# Cognitive and Psychological Sciences

The Department of Cognitive and Psychological Sciences (CoPsy) is dedicated to the interdisciplinary study of the mind, brain and behavior. Its mission is to conduct impactful state-of-the-art research, to teach, and to provide service to society in these areas of scholarship. Our curriculum features a unique, intellectually diverse mix of courses. We place a particular emphasis on methods, critical thinking, and research skills to address questions about the mind, brain, and behavior.

For additional information, please visit the department's website: https://copsy.brown.edu/

## Cognitive Neuroscience Concentration Requirements

Cognitive neuroscience is the study of higher cognitive functions in humans and their underlying neural bases. It is an integrative area of study drawing primarily from cognitive science, psychology, neuroscience, and linguistics. There are two broad directions that can be taken in this concentration - one is behavioral/experimental and the other is computational/modeling. In both, the goal is to understand the nature of cognition from a neural perspective. The standard concentration for the Sc.B. degree requires courses on the foundations, systems level, and integrative aspects of cognitive neuroscience as well as laboratory and elective courses that fit within a particular theme or category such as general cognition, perception, language development or computational/modeling. Concentrators must also complete a senior seminar course or an independent research course. Students may also participate in the work of the Brown Institute for Brain Science, an interdisciplinary program that unites ninety faculty from eleven departments.

## Standard Program for the AB degree

***These are the new requirements approved by CCC effective Fall 2024. For existing concentrators graduating in 2024-25, the prior requirements can be found by selecting the Bulletin archive*** **https://bulletin.brown.edu/archive/2023-24/**

## Common Core

Careers in Cognitive Neuroscience and related fields requires familiarity with statistics. Therefore, the Cognitive Neuroscience concentration requires a course in Quantitative Methods (CPSY 0900). CPSY 0900 is a prerequisite for most of the laboratory courses, so concentrators should plan to take this course by their fourth semester. The department does not grant concentration credit of AP Statistics, regardless of score. Students who feel that CPSY 0900 is too elementary can complete an approved alternative course (e.g., APMA 1650, CPSY 2906, PHP 1501, ECON 1629, APMA 1660).

## Foundation

To provide students with a solid foundation of knowledge in their area of concentration and to minimize redundancy, the Cognitive Neuroscience concentration requires four foundation courses in Neuroscience, Cognitive Neuroscience, Cognitive Neuropsychology, and Computational Methods.

## Electives

Each concentrator will take four additional courses that allow the student to go into depth in some of the relevant topics. Three of these courses must be 1000-level courses. Some courses designed to count as electives will often have foundation courses as prerequisites and may include laboratory courses, content courses, or seminars.

## Research Methods

Another element in the Cognitive Neuroscience concentration is a research methods course that builds on the introductory statistics course (which will be a prerequisite) but exposes students to a variety of topics in research of the mind: to empirical methods (e.g., surveys, chronometry, eye tracking, brain imaging), to common designs (e.g., factorial experimental, correlational, longitudinal), to research ethics, and to best practices of literature review. Alternatively, students may take an approved laboratory course.

## Requirements for the A.B. degree

| | | |
|---|---|---|
| CPSY 0900 | Statistical Methods | 1 |
| CPSY 1900 | Research Methods And Design | 1 |
| or CPSY 1901 | Research Methods | |
| Two Foundation Courses in Cognition from the following: | | 2 |
| CPSY 0010 | Mind, Brain and Behavior: An Interdisciplinary Approach | |
| CPSY 0100 | Learning and Conditioning | |
| CPSY 0200 | Human Cognition | |
| or CPSY 0400 | Cognitive Neuroscience | |
| or CPSY 0450 | Brain Damage and the Mind | |
| CPSY 0500 | Perception and Mind | |
| CPSY 0550 | Science of Consciousness | |
| CPSY 0610 | Children's Thinking: The Nature of Cognitive Development | |
| or CPSY 0700 | Social Psychology | |
| One Foundation Course in Neuroscience from the following: | | 1 |
| CPSY 0400 | Cognitive Neuroscience | |
| CPSY 0450 | Brain Damage and the Mind | |
| NEUR 0010 | The Brain: An Introduction to Neuroscience | |
| One Foundation Course in Computation from the following: | | 1 |
| CPSY 0950 | Introduction to programming | |
| CPSY 1291 | Computational Methods for Mind, Brain and Behavior | |
| CPSY 1492 | Computational Cognitive Neuroscience | |
| CPSY 1950 | Deep Learning in Brains, Minds and Machines | |
| Or any introductory CSCI course with a programming component such as: | | |
| CSCI 0111 | Computing Foundations: Data | |
| or CSCI 0150 | Introduction to Object-Oriented Programming and Computer Science | |
| or CSCI 0170 | Computer Science: An Integrated Introduction | |
| or CSCI 0190 | Accelerated Introduction to Computer Science | |
| **Five Approved Electives:** | | **5** |
| Five courses from the CPSY, NEUR, or CSCI department, of which three must be at the 1000-level | | |
| **Capstone: Independent Study (CPSY 1970, CPSY 1980) or approved seminar** | | **1** |
| **Total Credits** | | **12** |

## Honors Requirement

An acceptable upper level Research Methods, for example CPSY 1900 or an acceptable Laboratory course (see below) will serve as a requirement for admission to the Honors program in Cognitive Neuroscience.

