of their second year in the Ph.D. program, students will be required to take a second-year examination. It involves (1) a critical review of work in the student’s area of research interest, and (2) an oral examination by the
student’s committee members. Should the student fail the second year exam, the student will be allowed to repeat the exam in the winter quarter. A subsequent failure results in the student leaving the program.

**Pre-advancement talk.** Prior to advancement, usually in the third year in the Ph.D., each student gives a talk to the department faculty and students in the Cognitive Sciences Research Seminar PSYCH 201A-PSYCH 201B-PSYCH 201C. Each student is expected to carry out theoretical/empirical research during the first two years. By the start of the third year, each student should have completed a research project of a scope and nature that is potentially publishable in a professional journal. (Another forum for the pre-advancement talk may be substituted with the written approval of the graduate director.) This talk is required prior to the student’s advancement to candidacy.

**Advancement examination.** The advancement examination consists of a written research proposal in NIH NRSA Predoctoral Fellowship format, and an oral defense of the proposed research. The requirements for advancement are detailed below.

**Dissertation.** Students must submit a dissertation describing original publishable research and present a public defense of the dissertation as the final requirement of the Ph.D. program as detailed below.

**Requirements for Advancement to Candidacy**

The requirements for advancement to candidacy are (1) the student must meet the requirements listed above for the appropriate Master’s degree; (2) the student must, in addition, form a five-member faculty committee selected according to Graduate Division policy. The committee will examine the student on a topic which is determined in consultation with the committee. A written document describing the student’s work on this topic must be submitted to the committee prior to advancement. The student must demonstrate an understanding of the background and issues for the research topic and show sufficient preparation and creativity to undertake planning for a dissertation project (e.g., by describing a possible experimental design or outlining a possible theoretical development); and (3) students are required to advance to candidacy by the end of the fall quarter of their third year in the program.

**Requirements for the Ph.D.**

The requirements for the Ph.D. degree are (1) the student must formally present and defend a written dissertation proposal to a committee of at least three members selected according to Graduate Division requirements. The dissertation proposal presentation may take place as part of the examination for Advancement to Candidacy, in which case, that five-member committee will approve the dissertation proposal; (2) the proposal must be approved prior to the final dissertation defense (usually at least three months before to allow time for the candidate to incorporate suggestions and changes required by the committee); (3) prior to the approval of the final version of the dissertation the student is expected to defend the dissertation in a public colloquium announced with at least one week’s notice; and (4) all requirements for the Ph.D. degree must be fulfilled within three years after advancement to candidacy.

The normative time for advancement to candidacy is three years. The normative time for completion of the Ph.D. is five years, and the maximum time permitted is six years.

**Faculty**

William H. Batchelder, Ph.D. Stanford University, **Professor of Cognitive Sciences** (mathematical models of learning and memory, mathematical psychology and measurement)

Bruce G. Berg, Ph.D. Indiana University, **Associate Professor of Cognitive Sciences** (audition, auditory attention, psychophysics of complex sounds, computational models of hearing)

Alyssa Brewer, Ph.D. Stanford University, **Associate Professor of Cognitive Sciences; Linguistics** (neuroimaging of visual perception, visual deficits, neurological disorders)

Charles F. Chubb, Ph.D. New York University, **Professor of Cognitive Sciences** (visual perception, mathematical modeling, histogram contrast analysis)

Thomas M. D’Zmura, Ph.D. University of Rochester, **Professor of Cognitive Sciences** (vision, hearing, language, brain-computer interfaces)

Barbara A. Dosher, Ph.D. University of Oregon, **UCI Distinguished Professor of Cognitive Sciences** (human information processing, memory retrieval, attention, visual perception)

Emily D. Grossman, Ph.D. Vanderbilt University, **Associate Professor of Cognitive Sciences** (visual perception, neuroimaging)

Gregory S. Hickok, Ph.D. Brandeis University, **Professor of Cognitive Sciences; Linguistics** (neuroanatomy of language, neural plasticity, neuroimaging, cognitive neuroscience)

Donald D. Hoffman, Ph.D. Massachusetts Institute of Technology, **Professor of Cognitive Sciences; Logic and Philosophy of Science** (machine and human vision, visual recognition, artificial intelligence, virtual reality, consciousness and cognition, shape from motion)

Jeffrey L. Krichmar, Ph.D. George Mason University, **Professor of Cognitive Sciences; Computer Science** (computational neuroscience, robotics)
Michael D. Lee, Ph.D. University of Adelaide, Professor of Cognitive Sciences (mathematical and computational models of stimulus representation, categorization, memory, decision-making, problem solving)

Mimi Liljeholm, Ph.D. University of California, Los Angeles, Assistant Professor of Cognitive Sciences (neural and computational bases of cognition, perception, and action)

Louis E. Narens, Ph.D. University of California, Los Angeles, Professor of Cognitive Sciences; Logic and Philosophy of Science (measurement, logic, metacognition)

Emre Neftci, Ph.D. University of Zurich, Assistant Professor of Cognitive Sciences (computational neuroscience, neuromorphic engineering, machine learning)

Lisa Pearl, Ph.D. University of Maryland, College Park, Associate Professor of Cognitive Sciences; Linguistics; Logic and Philosophy of Science (linguistics, computational linguistics, language development, language change, Bayesian models)

Virginia Richards, Ph.D. University of California, Berkeley, Professor of Cognitive Sciences (auditory perception and cognition, human psychophysics)

Kourosh Saberi, Ph.D. University of California, Berkeley, Professor of Cognitive Sciences (signal detection, psychophysics, cortical neuroscience, sensory genetics)

Barbara W. Sarnecka, Ph.D. University of Michigan, Associate Professor of Cognitive Sciences; Logic and Philosophy of Science (cognitive development, language development, number concepts, conceptual change, individual cognitive development, historical development of science and mathematics)

George Sperling, Ph.D. Harvard University, UCI Distinguished Professor of Cognitive Sciences; Neurobiology and Behavior (empirical studies of human information processing: short-term visual memory systems, attention, visual perception, 3-D object recognition; mathematical, computational, and neural models of visual processes: light adaptation, temporal sensitivity, contrast-D)

Ramesh Srinivasan, Ph.D. Tulane University, Department Chair and Professor of Cognitive Sciences; Biomedical Engineering (cognitive neuroscience, brain development, consciousness, perception, EEG, brain dynamics)

Mark Steyvers, Ph.D. Indiana University, Professor of Cognitive Sciences; Computer Science; Psychology and Social Behavior (higher-order cognition, cognitive neuroscience, computational modeling, collective intelligence)

Joachim S. Vandekerckhove, Ph.D. University of Leuven, Assistant Professor of Cognitive Sciences; Statistics (response time modeling, model fitting, computational statistics, psychometrics, Bayesian statistics)

Charles E. Wright, Ph.D. University of Michigan, Associate Professor of Cognitive Sciences (cognitive psychology, human motor control, fits task, aimed movements, handwriting, immersive virtual reality, 1/f noise, quantitative models)

**Affiliate Faculty**

Nikil D. Dutt, Ph.D. University of Illinois at Urbana–Champaign, UCI Chancellor’s Professor of Computer Science; Cognitive Sciences; Electrical Engineering and Computer Science (embedded systems, computer architecture, electronic design automation, software systems, brain-inspired architectures and computing)

Charless C. Fowlkes, Ph.D. University of California, Berkeley, Associate Professor of Computer Science; Cognitive Sciences; Electrical Engineering and Computer Science (computer vision, machine learning, computational biology)

Susanne M. Jaeggi, Ph.D. University of Bern, Associate Professor of Education; Cognitive Sciences (working memory, executive functions, cognitive training, lifespan development aging, individual differences)

Elizabeth F. Loftus, Ph.D. Stanford University, UCI Distinguished Professor of Psychology and Social Behavior; Cognitive Sciences; Criminology, Law and Society; School of Law (cognitive psychology, human memory, psychology and law)

David C. Lyon, Ph.D. Vanderbilt University, Department Vice Chair and Associate Professor of Anatomy and Neurobiology; Cognitive Sciences (long range cortical circuits)

John Middlebrooks, Ph.D. University of California, San Francisco, Professor of Otolaryngology; Biomedical Engineering; Cognitive Sciences; Linguistics; Neurobiology and Behavior (hearing research, neurophysiology, psychophysics, auditory prosthesis, computational neuroscience)

Hernando C. Ombao, Ph.D. University of Michigan, Professor Emeritus of Statistics; Cognitive Sciences

Steven L. Small, M.D. University of Rochester, Dr. Stanley van den Noort Endowed Chair and Professor of Neurology; Cognitive Sciences; Neurobiology and Behavior

Hal S. Stern, Ph.D. Stanford University, Professor of Statistics; Cognitive Sciences
Fan-Gang Zeng, Ph.D. Syracuse University, Professor of Otolaryngology; Anatomy and Neurobiology; Biomedical Engineering; Cognitive Sciences (cochlear implants and auditory neuroscience)

**Cognitive Sciences Courses**

**COGS 109. Cognitive Sciences Research Seminar. 4 Units.**
Read and discuss examples of the primary research leading to the concepts covered in Psychology Fundamentals. Focuses on how this research is conducted and how inferences from it are drawn.