## Requirements for the Sc.B. degree

***These are the new requirements approved by CCC effective Fall 2024. For existing concentrators graduating in 2024-25, the prior requirements can be found by selecting the Bulletin archive*** **https://bulletin.brown.edu/archive/2023-24/**

**Common Core**

Careers in Cognitive Neuroscience and related fields requires familiarity with statistics. Therefore, the Cognitive Neuroscience concentration requires a course in Quantitative Methods (CPSY 0900 (https://bulletin.brown.edu/search/?P=CPSY%200900)). CPSY 0900 (https://

bulletin.brown.edu/search/?P=CPSY%200900) is a prerequisite for most of the laboratory courses, so concentrators should plan to take this course by their fourth semester. The department does not grant concentration credit of AP Statistics, regardless of score. Students who feel that CPSY 0900 (https://bulletin.brown.edu/search/?P=CPSY%200900) is too elementary can complete an approved alternative course (e.g., APMA 1650 (https://bulletin.brown.edu/search/?P=APMA%201650), CPSY 2906 (https://bulletin.brown.edu/search/?P=CPSY%202906), PHP 1501 (https://bulletin.brown.edu/search/?P=PHP%201501), ECON 1629 (https://bulletin.brown.edu/search/?P=ECON%201629), APMA 1660 (https://bulletin.brown.edu/search/?P=APMA%201660)).

## Foundation

To provide students with a solid foundation of knowledge in their area of concentration and to minimize redundancy, the Cognitive Neuroscience concentration requires four foundation courses in Neuroscience, Cognitive Neuroscience, Cognitive Neuropsychology, and Computational Methods.

## Electives

Each concentrator will take four additional courses that allow the student to go into depth in some of the relevant topics. Three of these courses must be 1000-level courses. Some courses designed to count as electives will often have foundation courses as prerequisites and may include laboratory courses, content courses, or seminars.

## Research Methods

Another element in the Cognitive Neuroscience concentration is a research methods course that builds on the introductory statistics course (which will be a prerequisite) but exposes students to a variety of topics in research of the mind: to empirical methods (e.g., surveys, chronometry, eye tracking, brain imaging), to common designs (e.g., factorial experimental, correlational, longitudinal), to research ethics, and to best practices of literature review. Alternatively, students may take an approved laboratory course.

## Requirements for Sc.B.

In line with university expectations, the Sc.B. requirements include a greater number of courses and especially science courses. The definition of “science” is flexible. A good number of these courses will be outside of CLPS, but several CLPS courses might fit into a coherent package as well. In addition, the Sc.B. degree also requires a lab course to provide these students with in-depth exposure to research methods in a particular area of the science of the mind.

| | | |
|---|---|---|
| CPSY 0900 | Statistical Methods | 1 |
| CPSY 1900 | Research Methods And Design | 1 |
| or CPSY 1901 | Research Methods | |
| Two Foundation Courses in Cognition from the following: | | 2 |
| CPSY 0010 | Mind, Brain and Behavior: An Interdisciplinary Approach | |
| CPSY 0100 | Learning and Conditioning | |
| CPSY 0200 | Human Cognition | |
| or CPSY 0400 | Cognitive Neuroscience | |
| or CPSY 0450 | Brain Damage and the Mind | |
| CPSY 0500 | Perception and Mind | |
| CPSY 0550 | Science of Consciousness | |
| CPSY 0610 | Children's Thinking: The Nature of Cognitive Development | |
| or CPSY 0700 | Social Psychology | |
| One Foundation Course in Neuroscience from the following: | | 1 |
| CPSY 0400 | Cognitive Neuroscience | |
| CPSY 0450 | Brain Damage and the Mind | |
| NEUR 0010 | The Brain: An Introduction to Neuroscience | |
| One Foundation Course in Computation from the following: | | 1 |
| CPSY 0950 | Introduction to programming | |
| CPSY 1291 | Computational Methods for Mind, Brain and Behavior | |
| CPSY 1492 | Computational Cognitive Neuroscience | |
| CPSY 1950 | Deep Learning in Brains, Minds and Machines | |
| Or any introductory CSCI course with a programming component such as: | | |
| CSCI 0111 | Computing Foundations: Data | |
| or CSCI 0150 | Introduction to Object-Oriented Programming and Computer Science | |
| or CSCI 0170 | Computer Science: An Integrated Introduction | |
| or CSCI 0190 | Accelerated Introduction to Computer Science | |
| Five Approved Electives: | | 5 |
| Five courses from the CPSY, NEUR, or CSCI department, of which three must be at the 1000-level | | |
| Five additional STEM courses of which two (2) must be CPSY courses at the 1000-level from the Electives of Capstone offerings (a lab is strongly recommended). Courses from APMA, BIOL, CSCI, CHEM, CPSY, MATH, NEUR, or PHYS will be considered and must be applicable to a concentration in that department. | | 5 |
| Capstone: Independent Study (CPSY 1970, CPSY 1980) or approved seminar | | 1 |
| **Total Credits** | | **17** |

## Honors Requirement

An acceptable upper level Research Methods, for example CPSY 1900 or an acceptable Laboratory course (see below) will serve as a requirement for admission to the Honors program in Cognitive Neuroscience.

# Cognitive Science Concentration Requirements

## Concentration Requirements

***These are the new requirements approved by CCC effective Fall 2024. For existing concentrators graduating in 2024-25, the prior requirements can be found by selecting the Bulletin archive*** **https://bulletin.brown.edu/archive/2023-24/**

## Common Core

Careers in Cognitive Science and related fields requires familiarity with statistics. Therefore, the Cognitive Science concentration requires a course in Quantitative Methods (CPSY 0900). CPSY 0900 is a prerequisite for most of the laboratory courses, so concentrators should plan to take this course by their fourth semester. The department does not grant concentration credit of AP Statistics, regardless of score. Students who feel that CPSY 0900 is too elementary can complete an approved alternative course (e.g., APMA 1650, CPSY 2906 ).

## Foundation

To provide students with a solid foundation of knowledge in their area of concentration and to minimize redundancy, the Cognitive Science concentration requires four foundation courses in Human Cognition, Perception, Language, and Computational Methods.

## Electives

Each concentrator will take four additional courses that allow the student to go into depth in some of the relevant topics. These electives must include at least two courses in one of the four foundation topics (i.e., Human Cognition, Perception, Language, and Computational Methods). The courses designed to count as electives will often have foundation courses as prerequisites and may include laboratory courses, content courses, or seminars.

## Research Methods and Capstone

Another element in the Cognitive Science concentration is a research methods course that builds on the introductory statistics course (which will be a prerequisite) but exposes students to a variety of topics in research of the mind: to empirical methods (e.g., surveys, chronometry, eye tracking, brain imaging), to common designs (e.g., factorial experimental, correlational, longitudinal), to research ethics, and to best practices of literature review. Concentrators will additionally take either a seminar course or an independent research course to serve as their capstone experience.

## Requirements for the A.B. degree

| | | |
|---|---|---|
| CPSY 1900 | Research Methods And Design | 1 |
| or CPSY 1901 | Research Methods | |
| Three Foundation Courses within CPSY: | | 3 |
| CPSY 0010 | Mind, Brain and Behavior: An Interdisciplinary Approach | |
| CPSY 0200 | Human Cognition | |
| or CPSY 0220 | Making Decisions | |
| CPSY 0400 | Cognitive Neuroscience | |
| or CPSY 0450 | Brain Damage and the Mind | |
| CPSY 0500 | Perception and Mind | |
| or CPSY 0550 | Science of Consciousness | |
| CPSY 0610 | Children's Thinking: The Nature of Cognitive Development | |
| or CPSY 0700 | Social Psychology | |
| CPSY 0800 | Language and the Mind | |
| One Foundation Course Outside of CPSY: | | 1 |
| LING 0100 | Introduction to Linguistics | |
| NEUR 0010 | The Brain: An Introduction to Neuroscience | |
| SOC 0010 | Social Forces: An Introduction to Sociology | |
| Or choose from a set of approved courses in PHIL, ANTH, or SOC | | |
| One Foundation Course in Computation: | | 1 |
| CPSY 0950 | Introduction to programming | |
| CPSY 1291 | Computational Methods for Mind, Brain and Behavior | |
| CPSY 1492 | Computational Cognitive Neuroscience | |
| CPSY 1950 | Deep Learning in Brains, Minds and Machines | |
| Or any introductory CSCI course with a programming component such as: | | |
| CSCI 0111 | Computing Foundations: Data | |
| or CSCI 0150 | Introduction to Object-Oriented Programming and Computer Science | |
| or CSCI 0170 | Computer Science: An Integrated Introduction | |
| or CSCI 0190 | Accelerated Introduction to Computer Science | |
| Four Approved Electives related to Cognitive Science, such as: | | 4 |
| Students should take four courses from CPSY, PHIL, NEUR, SOC, ANTH, LING, or CSCI with at least one of these classes coming from CPSY at 1the 1000-level and at least two others at the 1000-level. | | |
| Capstone: Independent Study (CPSY 1970, CPSY 1980) or approved seminar | | 1 |
| **Total Credits** | | **11** |

## Honors Requirement

The Honors Program in Cognitive Science gives undergraduates a special opportunity to carry out a research project under the direction of a faculty member. The program also provides the opportunity for outstanding senior concentrators to receive their undergraduate degree with Honors. Participation in the program allows students to develop an understanding of research and acquire research skills and background.

Candidates for Honors in Cognitive Science must meet all of the requirements of the concentration as described above. Candidates submit their application for the program in semester 7. We encourage students to seek out a faculty mentor prior to semester 7 as well as complete certain course requirements before semester 7.

## Requirements for the Sc.B. degree

***These are the new requirements approved by CCC effective Fall 2024. For existing concentrators graduating in 2024-25, the prior requirements can be found by selecting the Bulletin archive*** **https://bulletin.brown.edu/archive/2023-24/**

## Common Core

Careers in Cognitive Science and related fields requires familiarity with statistics. Therefore, the Cognitive Science concentration requires a course in Quantitative Methods (CPSY 0900 ). CPSY 0900 is a prerequisite for most of the laboratory courses, so concentrators should plan to take this course by their fourth semester. The department does not grant concentration credit of AP Statistics, regardless of score. Students who feel that CPSY 0900 is too elementary can complete an approved alternative course (e.g., APMA 1650, CPSY 2906).