Prerequisite: PSYCH 9A
Prerequisite or corequisite: PSYCH 9A

Restriction: Cognitive Sciences Majors only.

**COGS 110. Quantitative Methods for Cognitive Sciences Research. 4 Units.**
Basics of quantitative methods used in cognitive sciences research focusing on linear algebra, Fourier analysis, multivariate statistics, and signal detection theory. Examples drawn from models and methods used in cognitive sciences research with practical examples.

Prerequisite: MATH 2B and STATS 7 and (PSYCH 114M or I&C SCI 31)

Restriction: Cognitive Sciences majors only.

**Psychology Courses**

**PSYCH 7A. Introduction to Psychology. 4 Units.**
Introduction to field of psychology, addressing the application of scientific methods to the study of human development, learning, memory, problem solving, perception, biological mechanisms, emotions and motivation, personality, psychopathology, and effects of diverse social and cultural contexts on human behavior.

Same as PSY BEH 9.
Overlaps with PSY BEH 11A, PSY BEH 11B, PSY BEH 11C, PSYCH 9A, PSYCH 9B.

Restriction: Criminology, Law and Society Majors have first consideration for enrollment. Public Health Sciences Majors have first consideration for enrollment. Social Ecology Majors have first consideration for enrollment. Urban Studies Majors have first consideration for enrollment. PSY BEH 9 and PSYCH 7A may not be taken for credit if taken after PSY BEH 11A, PSY BEH 11B, PSY BEH 11C, PSYCH 9A, PSYCH 9B, or PSYCH 9C.

(III)

**PSYCH 9A. Psychology Fundamentals. 4 Units.**
Designed to provide freshman with an in-depth survey of general psychology. Topics include biological bases of behavior, sensation, perception, cognition, development, personality, psychopathology, and social psychology.

Same as PSY BEH 11A.

Restriction: Lower-division students only. Cognitive Sciences Majors have first consideration for enrollment. Criminology, Law and Society Majors have first consideration for enrollment. Psychology and Social Behavior Majors have first consideration for enrollment. Psychology Majors have first consideration for enrollment. Public Health Sciences Majors have first consideration for enrollment. Public Health Policy Majors have first consideration for enrollment. Social Ecology Majors have first consideration for enrollment. Urban Studies Majors have first consideration for enrollment. PSY BEH 9 and PSYCH 7A may not be taken for credit if taken after PSY BEH 11A, PSY BEH 11B, PSY BEH 11C, PSYCH 9A, PSYCH 9B, or PSYCH 9C.

(III)

**PSYCH 9B. Psychology Fundamentals. 4 Units.**
Designed to provide freshman with an in-depth survey of general psychology. Topics include biological bases of behavior, sensation, perception, cognition, development, personality, psychopathology, and social psychology.

Same as PSY BEH 11B.

Restriction: Lower-division students only. Cognitive Sciences Majors have first consideration for enrollment. Criminology, Law and Society Majors have first consideration for enrollment. Psychology and Social Behavior Majors have first consideration for enrollment. Psychology Majors have first consideration for enrollment. Public Health Sciences Majors have first consideration for enrollment. Public Health Policy Majors have first consideration for enrollment. Social Ecology Majors have first consideration for enrollment. Urban Studies Majors have first consideration for enrollment. PSY BEH 9 and PSYCH 7A may not be taken for credit if taken after PSY BEH 11A, PSY BEH 11B, PSY BEH 11C, PSYCH 9A, PSYCH 9B, or PSYCH 9C.

(III)
PSYCH 9C. Psychology Fundamentals. 4 Units.
Designed to provide freshman with an in-depth survey of general psychology. Topics include biological bases of behavior, sensation, perception, cognition, development, personality, psychopathology, and social psychology.

Same as PSY BEH 11C.

Restriction: Lower-division students only. Cognitive Sciences Majors have first consideration for enrollment. Criminology, Law and Society Majors have first consideration for enrollment. Psychology and Social Behavior Majors have first consideration for enrollment. Psychology Majors have first consideration for enrollment. Public Health Sciences Majors have first consideration for enrollment. Public Health Policy Majors have first consideration for enrollment. Social Ecology Majors have first consideration for enrollment. Urban Studies Majors have first consideration for enrollment. PSY BEH 9 and PSYCH 7A may not be taken for credit if taken after PSY BEH 11A, PSY BEH 11B, PSY BEH 11C, PSYCH 9A, PSYCH 9B, or PSYCH 9C.

(III)

PSYCH 10A. Probability and Statistics in Psychology I. 4 Units.
An introduction to probability and statistics. Emphasis on thorough understanding of the probabilistic basis of statistical inference. Examples drawn primarily from psychology.

Overlaps with ANTHRO 10A, SOCECOL 13, SOC SCI 10A, SOCIOL 10A, POL SCI 10A.

Restriction: Psychology Majors have first consideration for enrollment.

(Va)

PSYCH 10B. Probability and Statistics in Psychology II. 4 Units.
An introduction to probability and statistics. Emphasis on thorough understanding of the probabilistic basis of statistical inference. Examples drawn primarily from psychology.

Prerequisite: PSYCH 10A

Overlaps with ANTHRO 10B, SOCECOL 13, SOC SCI 10B, SOCIOL 10B, POL SCI 10B.

Restriction: Psychology Majors have first consideration for enrollment.

(Va)

PSYCH 10C. Probability and Statistics in Psychology III. 4 Units.
An introduction to probability and statistics. Emphasis on thorough understanding of the probabilistic basis of statistical inference. Examples drawn primarily from psychology.

Prerequisite: PSYCH 10B

Overlaps with ANTHRO 10C, SOCECOL 13, SOC SCI 10C, SOCIOL 10C, POL SCI 10C.

Restriction: Psychology Majors have first consideration for enrollment.

(Vb)

PSYCH 21A. Adolescent Psychology. 4 Units.
Focuses on psychosocial dynamics of today’s adolescents in America emphasizing the quest for identity, independence, values, and sexual orientation. The influence of society, family, school, and peers is analyzed. Strategies for helping troubled adolescents are discussed.

Overlaps with PSY BEH 112D.

(III)

PSYCH 46A. Introduction to Human Memory. 4 Units.
 Covers the core concepts of modern research and theorizing about human memory, including structural subdivisions (e.g., perceptual memory, short-term memory, long-term memory), different measures of memory (e.g., recall, reorganization), and some practical applications of memory research (e.g., mnemonics).

(III)
PSYCH 56L. Acquisition of Language. 4 Units.
What children say, what they mean, and what they understand. Theories about the learning of language by one-, two-, and three-year olds. Comparison of kinds of data on which these theories are based.

Same as LINGUIS 51.

(III)

PSYCH 78A. Self-Identity and Society. 4 Units.
Studies sociological contributions to theory and research in social psychology, with focus on the social influences on personality, attitudes, beliefs, and behavior; socialization, human groups, and social interaction.

Same as SOCIOL 31.

(III)

PSYCH 89. Special Topics in Lower-Division Psychology. 4 Units.
Studies in selected areas of psychology at the lower-division level. Topics addressed vary each quarter.

Prerequisite: Prerequisites vary.

Repeatability: Unlimited as topics vary.

PSYCH H101A. Honors Seminar in Psychology I. 4 Units.
Focuses on the research activities and honors thesis research projects of each student and the research of various Cognitive Sciences faculty. Students discuss their research interests in the early and later stages of their projects. Research projects and write-ups required.