## Foundation

To provide students with a solid foundation of knowledge in their area of concentration and to minimize redundancy, the Cognitive Science concentration requires four foundation courses in Human Cognition, Perception, Language, and Computational Methods.

## Electives

Each concentrator will take four additional courses that allow the student to go into depth in some of the relevant topics. These electives must include at least two courses in one of the four foundation topics (i.e., Human Cognition, Perception, Language, and Computational Methods). The courses designed to count as electives will often have foundation courses as prerequisites and may include laboratory courses, content courses, or seminars.

## Research Methods and Capstone

Another element in the Cognitive Science concentration is a research methods course that builds on the introductory statistics course (which will be a prerequisite) but exposes students to a variety of topics in research of the mind: to empirical methods (e.g., surveys, chronometry, eye tracking, brain imaging), to common designs (e.g., factorial experimental, correlational, longitudinal), to research ethics, and to best practices of literature review. Concentrators will additionally take either a seminar course or an independent research course to serve as their capstone experience.

## Additional requirements for Sc.B.

In line with university expectations, the Sc.B. requirements include a greater number of courses and especially science courses. The definition of “science” is flexible. A good number of these courses will be outside of CPSY, but several CPSY courses might fit into a coherent package as well. In addition, the Sc.B. degree also requires a lab course to provide these students with in-depth exposure to research methods in a particular area of the science of the mind.

| | | |
|---|---|---|
| CPSY 1900 | Research Methods And Design | 1 |
| or CPSY 1901 | Research Methods | |
| Three Foundation Courses within CPSY: | | 3 |
| CPSY 0010 | Mind, Brain and Behavior: An Interdisciplinary Approach | |
| CPSY 0200 | Human Cognition | |
| or CPSY 0220 | Making Decisions | |
| CPSY 0400 | Cognitive Neuroscience | |
| or CPSY 0450 | Brain Damage and the Mind | |
| CPSY 0500 | Perception and Mind | |

| | | |
|---|---|---|
| or CPSY 0550 | Science of Consciousness | |
| CPSY 0610 | Children's Thinking: The Nature of Cognitive Development | |
| or CPSY 0700 | Social Psychology | |
| CPSY 0800 | Language and the Mind | |
| One Foundation Course Outside of CPSY: | | 1 |
| LING 0100 | Introduction to Linguistics | |
| NEUR 0010 | The Brain: An Introduction to Neuroscience | |
| SOC 0010 | Social Forces: An Introduction to Sociology | |
| Or choose from a set of approved courses in PHIL, ANTH, or SOC | | |
| One Foundation Course in Computation: | | 1 |
| CPSY 0950 | Introduction to programming | |
| CPSY 1291 | Computational Methods for Mind, Brain and Behavior | |
| CPSY 1492 | Computational Cognitive Neuroscience | |
| CPSY 1950 | Deep Learning in Brains, Minds and Machines | |
| Or any introductory CSCI course with a programming component such as: | | |
| CSCI 0111 | Computing Foundations: Data | |
| or CSCI 0150 | Introduction to Object-Oriented Programming and Computer Science | |
| or CSCI 0170 | Computer Science: An Integrated Introduction | |
| or CSCI 0190 | Accelerated Introduction to Computer Science | |
| Four Approved Electives related to Cognitive Science | | 4 |
| Students should take four courses from CPSY, PHIL, NEUR, SOC, ANTH, LING, or CSCI with at least one of these classes coming from CPSY at 1the 1000-level and at least two others at the 1000-level. | | |
| Five Additional STEM Courses, of which at least two (2) must be PCSY courses at the 1000-level (a lab course is strongly recommended). Courses in APMA, BIOL, CSCI, CHEM, CPSY, MATH, NEUR, or PHYS will be considered and must be applicable to a concentration in that departmen | | 5 |
| Capstone: Independent Study (CPSY 1970, CPSY 1980) or approved seminar | | 1 |
| **Total Credits** | | **16** |

## Honors Requirement

The Honors Program in Cognitive Science gives undergraduates a special opportunity to carry out a research project under the direction of a faculty member. The program also provides the opportunity for outstanding senior concentrators to receive their undergraduate degree with Honors. Participation in the program allows students to develop an understanding of research and acquire research skills and background.

Candidates for Honors in Cognitive Science must meet all of the requirements of the concentration as described above. Candidates submit their application for the program in semester 7. We encourage students to seek out a faculty mentor prior to semester 7 as well as complete certain course requirements before semester 7.

# Psychology Concentration Requirements

***These are the new requirements approved by CCC effective Fall 2024. For existing concentrators graduating in 2024-25, the prior requirements can be found by selecting the Bulletin archive*** **https://bulletin.brown.edu/archive/2023-24/**

The A.B. concentration requires 12 courses.

Careers in Psychology and related fields requires familiarity with statistics. Therefore, the Psychology concentration requires a course in Quantitative Methods (CPSY 0900). CPSY 0900 is a prerequisite for research methods and laboratory courses, so concentrators should plan to take this course by their fourth semester. Students may substitute for CPSY 0900 a comparable statistics course taught in another department, with the approval of a Psychology concentration advisor. Consult with a concentration advisor for details. The department does not grant concentration credit for AP Statistics, regardless of score.