Grading Option: Pass/no pass only.

Repeatability: May be taken for credit 2 times.

Restriction: Psychology Majors only. Cognitive Sciences Majors only. Social Science Honors students only.

PSYCH H101B. Honors Seminar in Psychology II. 4 Units.
Focuses on the research activities and honors thesis research projects of each student and the research of various Cognitive Sciences faculty. Students discuss their research interests in the early and later stages of their projects. Research projects and write-ups required.

Prerequisite: PSYCH H101A

Grading Option: Pass/no pass only.

Repeatability: May be taken for credit 2 times.

Restriction: Psychology Majors only. Cognitive Sciences Majors only. Social Science Honors students only.

PSYCH H101C. Honors Seminar in Psychology III. 4 Units.
Focuses on the research activities and honors thesis research projects of each student and the research of various Cognitive Sciences faculty. Students discuss their research interests in the early and later stages of their projects. Research projects and write-ups required.

Prerequisite: PSYCH H101B

Repeatability: May be taken for credit 2 times.

Restriction: Psychology Majors only. Cognitive Sciences Majors only. Social Science Honors students only.

PSYCH 111BW. Honors Advanced Experimental Psychology. 4 Units.
Design and analysis of multivalent, factorial, and correlational studies. Students prepare proposals for independent research.

Corequisite: PSYCH H111B
Prerequisite: PSYCH H11A and (PSYC H11A or PSYCH 112A). Satisfactory completion of the Lower-Division Writing requirement.

Restriction: Psychology Majors only. Social Science Honors students only.

(lb)
PSYCH H111A. Honors Experimental Psychology. 4 Units.
Emphasis on design of experiments and analysis of results. Experiments are conducted in laboratory sections.

Prerequisite: ((PSYCH 9A and PSYCH 9B and PSYCH 9C) or (PSY BEH 11A and PSY BEH 11B and PSY BEH 11C)) and ((PSYCH 10A and 10B and 10C) or (MATH 2A and MATH 2B and (MATH 7 or STATS 7))).

Overlaps with PSYCH 112A.
Restriction: Psychology and Cognitive Sciences Honors Program students only.

PSYCH H111B. Honors Advanced Experimental Psychology Laboratory. 2 Units.
Design and analysis of multivalent, factorial, and correlational studies. Students prepare proposals for independent research.

Corequisite: PSYCH 111BW

PSYCH H111C. Honors Research in Experimental Psychology. 4 Units.
Each student conducts a research project in experimental psychology. The projects are discussed in a seminar format. Written reports on each project are submitted at the end of the quarter.

Prerequisite: PSYCH 111BW or PSYCH 112B

Restriction: Psychology Majors only. Social Science Honors students only.

PSYCH 112A. Experimental Psychology. 4 Units.
Emphasis on design of experiments and analysis of results. Experiments are conducted in laboratory sections.

Corequisite: PSYCH 112LA
Prerequisite: ((PSYCH 9A and PSYCH 9B and PSYCH 9C) or (PSY BEH 11A and PSY BEH 11B and PSY BEH 11C)) and ((PSYCH 10A and PSYCH 10B and PSYCH 10C) or (MATH 2A and MATH 2B and (MATH 7 or STATS 7)))

Overlaps with PSYCH H111A, PSYCH 112F, PSYCH 112G.
Restriction: Psychology Majors have first consideration for enrollment.

PSYCH 112B. Advanced Experimental Psychology. 4 Units.
Design and analysis of multivalent, factorial, and correlational studies. Students prepare proposals for independent research.

Prerequisite: PSYCH 112A and PSYCH 112LA

Overlaps with PSYCH 112F, PSYCH 112FW, PSYCH 112G, PSYCH 112GW.
Restriction: Psychology Majors have first consideration for enrollment.

PSYCH 112BW. Advanced Experimental Psychology. 4 Units.
Design and analysis of multivalent, factorial, and correlational studies. Students prepare proposals for independent research.

Prerequisite: PSYCH 112A and PSYCH 112LA. Satisfactory completion of the Lower-Division Writing requirement.

Overlaps with PSYCH 112F, PSYCH 112FW, PSYCH 112G, PSYCH 112GW.
Restriction: Psychology Majors have first consideration for enrollment.

(Ib)

PSYCH 112C. Research in Experimental Psychology. 4 Units.
Each student conducts a research project in experimental psychology. The projects are discussed in a seminar format. Written reports on each project are submitted at the end of the quarter.

Prerequisite: PSYCH 112B and PSYCH 112LB

Overlaps with PSYCH 112F, PSYCH 112FW, PSYCH 112G, PSYCH 112GW.
Restriction: Psychology Majors have first consideration for enrollment.
PSYCH 112D. Effective Graphical Presentation of Data. 4 Units.
Learn to use MATLAB to produce graphical displays of data based on psychological principles for effective design. Approach is problem-oriented, with emphasis on case-studies using data from psychological experiments and real-world corpora. Assessment via independent individual projects.

Corequisite: PSYCH 112LD
Prerequisite: (PSYCH 9A and PSYCH 9B and PSYCH 9C) or (PSY BEH 11A and PSY BEH 11B and PSY BEH 11C) and (PSYCH 10C or SOC SCI 10C or ANTHRO 10C or POL SCI 10C or SOCIOL 10C) or (MATH 2B and STATS 7)

Restriction: Cognitive Sciences Majors have first consideration for enrollment. Psychology Majors have first consideration for enrollment.

PSYCH 112LA. Experimental Psychology Laboratory. 2 Units.
Required laboratory section and co-requisite for Psych 112A.

Corequisite: PSYCH 112A

Restriction: Psychology Majors have first consideration for enrollment.

PSYCH 112LB. Advanced Experimental Psychology Laboratory. 2 Units.
Required laboratory section for PSYCH 112B and PSYCH 112BW.

Restriction: Psychology Majors have first consideration for enrollment.

PSYCH 112LC. Research in Experimental Psychology.
Required laboratory section and co-requisite for PSYCH 112C.

Corequisite: PSYCH 112C

PSYCH 112LD. Effective Graphical Presentation of Data Lab. 2 Units.
Lab to learn to use MATLAB to produce graphical displays of data based on psychological principles for effective design. Approach is problem-oriented, with emphasis on case-studies using data from psychological experiments and real-world corpora. Assessment via independent individual projects.

Corequisite: PSYCH 112D

Restriction: Psychology Majors have first consideration for enrollment. Cognitive Sciences Majors have first consideration for enrollment.

PSYCH 112LM. Research Methods in Psychology Laboratory. 2 Units.
Required laboratory section and co-requisite for PSYCH 112M.

Corequisite: PSYCH 112M

Restriction: Psychology Majors have first consideration for enrollment.

PSYCH 112LR. Cognitive Robotics Laboratory. 2 Units.
Required laboratory section and corequisite for PSYCH 112R.

Corequisite: PSYCH 112R

Restriction: Psychology Majors have first consideration for enrollment. Cognitive Sciences Majors have first consideration for enrollment.

PSYCH 112M. Research Methods in Psychology. 4 Units.
Research methods in psychology for majors who wish to fulfill this requirement separately from upper-division writing. Covers both experimental and descriptive research methods, analysis of results, and reading the psychological literature. Research experience is provided in laboratory sections.

Corequisite: PSYCH 112LM
Prerequisite: (PSYCH 9A and PSYCH 9B and PSYCH 9C) or (PSY BEH 11A and PSY BEH 11B and PSY BEH 11C) and (PSYCH 10C or SOC SCI 10C or ANTHRO 10C or POL SCI 10C or SOCIOL 10C) or (MATH 2B and STATS 7)

Restriction: Psychology Majors have first consideration for enrollment.

PSYCH 112R. Cognitive Robotics. 4 Units.
Introduces concepts on experimental design, embodiment, robot construction, and computer programming. Concepts of embodied intelligence and case studies of cognitive robotics are covered in lecture. Simple robots are constructed and programmed to carry out different behavioral experiments in lab.