Another element in the Psychology concentration is a course on research methods. Research Methods and Design (CPSY 1900 or Research Methods CPSY 1901 is the preferred course for fulfilling this requirement. This course builds on the introductory statistics course and exposes students to a variety of topics in the psychological sciences: to empirical methods (e.g., surveys, chronometry, eye tracking, brain imaging), to common designs (e.g., factorial experimental, correlational, longitudinal), to research ethics, and to best practices of literature review. Other CPSY laboratory courses can be used to fulfill the research methods requirement; consult with a Psychology advisor for lists of approved courses. Laboratory or research methods courses in other departments cannot be used to fulfill the research methods requirement. The research methods requirement should be fulfilled before senior year.

**Foundation**

To provide students with a solid foundation of knowledge in their area of concentration, the Psychology concentration requires five foundation courses, representing core areas of Psychology as a science. Foundation courses are all numbered below the 1000 level. List of approved foundation courses are posted on the CPSY undergraduate page. CPSY courses above the 1000 level and courses in other departments, at any level, cannot be used to satisfy foundation requirements.

**Electives**

Concentrators will select four additional courses that examine in greater depth topics of special interest to them. The CPSY courses designed to count as electives will often have foundation courses as prerequisites. Electives can be chosen from laboratory courses, lecture courses, or seminars. At least two electives should be at the 1000 level. In addition, students may choose up to two courses outside of CPSY (preferably at the 1000 level) as electives. Electives should fit into a coherent intellectual theme, and should be chosen in consultation with a concentration advisor.

## Requirements for the A.B. degree

**STANDARD PROGRAM FOR THE A.B. DEGREE**

| | | |
|---|---|---|
| Common Core: | | |
| CPSY 0900 | Statistical Methods | 1 |
| CPSY 1900 | Research Methods And Design (or approved laboratory course) | 1 |
| OR | | |
| CPSY 1901 | Research Methods (or approved laboratory course) | |
| Five courses from the following: | | 5 |
| CPSY 0010 | Mind, Brain and Behavior: An Interdisciplinary Approach | |
| CPSY 0100 | Learning and Conditioning | |
| CPSY 0110 | Animal Behavior | |
| CPSY 0200 | Human Cognition | |
| or CPSY 0220 | Making Decisions | |
| CPSY 0400 | Cognitive Neuroscience | |
| or CPSY 0450 | Brain Damage and the Mind | |
| CPSY 0500 | Perception and Mind | |
| CPSY 0610 | Children's Thinking: The Nature of Cognitive Development | |
| or CPSY 0620 | Social and Moral Development | |
| CPSY 0700 | Social Psychology | |
| or CPSY 0701 | Personality Theory | |
| CPSY 0800 | Language and the Mind | |
| Four approved Electives related to Psychology | | 4 |

| | |
|---|---|
| Capstone: Independent Study (CPSY 1970, CPSY 1980) or approved seminar | 1 |
| **Total Credits** | **12** |

**Honors Requirement**

The Honors Program in Psychology gives undergraduates a special opportunity to carry out a research project under the direction of a faculty member. The program also provides the opportunity for outstanding senior concentrators to receive their undergraduate degree with Honors. Participation in the program allows students to develop an understanding of research and acquire research skills and background.

Candidates for Honors in Psychology must meet all of the requirements of the concentration as described above. Candidates submit their application for the program in semester 7. We encourage students to seek out a potential faculty mentor prior to semester 7. Candidates for Honors must have completed the Statistics CPSY 0900 and Research Methods and Design (CPSY 1900, Research Methods CPSY 1901, or laboratory course) requirements before semester 7. Please refer to the CPSY Honors Program page for detailed information about the specific requirements for the Honors program in Psychology.

## *These are the new requirements approved by CCC effective Fall 2024. For existing concentrators graduating in 2024-25, the prior requirements can be found by selecting the Bulletin archive* https://bulletin.brown.edu/archive/2023-24/

## Common Core

Careers in Psychology and related fields requires familiarity with statistics. Therefore, the Psychology concentration requires a course in Quantitative Methods (CPSY 0900 (https://bulletin.brown.edu/search/?P=CPSY%200900)). CPSY 0900 (https://bulletin.brown.edu/search/?P=CPSY%200900) is a prerequisite for research methods and laboratory courses, so concentrators should plan to take this course by their fourth semester. Students may substitute for CPSY 0900 (https://bulletin.brown.edu/search/?P=CPSY%200900) a comparable statistics course taught in another department, with the approval of a Psychology concentration advisor. Consult with a concentration advisor for details. The department does not grant concentration credit for AP Statistics, regardless of score.

Another element in the Psychology concentration is a course on research methods. Research Methods and Design (CPSY 1900 (https://bulletin.brown.edu/search/?P=CPSY%201900) or Research Methods CPSY 1901 (https://bulletin.brown.edu/search/?P=CPSY%201901) is the preferred course for fulfilling this requirement. This course builds on the introductory statistics course and exposes students to a variety of topics in the psychological sciences: to empirical methods (e.g., surveys, chronometry, eye tracking, brain imaging), to common designs (e.g., factorial experimental, correlational, longitudinal), to research ethics, and to best practices of literature review. Other CPSY laboratory courses can be used to fulfill the research methods requirement; consult with a Psychology advisor for lists of approved courses. Laboratory or research methods courses in other departments cannot be used to fulfill the research methods requirement. The research methods requirement should be fulfilled before senior year.