Corequisite: PSYCH 112LR
Prerequisite: (PSYCH 9A and PSYCH 9B and PSYCH 9C) or (PSY BEH 11A and PSY BEH 11B and PSY BEH 11C) and (PSYCH 10C or SOC SCI 10C or ANTHRO 10C or POL SCI 10C or SOCIOL 10C) or (MATH 2B and STATS 7)

Restriction: Cognitive Sciences Majors have first consideration for enrollment. Psychology Majors have first consideration for enrollment.
PSYCH 113T. Introduction to Psychological Tests and Measurement. 4 Units.
Principles of psychological measurement, including elementary psychophysics, psychometrics, test theory, and the measurement of abilities, attitudes, traits, and interests. Reliability and validity of psychological measurements.
Prerequisite: (PSYCH 7A or PSY BEH 9) or (PSYCH 9A and PSYCH 9B and PSYCH 9C) or (PSY BEH 11A and PSY BEH 11B and PSY BEH 11C)
Overlaps with PSY BEH 151C.
Restriction: Psychology Majors have first consideration for enrollment.

PSYCH 114M. MATLAB Programming. 4 Units.
MATLAB is a mathematical software package for solving quantitative problems often encountered in experimental psychology. Topics include rudiments of programming, statistical analysis of data, matrix algebra, signal processing, graphic visualization, and simulated models of cognitive and perceptual processes.
Restriction: Psychology Majors have first consideration for enrollment. Cognitive Sciences Majors have first consideration for enrollment.

PSYCH 119. Special Topics in Research Methodologies. 1-4 Units.
Studies in selected areas of research methodologies. Topics addressed vary each quarter.
Prerequisite: Prerequisites vary.
Repeatability: Unlimited as topics vary.
Restriction: Psychology Majors have first consideration for enrollment.

PSYCH 120A. Abnormal Psychology. 4 Units.
Introduction to psychopathology and behavioral deviations, and the concepts of theories regarding these conditions.
Prerequisite: (PSYCH 7A or PSY BEH 9) or (PSYCH 9C or PSY BEH 11C)
Overlaps with PSY BEH 102C.
Restriction: Psychology Majors have first consideration for enrollment. Cognitive Sciences Majors have first consideration for enrollment.

PSYCH 120D. Developmental Psychology. 4 Units.
A general introduction to the study of the physical, intellectual, social, and emotional development of the child from birth to adulthood.
Prerequisite: (PSYCH 7A or PSY BEH 9) or (PSYCH 9A or PSY BEH 11A)
Overlaps with PSY BEH 111D.
Restriction: Psychology Majors have first consideration for enrollment. Cognitive Sciences Majors have first consideration for enrollment. Nursing Science Majors have first consideration for enrollment.

PSYCH 120H. History of Psychology. 4 Units.
A history of the development of various schools and systems of psychological thought.
Prerequisite: (PSYCH 7A or PSY BEH 9) or (PSYCH 9C or PSY BEH 11C)
Restriction: Cognitive Sciences Majors have first consideration for enrollment. Psychology Majors have first consideration for enrollment.

PSYCH 120P. Personality Theories. 4 Units.
A survey of the evolution of personality theory during this century. An overview of major perspectives in the field, with special attention to Freud, Jung, and Adler.
Prerequisite: (PSYCH 7A or PSY BEH 9) or (PSYCH 9C or PSY BEH 11C)
Overlaps with PSY BEH 170S.
Restriction: Psychology Majors have first consideration for enrollment. Cognitive Sciences Majors have first consideration for enrollment.
PSYCH 121M. Theories of Motivation. 4 Units.
Factors affecting the behavioral performance of organisms. A survey of theoretical and empirical approaches to the physiological, psychological, and social factors which generate behavior.
Prerequisite: (PSYCH 7A or PSY BEH 9) and (PSYCH 9A and PSYCH 9B and PSYCH 9C) or (PSY BEH 11A and PSY BEH 11B and PSY BEH 11C)
Overlaps with PSY BEH 176S.
Restriction: Psychology Majors have first consideration for enrollment.

PSYCH 121P. Positive Psychology. 4 Units.
Positive psychology, at the subjective level, is about valued subjective experiences; at the individual level, it is about positive individual traits; and at the group level, it is about the civic virtues and institutions that move individuals toward better citizenship.
Prerequisite: (PSYCH 9A and PSYCH 9B and PSYCH 9C) or (PSY BEH 11A and PSY BEH 11B and PSY BEH 11C)
Restriction: Psychology Majors have first consideration for enrollment.

PSYCH 121S. Psychology of Sleep and Consciousness. 4 Units.
Covers the physiology, neurochemistry, and neuroanatomy associated with sleep, contemporary sleep theory, REM and NREM, phenomenology, sleep disorders, examination of differences between conscious and unconscious cognitive function, the history of sleep and dream theories from ancient time to present day.
Restriction: Psychology Majors have first consideration for enrollment.

PSYCH 122C. Clinical Psychology. 4 Units.
Provides overview of the clinical psychology field including theories and techniques used in counseling and testing.
Overlaps with PSY BEH 150C.
Restriction: Psychology Majors have first consideration for enrollment.

PSYCH 122I. Organizational/Industrial Psychology. 4 Units.
Introduction to applied psychology in organizations, including personnel testing, selection, training and evaluation, job and classification analysis, job satisfaction and motivation, organizational development, leadership, market research, and consumer psychology. Potential ethical problems are discussed.
Prerequisite: (PSYCH 7A or PSY BEH 9) or (PSYCH 9A or PSY BEH 11A) or (PSYCH 9B or PSY BEH 11B) or (PSYCH 9C or PSY BEH 11C)
Restriction: Psychology Majors have first consideration for enrollment.

PSYCH 123P. Topics in Philosophy of Psychology. 4 Units.
Selected topics in the philosophy of psychology, e.g., the nature of psychological explanation, reductionism, issues in cognitive, behavioral, and neuroscience.
Repeatability: Unlimited as topics vary.
Same as LPS 143, PHILOS 143.
Restriction: Psychology Majors have first consideration for enrollment. Philosophy Majors have first consideration for enrollment.

PSYCH 124S. Sports Psychology. 4 Units.
Discusses the field of sports psychology with an emphasis on clinical practice including motivation, goal setting, performance skills, and mental skills. Discusses and utilizes a wide range of techniques designed to enhance performance and manage problems among athletes.
Prerequisite: (PSYCH 7A or PSY BEH 9) or (PSYCH 9C or PSY BEH 11C)
Overlaps with PSY BEH 139H.
Restriction: Psychology Majors have first consideration for enrollment.

PSYCH 124V. Psychology of Violence. 4 Units.
Discusses the psychology of violence and aggression with an emphasis on understanding the psychological, social, and physiological roots of violent and aggressive behavior. Psychological treatment techniques and strategies for prevention of aggressive and violent behavior are also discussed.
Prerequisite: (PSYCH 7A or PSY BEH 9) or (PSYCH 9C or PSY BEH 11C)
Restriction: Psychology Majors have first consideration for enrollment.
PSYCH 129. Special Topics in General Psychology. 4 Units.
Studies in selected areas of general psychology. Topics addressed vary each quarter.
Prerequisite: Prerequisites vary.
Repeatability: Unlimited as topics vary.
Restriction: Psychology Majors have first consideration for enrollment.

PSYCH 130A. Perception and Sensory Processes. 4 Units.
A general introduction to the scientific study of sensory processes and perceptual phenomena, with special emphasis in the visual systems.
Prerequisite: (PSYCH 7A or PSY BEH 9) or (PSYCH 9A or PSY BEH 11A)
Overlaps with PSYCH 131A, PSYCH 131B.
Restriction: Cognitive Sciences Majors have first consideration for enrollment. Psychology Majors have first consideration for enrollment.

PSYCH 131A. Vision. 4 Units.
Visual perception and the anatomy and physiology of the visual system. Topics include the retina and the visual pathway; visual sensitivity; color vision; spatial vision; motion perception; and the development of the visual system.
Same as BIO SCI N182.
Overlaps with PSYCH 130A.
Restriction: Upper-division students only. Psychology Majors have first consideration for enrollment. Cognitive Sciences Majors have first consideration for enrollment. School of Biological Sciences students have first consideration for enrollment.

PSYCH 131B. Hearing. 4 Units.
Auditory perception, the anatomy and physiology of the auditory system, and the physics of sound. Topics include neural transduction of sound, sensitivity, sound localization, complex sound perception, and hearing loss.
Prerequisite: (PSYCH 9A or PSY BEH 11A) and (PSYCH 9B or PSY BEH 11B)
Overlaps with PSYCH 130A.
Restriction: Psychology Majors have first consideration for enrollment. Cognitive Sciences Majors have first consideration for enrollment.

PSYCH 135M. The Mind/Body Problem. 4 Units.
What is consciousness and what is matter and how are the two related? How can brains have minds? This multidisciplinary course draws on information from the fields of computer vision, artificial intelligence, cognition, neurophysiology, philosophy, and psychophysics.
Restriction: Psychology Majors have first consideration for enrollment.

PSYCH 139. Special Topics in Perception and Sensory Processes. 4 Units.
Studies in selected areas of perception and sensory processes. Topics addressed vary each quarter.
Prerequisite: Prerequisites vary.
Repeatability: Unlimited as topics vary.
Restriction: Psychology Majors have first consideration for enrollment.

PSYCH 140C. Cognitive Science. 4 Units.
Introduction to the investigations of the structure and function of the mind, from viewpoints of computation, neuroscience, philosophy, and cognitive psychology. Topics include perception, attention, knowledge representations, learning and memory, action, reasoning, and language.
Prerequisite: (PSYCH 7A or PSY BEH 9) and (PSYCH 9A or PSY BEH 11A) and (PSYCH 9B or PSY BEH 11B)
Restriction: Cognitive Sciences Majors have first consideration for enrollment. Psychology Majors have first consideration for enrollment.

PSYCH 140L. Principles of Learning Theory. 4 Units.
Investigation of the learning and memory processes of human and animals. Basic experimental approaches to learning and memory, empirical results, and theoretical interpretations of the evidence are discussed.
Prerequisite: (PSYCH 7A or PSY BEH 9) or (PSYCH 9A or PSY BEH 11A)
Restriction: Psychology Majors have first consideration for enrollment. Cognitive Sciences Majors have first consideration for enrollment.
PSYCH 140M. Human Memory. 4 Units.
Developments in the area of memory; history of memory research; theories of the nature of memory. Visual memory, recognition memory, high-speed scanning, free recall, short-term memory, mnemonics, retrieval, relationship of memory to thinking. Selected theoretical formulations for memory.
Prerequisite: (PSYCH 7A or PSY BEH 9) or (PSYCH 9B or PSY BEH 11B)
Restriction: Psychology Majors have first consideration for enrollment. Cognitive Sciences Majors have first consideration for enrollment.

PSYCH 141J. Jumpstart I: Early Language, Literacy, and Social Development. 4 Units.
An experiential course integrated with lecture material in the field of child development and education. Students are expected to attend lectures, complete assignments, and commit eight hours per week as mentors of disadvantaged preschool children.
Same as EDUC 141A.
Restriction: Psychology Majors have first consideration for enrollment. Department of Education students have first consideration for enrollment.

PSYCH 141K. Jumpstart I: Early Language, Literacy, and Social Development. 4 Units.
An experiential course integrated with lecture material in the field of child development and education. Students are expected to attend lectures, complete assignments, and commit eight hours per week as mentors of disadvantaged preschool children.
Same as EDUC 141B.
Restriction: Psychology Majors have first consideration for enrollment. Department of Education students have first consideration for enrollment.

PSYCH 141L. Jumpstart I: Early Language, Literacy, and Social Development. 4 Units.
An experiential course integrated with lecture material in the field of child development and education. Students are expected to attend lecture, complete assignments, and commit eight hours per week as mentors of disadvantaged preschool children.
Same as EDUC 141C.
Restriction: Psychology Majors have first consideration for enrollment. Department of Education students have first consideration for enrollment.

PSYCH 141M. Jumpstart II: Early Language, Literacy, and Social Development. 4 Units.
An experiential course integrated with lecture material in the field of child development and education. Students are expected to attend lectures, complete assignments, and commit eight hours per week as mentors of disadvantaged preschool children.
Prerequisite: (PSYCH 141J and PSYCH 141K and PSYCH 141L) or (EDUC 141A and EDUC 141B and EDUC 141C)
Same as EDUC 141D.

PSYCH 141N. Jumpstart II: Early Language, Literacy, and Social Development. 4 Units.
An experiential course integrated with lecture material in the field of child development and education. Students are expected to attend lectures, complete assignments, and commit eight hours per week as mentors of disadvantaged preschool children.
Prerequisite: (PSYCH 141J and PSYCH 141K and PSYCH 141L) or (EDUC 141A and EDUC 141B and EDUC 141C)
Same as EDUC 141E.

PSYCH 141O. Jumpstart II: Early Language, Literacy, and Social Development. 4 Units.
An experiential course integrated with lecture material in the field of child development and education. Students are expected to attend lectures, complete assignments, and commit eight hours per week as mentors of disadvantaged preschool children.
Prerequisite: (PSYCH 141J and PSYCH 141K and PSYCH 141L) or (EDUC 141A and EDUC 141B and EDUC 141C)
Same as EDUC 141F.

PSYCH 141P. Jumpstart III: Early Language, Literacy, and Social Development. 4 Units.
An experiential course integrated with lecture material in the field of child development and education. Students are expected to attend lectures, complete assignments, and commit eight hours per week as mentors of disadvantaged preschool children.
Prerequisite: (PSYCH 141M and PSYCH 141N and PSYCH 141O) or (EDUC 141D and EDUC 141E and EDUC 141F)
Same as EDUC 141G.
PSYCH 141Q. Jumpstart III: Early Language, Literacy, and Social Development. 4 Units.
An experiential course integrated with lecture material in the field of child development and education. Students are expected to attend lectures, complete assignments, and commit eight hours per week as mentors of disadvantaged preschool children.

Prerequisite: (PSYCH 141M and PSYCH 141N and PSYCH 141O) or (EDUC 141D and EDUC 141E and EDUC 141F)

Same as EDUC 141H.

PSYCH 141R. Jumpstart III: Early Language, Literacy, and Social Development. 4 Units.
An experiential course integrated with lecture material in the field of child development and education. Students are expected to attend lectures, complete assignments, and commit eight hours per week as mentors of disadvantaged preschool children.

Prerequisite: (PSYCH 141M and PSYCH 141N and PSYCH 141O) or (EDUC 141D and EDUC 141E and EDUC 141F)

Same as EDUC 141I.

PSYCH 143P. Human Problem Solving. 4 Units.
Modern developments in the psychology of human problem solving. Topics include concept identification, arithmetic, sets, logic puzzles, story problems, group problem solving, and theorem proving.

Prerequisite: (PSYCH 7A or PSY BEH 9) or (PSYCH 9B or PSY BEH 11B)

Restriction: Psychology Majors have first consideration for enrollment. Cognitive Sciences Majors have first consideration for enrollment.

PSYCH 145P. Attention and Learning Deficits in Children I. 4 Units.
Learning in normal and attention-deficit disordered children. Covers the normal developmental course of learning and a variety of deficits. Includes field work with attention-deficit disordered children.

Restriction: Psychology Majors have first consideration for enrollment.

PSYCH 145Q. Attention and Learning Deficits in Children II. 4 Units.
Learning in normal and attention-deficit disordered children. Covers the normal developmental course of learning and a variety of deficits. Includes field work with attention-deficit disordered children.

Prerequisite: PSYCH 145P

Restriction: Psychology Majors have first consideration for enrollment.

PSYCH 145R. Attention and Learning Deficits in Children III. 4 Units.
Learning in normal and attention-deficit disordered children. Covers the normal developmental course of learning and a variety of deficits. Includes field work with attention-deficit disordered children.

Prerequisite: PSYCH 145Q

Restriction: Psychology Majors have first consideration for enrollment.

PSYCH 146MW. Writing about Memory. 4 Units.
Covers a broad range of texts, literary, philosophical, and scientific, each probing the nature of memory and its meaning in human life. Readings are drawn from across many disciplines and many perspectives.

Prerequisite: PSYCH 7A or PSYCH 9B or PSY BEH 9 or PSY BEH 11B. Satisfactory completion of the Lower-Division Writing requirement.

Restriction: Psychology Majors have first consideration for enrollment.

PSYCH 148A. Cognitive Development Research. 4 Units.
Provides experience in cognitive development research, centered around the child's acquisition of number words and concepts. Students conduct research and review and discuss each other's projects in weekly lab meetings with instructor and graduate students.

Repeatability: May be repeated for credit unlimited times.