**Foundation**

To provide students with a solid foundation of knowledge in their area of concentration, the Psychology concentration requires five foundation courses, representing core areas of Psychology as a science. Foundation courses are all numbered below the 1000 level. List of approved foundation courses are posted on the CPSY undergraduate page. CPSY courses above the 1000 level and courses in other departments, at any level, cannot be used to satisfy foundation requirements.

**Electives**

Concentrators will select four additional courses that examine in greater depth topics of special interest to them. The CPSY courses designed to count as electives will often have foundation courses as prerequisites. Electives can be chosen from laboratory courses, lecture courses, or seminars. At least two electives should be at the 1000 level. In addition, students may choose up to two courses outside of CPSY (preferably at the 1000 level) as electives. Electives should fit into a coherent intellectual theme, and should be chosen in consultation with a concentration advisor.

## Additional requirements for Sc.B.

In line with university expectations, the Sc.B. requirements include a greater number of courses and especially science courses. The definition of “science” is flexible. Some of these courses will be outside of CPSY, but several CPSY courses might fit into a coherent package as well. In addition, the Sc.B. degree also requires a laboratory course (in addition to CPSY 1900/CPSY 1901 or its alternative) to provide these students with in-depth exposure to research methods in a particular area of the science of the mind. Lists of approved laboratory courses can be obtained from the Psychology concentration advisors.

## Requirements Specific for the Sc.B. degree

**STANDARD PROGRAM FOR THE Sc.B. DEGREE**

| | | |
|---|---|---|
| Common Core: | | |
| CPSY 0900 | Statistical Methods | 1 |
| CPSY 1900 | Research Methods And Design (or approved laboratory course) | 1 |
| OR | | |
| CPSY 1901 | Research Methods (or approved laboratory course) | |
| Five courses from the following: | | 5 |
| CPSY 0010 | Mind, Brain and Behavior: An Interdisciplinary Approach | |
| CPSY 0100 | Learning and Conditioning | |
| CPSY 0110 | Animal Behavior | |
| CPSY 0200 | Human Cognition | |
| or CPSY 0220 | Making Decisions | |
| CPSY 0400 | Cognitive Neuroscience | |
| or CPSY 0450 | Brain Damage and the Mind | |
| CPSY 0500 | Perception and Mind | |
| CPSY 0610 | Children's Thinking: The Nature of Cognitive Development | |
| or CPSY 0620 | Social and Moral Development | |
| CPSY 0700 | Social Psychology | |
| or CPSY 0701 | Personality Theory | |
| CPSY 0800 | Language and the Mind | |
| Four approved Electives related to Psychology | | 4 |
| Capstone: Independent Study (CPSY 1970, CPSY 1980) or approved seminar | | 1 |
| Five Additional STEM courses: of these, at least two (2) must be CPSY courses, all must be related to Psychology, and all must be applicable to a concentration in that department | | 5 |
| **Total Credits** | | **17** |

## Honors Requirement

The Honors Program in Psychology gives undergraduates a special opportunity to carry out a research project under the direction of a faculty member. The program also provides the opportunity for outstanding senior concentrators to receive their undergraduate degree with Honors. Participation in the program allows students to develop an understanding of research and acquire research skills and background.

Candidates for Honors in Psychology must meet all of the requirements of the concentration as described above. Candidates submit their application for the program in semester 7. We encourage students to seek out a potential faculty mentor prior to semester 7. Candidates for Honors must have completed the Statistics CPSY 0900 and Research Methods and Design (CPSY 1900, Research Methods CPSY 1901, or laboratory course) requirements before semester 7. Please refer to the

CPSY Honors Program page for detailed information about the specific requirements for the Honors program in Psychology.

## Behavioral Decision Sciences Concentration Requirements

Leading to a Bachelor of Arts, the study of decision making at Brown covers descriptive questions like how people, institutions, and nations make judgments and decisions; normative questions about rationality, such as what constitutes the best judgments and decisions; and prescriptive questions, such as how the process of decision making can be improved to make actual decisions closer to optimal ones. By virtue of its broad interdisciplinary nature, the study of decision making covers work found in a variety of more traditional disciplines including psychology, cognitive science, economics, philosophy, computer science, and neuroscience. Professors Steven Sloman and David Levari are the concentration advisors. Upon declaring, concentrators are also encouraged to speak with the appropriate area specialist from among those listed here.