Restriction: Psychology Majors have first consideration for enrollment.

Concurrent with PSYCH 228A.
PSYCH 148B. Cognitive Development Research. 4 Units.
Provides experience in cognitive development research, centered around the child's acquisition of number words and concepts. Students conduct research and review and discuss each other's projects in weekly lab meetings with instructor and graduate students.
Repeatability: May be repeated for credit unlimited times.
Restriction: Psychology Majors have first consideration for enrollment.
Concurrent with PSYCH 228B.

PSYCH 148C. Cognitive Development Research. 4 Units.
Provides experience in cognitive development research, centered around the child's acquisition of number words and concepts. Students conduct research and review and discuss each other's projects in weekly lab meetings with instructor and graduate students.
Repeatability: May be repeated for credit unlimited times.
Restriction: Psychology Majors have first consideration for enrollment.
Concurrent with PSYCH 228C.

PSYCH 149. Special Topics in Cognition and Learning. 4 Units.
Studies in selected areas of cognition and learning. Topics addressed vary each quarter.
Prerequisite: Prerequisites vary.
Repeatability: Unlimited as topics vary.
Restriction: Psychology Majors have first consideration for enrollment.

PSYCH 150. Psychology of Language. 4 Units.
Examines language using the tools of experimental psychology. From sounds to words to spoken and written sentences, explores how language is used in real time, and how its use reveals how it is represented in the mind.
Prerequisite: (PSYCH 7A or PSY BEH 9) or (PSYCH 9B or PSY BEH 11B)
Same as LINGUIS 155.
Restriction: Psychology Majors have first consideration for enrollment. Cognitive Sciences Majors have first consideration for enrollment.

PSYCH 156A. Acquisition of Language II. 4 Units.
Focuses on native language learning, exploring the way in which infants and very young children unconsciously uncover the rich systematic knowledge of their native language. Examines both experimental and computational studies that quantitatively investigate the "how" of language acquisition.
Prerequisite: PSYCH 56L or LINGUIS 51
Same as LINGUIS 150.
Restriction: Cognitive Sciences Majors have first consideration for enrollment. Psychology Majors have first consideration for enrollment.

PSYCH 159. Special Topics in Semiotics and Language. 4 Units.
Studies in selected areas of language sciences. Topics addressed vary each quarter.
Prerequisite: Prerequisites vary.
Repeatability: Unlimited as topics vary.
Restriction: Psychology Majors have first consideration for enrollment.

PSYCH 160A. Introduction to Cognitive Neuroscience. 4 Units.
Introduction to the neural basis of human perceptual, motor, and cognitive abilities. Topics include sensory perception, motor control, memory, language, attention, emotion, frontal lobe function, functional brain imaging, and neuropsychological disorders.
Prerequisite: (PSYCH 7A or PSY BEH 9) and (PSYCH 9A or PSY BEH 11A) and (PSYCH 9B or PSY BEH 11B)
Restriction: Cognitive Sciences Majors have first consideration for enrollment. Psychology Majors have first consideration for enrollment.
PSYCH 160D. Brain Disorders and Behavior. 4 Units.
Examines the localization of human brain functions and the effects of neurological disorders on psychological functions such as perception, motor control, language, memory, and decision-making.
Prerequisite: (PSYCH 7A or PSY BEH 9) and (PSYCH 9A or PSY BEH 11A) and (PSYCH 9B or PSY BEH 11B) or BIO SCI 35 or BIO SCI N110
Same as BIO SCI N165.
Restriction: Cognitive Sciences Majors have first consideration for enrollment. Biological Sciences Majors have first consideration for enrollment. Psychology Majors have first consideration for enrollment.

PSYCH 161. Language and the Brain . 4 Units.
Research analysis on biological bases of human linguistic capacity. Development, focusing on hemispheric specialization, plasticity; localization of specific linguistic functions in adults, with emphasis on study of aphasias; relation of linguistic capacity to general cognitive capacity, considering research on retardation.
Prerequisite: (PSYCH 7A or PSY BEH 9 or PSYCH 9A or PSY BEH 11A) and (PSYCH 9B or PSY BEH 11B or BIO SCI 35 or BIO SCI N110)
Same as BIO SCI N160, LINGUIS 158.
Restriction: Cognitive Sciences Majors have first consideration for enrollment. Biological Sciences Majors have first consideration for enrollment. Psychology Majors have first consideration for enrollment.

PSYCH 161H. Hearing and the Brain. 4 Units.
An overview of brain mechanisms of hearing, including perception of simple sounds, speech, and music. Begins with sound itself, and looks at processing by the ear, auditory pathways, auditory cortex, and beyond. Also auditory development, learning, and clinical issues.
Prerequisite: PSYCH 160A or BIO SCI N110
Same as BIO SCI N147.
Restriction: Cognitive Sciences Majors have first consideration for enrollment. Psychology Majors have first consideration for enrollment.

PSYCH 162B. Human Memory Disorders. 4 Units.
Focuses on models and methods of assessing human memory and its disorders. Exposure to conventional and new assessment devices provided.
Restriction: Cognitive Sciences Majors have first consideration for enrollment. Psychology Majors have first consideration for enrollment.

PSYCH 162N. Human Neuropsychology. 4 Units.
A survey of human brain disorders using a clinical case study approach to illustrate fundamental issues in studying brain and behavior. Topics include sensory deficits, attentional neglect, amnesia, cortical organization, clinical psychopathology, and more.
Prerequisite: BIO SCI N110 or PSYCH 9A or PSY BEH 11A
Same as PSY BEH 163C, BIO SCI N173.
Restriction: School of Biological Sciences students have first consideration for enrollment. Cognitive Sciences Majors have first consideration for enrollment. Psychology and Social Behavior Majors have first consideration for enrollment. Psychology Majors have first consideration for enrollment.

PSYCH 165A. Visual Neuroscience Research. 4 Units.
Covers a range of cognitive neuroscience research topics with emphasis on cortical organization of visual circuits, object recognition, motion perception, visual attention, and decision making.
Repeatability: May be repeated for credit unlimited times.
Concurrent with PSYCH 263A.

PSYCH 165B. Visual Neuroscience Research. 4 Units.
Covers a range of cognitive neuroscience research topics with emphasis on cortical organization of visual circuits, object recognition, motion perception, visual attention, and decision making.
Repeatability: May be repeated for credit unlimited times.
Concurrent with PSYCH 263B.
PSYCH 165C. Visual Neuroscience Research. 4 Units.
Covers a range of cognitive neuroscience research topics with emphasis on cortical organization of visual circuits, object recognition, motion perception, visual attention, and decision making.

Repeatability: May be repeated for credit unlimited times.

Concurrent with PSYCH 263C.

PSYCH 169. Special Topics in Cognitive Neuroscience. 4 Units.
Studies in selected areas of cognitive neuroscience. Topics addressed vary each quarter.

Prerequisite: Prerequisites vary.

Repeatability: Unlimited as topics vary.

Restriction: Psychology Majors have first consideration for enrollment.

PSYCH 173A. Psychological Anthropology. 4 Units.
Cultural differences and similarities in personality and behavior. Child-rearing practices and consequent adult personality characteristics, biocultural aspects of child development and attachment, culture and behavior evolutionary models, politically linked personality, cognitive anthropology, psychology of narrative forms, comparative national character studies.

Prerequisite: ANTHRO 2A or PSYCH 7A or (PSYCH 9A and PSYCH 9B and PSYCH 9C) or (PSY BEH 11A and PSY BEH 11B and PSY BEH 11C)

Same as ANTHRO 132A.

Restriction: Psychology Majors have first consideration for enrollment.

PSYCH 174E. African American Psychology. 4 Units.
Historical overview of the development of black psychology and the African American frame of reference. Topics include personality development, psychological assessment, issues in education, black mental health, and the role of the African American psychologist in the community.

Same as AFAM 153.

PSYCH 174F. Chicano/Latino Psychology. 4 Units.
Examines research and literature investigating Chicano/Latino ethnicity as a variable influencing behavior. Explores mental health needs and issues of Chicano/Latinos and discusses competent, sensitive methods of mental health service delivery.

Same as CHC/LAT 171.

PSYCH 174H. Chicano/Latino Families. 4 Units.
Introduction to the research, literature, and issues surrounding the topic of Chicano/Latino families including cultural history, contemporary issues, organization of family, traditions, lifestyles, values, beliefs, generational differences, gender issues, ethnic identity, evolution of demographic patterns, current economic and political standings.