## Standard Program for the AB Degree

***These are the new requirements approved by CCC effective Fall 2024. For existing concentrators graduating in 2024-25, the prior requirements can be found by selecting the Bulletin archive*** **https://bulletin.brown.edu/archive/2023-24/**

| | | |
|---|---|---|
| **Foundational Courses:** | | |
| CPSY 0220 | Making Decisions | 1 |
| Choose one of the following: | | 1 |
| CPSY 0200 | Human Cognition | |
| CPSY 0400 | Cognitive Neuroscience | |
| CPSY 0450 | Brain Damage and the Mind | |
| CPSY 0620 | Social and Moral Development | |
| CPSY 0700 | Social Psychology | |
| Choose one from the following: | | 1 |
| CPSY 0710 | The Psychology and Philosophy of Happiness | |
| CPSY 1280B | Special Topics in Cognition: Collective Cognition and Collective Behavior | |
| CPSY 1280C | Topics in Cognition: Information and Decision Making | |
| CPSY 1470 | Mechanisms of Motivated Decision Making | |
| CPSY 1495 | Affective Neuroscience | |
| CPSY 1560 | Visually-Guided Action and Cognitive Processes | |
| CPSY 1680A | Topics in Development: Social Learning | |
| CPSY 1730 | Psychology in Business and Economics | |
| CPSY 1750 | Blame and Punishment | |
| CPSY 1760 | The Moral Brain | |
| **Distribution Requirements:** | | |
| Select one Introductory Course from the following: | | 1 |
| CPSY 0950 | Introduction to programming | |
| ECON 0110 | Principles of Economics | |
| CSCI 0150 | Introduction to Object-Oriented Programming and Computer Science | |
| CSCI 0170 | Computer Science: An Integrated Introduction | |
| CSCI 0180 | Computer Science: An Integrated Introduction | |
| CSCI 0190 | Accelerated Introduction to Computer Science | |
| Select Two Advanced Courses From: | | 2 |
| CSCI 1410 | Artificial Intelligence | |
| CSCI 1420 | Machine Learning | |
| ECON 1090 | Introduction to Game Theory | |
| ECON 1110 | Intermediate Microeconomics | |
| ECON 1130 | Intermediate Microeconomics (Mathematical) | |
| ECON 1170 | Welfare Economics and Social Choice Theory | |
| ECON 1200 | History of Economic Thought | |
| ECON 1805 | Experimental and Behavioral Economics | |
| ECON 1820 | Theory of Behavioral Economics | |
| ECON 1870 | Game Theory and Applications to Economics | |
| PHIL 1610 | Decision Theory: Foundations and Applications | |
| PHIL 1430 | Moral Theories | |
| SOC 1311 | Micro-Organizational Theory: Social Behavior in Organizations | |
| SOC 1315 | Macro-Organizational Theory: Organizations in Social Context | |
| **Methods Classes:** | | |
| Basic Probability and Statistics. Choose One From the Following: | | 1 |
| CPSY 0900 | Statistical Methods | |
| APMA 1650 | Introduction to Probability and Statistics with Calculus | |
| CSCI 1450 | Advanced Introduction to Probability for Computing and Data Science | |
| DATA 0200 | Data Science Fluency | |
| ECON 1620 | Introduction to Econometrics | |
| Advanced Methods. Choose one of the following: | | 1 |
| CPSY 1291 | Computational Methods for Mind, Brain and Behavior | |
| CPSY 1492 | Computational Cognitive Neuroscience | |
| ECON 1630 | Mathematical Econometrics I | |
| ECON 1660 | Big Data | |
| SOC 1120 | Market and Social Surveys | |
| SOC 1260 | Market Research in Public and Private Sectors | |
| or any advanced course in Computer Science beyond the introductory set of classes | | |
| **Choose one of the following Research Methods and Design courses:** | | **1** |
| CPSY 1791 | Laboratory in Social Cognition | |
| CPSY 1890 | Laboratory in Psycholinguistics | |
| CPSY 1900 | Research Methods And Design | |
| CPSY 1901 | Research Methods | |
| ECON 1629 | Applied Research Methods for Economists | |
| IAPA 1500A | Ethnographic Research Methods | |
| POLS 1600 | Political Research Methods | |
| SOC 1020 | Methods of Social Research | |
| SOC 1260 | Market Research in Public and Private Sectors | |
| **Electives:** | | **3** |
| Students will choose three additional courses in consultation with a concentration advisor that will constitute an integrated specialization in some area of decision science. Any advanced course taught at Brown is eligible. | | |
| **Capstone:** | | **1** |
| CPSY 1960 | Senior Seminar in Behavioral Decision Sciences | |
| **Total Credits** | | **13** |

Students will be expected to take no more than 6 courses below the 1000-level within the concentration. Students with multiple concentrations may not apply more than 2 courses from a second concentration to the AB in

Behavioral Decision Sciences. Students are responsible for satisfying all prerequisites for courses they plan to take.

## Honors

The Honors Program in BDS gives undergraduates a special opportunity to carry out a research project under the direction of a faculty member that they have developed a relationship with. The program also provides the opportunity for senior concentrators to receive their undergraduate degree with Honors. Participation in the program allows students to develop an understanding of research and acquire research skills and background.

Candidates for Honors in BDS must meet all of the requirements of the BDS concentration as described above. Candidates submit their application for the program at the beginning of semester 7. We encourage students to seek out a faculty mentor prior to semester 7 and to complete their methods courses and two of their three electives before semester 7. Please refer to the CPSY Honors Program page for detailed information about the specific requirements for the Honors Program in BDS.

# Cognitive and Psychological Sciences Graduate Program

The department of Cognitive and Psychological Sciences is a unique multidisciplinary department that offers Doctor of Philosophy (Ph.D.) degrees in two fields: Cognitive Science and Psychology.

While the department offers transitional Master's degrees en route to the Ph.D., it does not accept applicants into non-Ph.D. programs.