Same as CHC/LAT 170, SOC SCI 165.

PSYCH 176A. Political Psychology. 4 Units.
Examination of how psychological theory and research may be used to better understand political thought and behavior. Drawing on theories of learning, cognition, and personality, discusses such topics as the formation of political attitudes, and the process of political decision-making.

Same as POL SCI 128C.

Restriction: Majors only. POL SCI 128C may not be taken for credit if taken after POL SCI 137C.

PSYCH 177D. Deviance. 4 Units.
Perspectives on deviance and criminality in behavior, institution, community, and myth. The suitability of contemporary theories of deviant behavior.

Same as SOCIOL 156, CRM/LAW C107.

Restriction: Criminology, Law and Society Majors have first consideration for enrollment. Social Ecology Majors have first consideration for enrollment. Sociology Majors have first consideration for enrollment. Psychology Majors have first consideration for enrollment.
PSYCH 177F. Forensic Psychology: Advanced Seminar. 4 Units.
The focus is on the psychology of criminal offending, particularly violent behavior. Examines violence, sexual offending, and mental disorder related to crime with regard to clinical assessment and treatment; mental health services within forensic institutions.
Prerequisite: (PSY BEH 9 or PSY BEH 11C or PSYCH 7A or PSYCH 9C) and PSY BEH 102C and (PSY BEH 178S or CRM/LAW C149)
Same as PSY BEH 156C, CRM/LAW C136.
Restriction: Psychology and Social Behavior Majors have first consideration for enrollment. Social Ecology Majors have first consideration for enrollment. Psychology Majors have first consideration for enrollment. Criminology, Law and Society Majors have first consideration for enrollment.

PSYCH 178N. Social Psychology of Networks. 4 Units.
Review of network methods used in small group and organizational research. Discussion of social psychological literature relevant to the network of study of cognitive social structure, exchange/communication, identity negotiation, and social control. Case study of network datasets exemplifies research issues.
Same as SOCIOL 135.
Restriction: Sociology Majors have first consideration for enrollment. Psychology Majors have first consideration for enrollment.

PSYCH 179. Special Topics in Interdisciplinary Studies. 1-4 Units.
Studies in selected areas of interdisciplinary studies. Topics addressed vary each quarter.
Prerequisite: Prerequisites vary.
Repeatability: Unlimited as topics vary.
Restriction: Psychology Majors have first consideration for enrollment.

PSYCH 190. Senior Thesis. 4 Units.
Student writes senior thesis on a topic of psychology with guidance from a three-member committee comprised of Cognitive Sciences faculty. Senior thesis includes the following: research statement, literature review, experimental design, data collection and analysis, and a written final thesis.
Grading Option: In progress only.
Repeatability: May be taken for credit 3 times.

PSYCH 198. Directed Group Study. 1-4 Units.
Directed study with Cognitive Sciences faculty.
Repeatability: May be repeated for credit unlimited times.

PSYCH 199. Independent Study. 1-4 Units.
Independent research with Cognitive Sciences faculty.

PSYCH 201A. Cognitive Sciences Research Seminar. 1.3 Unit.
Weekly reports and colloquia by faculty, students, and visitors.
Grading Option: Satisfactory/unsatisfactory only.
Restriction: Graduate students only. Psychology Majors only.

PSYCH 201B. Cognitive Sciences Research Seminar. 1.3 Unit.
Weekly reports and colloquia by faculty, students, and visitors.
Prerequisite: PSYCH 201A
Grading Option: Satisfactory/unsatisfactory only.
Restriction: Graduate students only. Psychology Majors only.
PSYCH 201C. Cognitive Sciences Research Seminar. 1.4 Unit.
Weekly reports and colloquia by faculty, students, and visitors.

Prerequisite: PSYCH 201B
Grading Option: Satisfactory/unsatisfactory only.
Restriction: Graduate students only. Psychology Majors only.

PSYCH 202A. Proseminar in the Cognitive Sciences. 1 Unit.
Introduction to the conceptual foundations and basic research results in the cognitive sciences for first-year graduate students.

Grading Option: Satisfactory/unsatisfactory only.
Restriction: Graduate students only.

PSYCH 203A. Discrete Mathematics and Probability. 4 Units.
Logic and set theory are covered during the first three weeks, using an interactive computer system. The remaining seven weeks are devoted to probability theory and cover elementary concepts from samples spaces to Chebychev's Inequality and the moment generating function.

Restriction: Graduate students only.

PSYCH 203B. Introduction to Mathematical Statistics. 4 Units.

Restriction: Graduate students only.

PSYCH 203C. Algorithmic Statistics. 4 Units.
Discussion of the fundamentals of statistical inference and computational implementations of common statistical models.

Restriction: Graduate students only.

PSYCH 203D. Applied Mathematics for Cognitive Sciences Research. 4 Units.
Covers the basics of linear systems analysis, focusing on linear algebra, Fourier analysis, differential equations, and elementary signal processing. Applications in Cognitive Science and Cognitive Neuroscience research will be developed.

Prerequisite: PSYCH 205A
Restriction: Graduate students only. Psychology Majors only.

PSYCH 204A. Seminar in Professional Development. 1 Unit.
Development of professional skills. Focuses on grant writing and submission process, responsible conduct of research, and ethics training.

Grading Option: Satisfactory/unsatisfactory only.
Restriction: Graduate students only. Psychology Majors only.

PSYCH 204B. Seminar in Professional Development. 1 Unit.
Development of professional skills. Focus on scientific presentations and preparation.

Grading Option: Satisfactory/unsatisfactory only.
Restriction: Graduate students only. Psychology Majors only.

PSYCH 204C. Seminar in Professional Development. 1 Unit.
Development of professional skills. Focuses on career opportunities, interests and information, and community outreach.

Grading Option: Satisfactory/unsatisfactory only.
Restriction: Graduate students only. Psychology Majors only.

PSYCH 205A. Computational and Research Methods with MATLAB. 4 Units.
Introduces rudiments of programming, statistical analysis and probability theory, graphic visualization, GUI design, spectral analysis, and simulation models using MATLAB, a software package for solving quantitative problems often encountered in experimental psychology.

Restriction: Graduate students only.
PSYCH 205B. Running Experiments Using MATLAB. 4 Units.
Provides an in-depth introduction to writing MATLAB programs to run auditory and visual experiments. Topics covered include program structure, stimulus generation, presentation, and data collection.

Prerequisite: PSYCH 205A

PSYCH 205C. Computational Statistics. 4 Units.
Introduction to a number of computational statistics approaches including exploratory data analysis and modeling using a probabilistic framework with Bayesian graphical models. Emphasis will be on in-class programming using MATLAB.

Restriction: Graduate students only.

PSYCH 210A. Introduction to Cognitive and Brain Sciences I: Perception. 4 Units.
Discusses models of cognition and evidence linking cognition and the brain. Focus is on visual, auditory, and somatic perception and bottom-up mechanisms of attention.

Restriction: Graduate students only.

PSYCH 210B. Introduction to Cognitive and Brain Sciences II: Cognition. 4 Units.
Discusses models of cognition and evidence linking cognition and the brain. Focus is on emotion, top-down attention, goal-directed behavior, categorization, judgment, and decision-making.

Restriction: Graduate students only.

PSYCH 210C. Introduction to Cognitive and Brain Sciences III: Learning and Development. 4 Units.
Discusses experimental data, formal models of learning, and evidence linking learning and development to its neural substrates. Topics include Pavlovian and instrumental conditioning, language acquisition, causal reasoning, perceptual learning, category formation, and structure learning.

Restriction: Graduate students only.

PSYCH 211. Attention and Perception. 4 Units.
Focuses on selective attention, the process of selecting a subset of available information for analysis and representation, and on how stimulus salience, behavioral goals, and expectations influence attentional deployment and perception. Also explores related cognitive processes and applications.

Restriction: Graduate students only.

PSYCH 213. The Mind/Body Problem. 4 Units.
Course is multidisciplinary, drawing on information from the fields of quantum physics, computer vision, artificial intelligence, cognition, neurophysiology, philosophy, and psychophysics.

Restriction: Graduate students only.

PSYCH 214. Bayesian Cognitive Modeling. 4 Units.
Considers a range of statistical methods of data analysis and simple cognitive models using the Bayesian graphical modeling framework.

Restriction: Graduate students only.

PSYCH 215L. Language Acquisition. 4 Units.
Focuses on native language learning, exploring the way in which infants and very young children unconsciously uncover the rich systematic knowledge of their native language. Examines both experimental and computational studies that quantitatively investigate the "how" of language acquisition.

Restriction: Graduate students only.

PSYCH 217. Vision. 4 Units.
Examines visual sensation and perception using psychophysical and neuroscientific perspectives. Covers visual stimulus description and generation; the eye and retinal processing; LGN and cortical visual area function; specialized processing for form, depth, motion, and color perception; and neurological disorders.

Restriction: Graduate students only.

PSYCH 218. Hearing. 4 Units.
Examines auditory sensation and perception using psychophysical and neuroscientific perspectives. Covers physical aspects of sound; subcortical auditory processing; aspects of sensation and perception such as sensitivity, sound localization, and complex-sound recognition; neuroscientific studies of cortical function; and abnormal auditory processing.

Restriction: Graduate students only.
PSYCH 228A. Cognitive Development Research. 4 Units.
Provides experience in cognitive development research, centered around the child's acquisition of number words and concepts. Students conduct research and review and discuss each other's projects in weekly lab meetings with instructor and graduate students.

Repeatability: May be repeated for credit unlimited times.
Concurrent with PSYCH 148A.

PSYCH 228B. Cognitive Development Research. 4 Units.
Provides experience in cognitive development research, centered around the child's acquisition of number words and concepts. Students conduct research and review and discuss each other's projects in weekly lab meetings with instructor and graduate students.

Repeatability: May be repeated for credit unlimited times.
Concurrent with PSYCH 148B.

PSYCH 228C. Cognitive Development Research. 4 Units.
Provides experience in cognitive development research, centered around the child's acquisition of number words and concepts. Students conduct research and review and discuss each other's projects in weekly lab meetings with instructor and graduate students.

Repeatability: May be repeated for credit unlimited times.
Concurrent with PSYCH 148C.

PSYCH 229. Special Topics in Human Cognition. 1.3-4 Units.
Current research in brain/ behavior relationships, human memory, and learning theory is presented.

Repeatability: Unlimited as topics vary.
Restriction: Graduate students only.

PSYCH 231P. Topics in Philosophy of Psychology. 4 Units.
Selected topics in the philosophy of psychology, e.g., the nature of psychological explanation, reductionism, issues in cognitive, behavioral, and neuroscience.

Repeatability: Unlimited as topics vary.
Same as LPS 243, PHILOS 243.

PSYCH 234A. Mathematical Models of Cognitive Processes I. 4 Units.
Mathematical models of various cognitive processes developed since 1960, including learning, memory, perception, psycholinguistics, and problem solving. Models are formulated in different mathematical languages: calculus, algebra, logic, probability, and computer. Difficulties in testing and validating models discussed.

Restriction: Graduate students only.

PSYCH 236. Multivariate Time Series Analysis. 4 Units.
Introduces multivariate time series analysis theory and methods emphasizing computational methods in spectral analysis, autoregressive modeling, information theory, principal and independent components analysis, and nonlinear dynamics. Applications to human neuroimaging data are extensively discussed.

Prerequisite: PSYCH 205A
Restriction: Graduate students only.

PSYCH 237. Advanced Bayesian Cognitive Modeling. 4 Units.
Considers a range of advanced cognitive process models including models of signal detection, memory retention, category learning, stimulus representation, and reasoning using the Bayesian graphical modeling framework.

Prerequisite: PSYCH 214
Restriction: Graduate students only.
PSYCH 239. Special Topics in Methodology and Models. 1.3-4 Units.
Current research in cognitive sciences methodologies, concepts, and models is presented.

Repeatability: Unlimited as topics vary.

Restriction: Graduate students only.

PSYCH 245A. Computational Models of Language Learning. 4 Units.
Focuses on computational models of native language learning, exploring how probabilistic learning and inference fare on difficult case studies within language acquisition. In all cases, grounds the learning models in available empirical data and considers their psychological plausibility.

Prerequisite: PSYCH 215L

Restriction: Graduate students only.

PSYCH 249. Special Topics in Language Science. 1.3-4 Units.
Foundations and current research in theoretical, experimental, and computational linguistics.

Repeatability: Unlimited as topics vary.

Restriction: Graduate students only.

PSYCH 254. Human Information Processing. 4 Units.
Detailed introduction to speed-accuracy tradeoff experimental procedures; speed-accuracy tradeoff issues; quantitative modeling of temporal aspects of human information processing.

Repeatability: May be repeated for credit unlimited times.

Restriction: Graduate students only.

PSYCH 259. Special Topics in Human Performance. 1.3-4 Units.
Current research in the human issues involved with sensation, perception, and cognition.

Repeatability: Unlimited as topics vary.

Restriction: Graduate students only.

PSYCH 261N. Cortical Neuroscience. 4 Units.
Physiology of the cerebral cortex, theoretical neuroscience, and the neural basis of perception.

Prerequisite: PSYCH 216

PSYCH 262. Functional Neuroanatomy. 4 Units.
It is impossible to truly understand human behavior without some understanding of the physical structure that enables behavior. Examines recent findings in functional neuroanotomy through lectures and papers discussing links between particular behaviors and specific brain structures.

Restriction: Graduate students only.

PSYCH 263A. Visual Neuroscience Research. 4 Units.
Covers a range of cognitive neuroscience research topics with emphasis on cortical organization of visual circuits, object recognition, motion perception, visual attention, and decision making.

Repeatability: May be repeated for credit unlimited times.

Restriction: Graduate students only.

Concurrent with PSYCH 165A.

PSYCH 263B. Visual Neuroscience Research. 4 Units.
Covers a range of cognitive neuroscience research topics with emphasis on cortical organization of visual circuits, object recognition, motion perception, visual attention, and decision making.

Restriction: Graduate students only.

Concurrent with PSYCH 165B.
PSYCH 263C. Visual Neuroscience Research. 4 Units.
Covers a range of cognitive neuroscience research topics with emphasis on cortical organization of visual circuits, object recognition, motion perception, visual attention, and decision making.

Restriction: Graduate students only.

Concurrent with PSYCH 165C.

PSYCH 265. Introduction to Functional MRI. 4 Units.
Describes the fundamentals of imaging the human brain function using functional Magnetic Resonance Imaging (fMRI). Topics include basic fMRI physics, experimental design, and data acquisition and analysis.

Restriction: Graduate students only.

PSYCH 267. Cognitive Neuroscience of Music. 4 Units.
Introduction to cortical mechanisms involved in music perception and production.

Repeatability: May be repeated for credit unlimited times.

Restriction: Graduate students only.

PSYCH 268A. Computational Neuroscience. 4 Units.
Introduction to computational neuroscience. Mathematical models of single neurons, neural circuits, thalamocortical systems, and cortical mass action can stimulate single-unit, local field potential, and EEG dynamics. These models are used to investigate mechanisms of sensation, motor control, attention, and consciousness.

Prerequisite: PSYCH 205A and (PSYCH 216 or PSYCH 261N)

PSYCH 268R. Cognitive Robotics. 4 Units.
Introduces concepts for studying cognitive function by embedding brain models on robotic platforms. Topics include robot construction, computer programming, and the notion of embodiment. Students construct simple robots and program these robots to perform different behaviors.

PSYCH 269. Special Topics in Cognitive Neuroscience. 1.3-4 Units.
Current research in cognitive neuroscience.

Repeatability: Unlimited as topics vary.

Restriction: Graduate students only.

PSYCH 289. Special Topics in Sensation and Perception. 1.3-4 Units.
Current research in the reception and processing of visual and auditory stimuli presented.

Repeatability: Unlimited as topics vary.

Restriction: Graduate students only.

PSYCH 290. Dissertation Research. 1-12 Units.
Dissertation research with Cognitive Science faculty.

Repeatability: May be repeated for credit unlimited times.

Restriction: Graduate students only. Psychology Majors only.

PSYCH 299. Individual Study. 4-12 Units.
Individual research with Cognitive Science faculty.

Repeatability: May be repeated for credit unlimited times.

Restriction: Graduate students only.