For more information on admission and program requirements, please visit the following website:

https://graduateprograms.brown.edu/graduate-program/cognitive-science-phd (https://graduateprograms.brown.edu/graduate-program/cognitive-science-phd/)

## Courses

**CPSY 0010. Mind, Brain and Behavior: An Interdisciplinary Approach**.
This course will provide an interdisciplinary approach to the science of the mind through lens of psychology, cognitive science, cognitive neuroscience, behavioral neuroscience, computational modeling and linguistics, as uniquely represented by our department. It will focus on questions that drive the field, current state-of-the-art, and successful techniques and approaches. Questions addressed will include: What is the nature of the human mind? How do we get input from the world? How do we communicate? How do we change as infants and adults through experience? How do we make decisions and judgments? How do minds meet other minds in a social world?

**CPSY 0020. Approaches to the Mind: Introduction to Cognitive Science**.
Cognitive science is the study of the mind from an interdisciplinary perspective. It focuses on such questions as how do we process information to recognize objects and faces, to know that a cup is not a bowl, to remember and learn, and to speak and understand? How can studying the brain inform us about the mind? This course will examine the above questions and discuss major themes in cognitive science including nature-nurture, categories and representations, and the nature of computations.

**CPSY 0050A. Computing as Done in Brains and Computers**.
Brains and computers compute in different ways. We will discuss the software and hardware of brains and computers and with introduction to the way brains are organized, the way computers are organized, and why they are good at such different things. We will talk about our current research, the Ersatz Brain Project, an attempt to design a first-class second-class brain. Enrollment limited to 15 first year students.

**CPSY 0050B. The Two Visual Systems: Visual Perception and Control of Action**.
In a series of theoretical articles, Melvyn Goodale and his collaborators have proposed that separate, but interacting visual systems have evolved for the perception of objects on the one hand and the control of actions directed at those objects on the other hand. This seminar will cover the basic literature addressing this problem with studies involving human and animal studies. Enrollment limited to 19 first year students.

**CPSY 0050C. Intentionality and Theories of the Mind**.
The purpose of this seminar is to familiarize students with the topic of "theory of mind" – how we understand each other's mental states. In particular, we will focus on how human beings understand other's intenions and beliefs and come to act volitionally. Readings will span developmental, cognitive, social, and cross-cultural psychology as well as neuroscience and philosophy. Emphasis in assignments will be on evaluating and constructing scientific investigations. Reserved for First Year students. Enrollment limited to 19.

**CPSY 0050D. Reading Science/Understanding Science**.
How is science presented in the modern media? How does this shape the way we think about and understand scientific ideas and the scientific process? Focusing on the brain sciences, we will critically read several award-winning scientific works written for non-specialized audiences, including books by Dawkins, Gould, Pinker, and Sapolsky. We will also consider critiques of these works, as well as related shorter articles intended for wider audiences (e.g., from Scientific American). Finally we will examine several examples of "bad neurojournalism" in an attempt to understand what makes good and bad science reporting. No prerequisites; enrollment limited to 19 first year students.

**CPSY 0050E. Animal Minds**.
This freshman seminar examines what we can learn about the mind of an animal through observations and manipulations of that animal's behavior. Drawing on the work of biologists, ethologists and psychologists in the field and in the lab, we will critically evaluate the evidence that animals have minds and debate the thesis that their minds are qualitatively indistinguishable from our own. Enrollment limited to 19 first year students.

**CPSY 0050F. Olfaction and Human Behavior**.
In this first year seminar we will explore how our sense of smell is involved in a variety of psychological processes, including: emotion, learning, memory, language and social behavior. Topics such as olfaction in health, technology and marketing will also be critically examined. Students will acquire the basics of olfactory physiology and perception-cognition through course reading, projects and discussions. Enrollment limited to 19 first year students.

**CPSY 0050G. Pidgins, Creoles, and the Emergence of Language**.
Pidgins and creoles are language systems that arise in situations of contact between groups without a common language. Their study has informed models of language change and has inspired theorizing about the origins of language, in particular the role children play as agents of language creation and language change. In the last twenty years, however, the field has seen significant upheavals, as foundational assumptions have been challenged and in some cases overturned. This course will consider pidgins and creoles within their socio-historical context, with primary emphasis on what pidgins and creoles can tell us about language emergence and language change. Enrollment limited to 19 first year students.

**CPSY 0050I. Art and Science of Learning**.
The course will emphasize normal adult learning, in comparison with learning of special populations, nonhuman animals, and computers. Topics will include perceptual learning, memorization, search, conditioning in changing environments, and motor learning. The role of types and amount of practice, motivation, and talent in the development of expertise in art, music, dance, science, sports, and games will be examined. Readings will be based on laboratory experiments and case histories of experts in a range of fields. Enrollment limited to 19 first year students.

**CPSY 0050J. Psychology of Creativity**.
This course is a first year seminar intended to introduce students to the lively word of creativity and the science thereof. Classic and contemporary readings will be discussed covering topics ranging from theory and assessment to applications in education, product design, organizational behavior, the arts, and science itself. Students will also be nudged to become more mindful of the role of creativity in their everyday lives. The course will emphasize class discussion and the production of tangible projects. Enrollment limited to 19 first year students.

**CPSY 0050K. Color**.
This Brown/RISD seminar will take a multidisciplinary approach to studying color. Each meeting will focus on color from a different perspective, through the lenses of psychology, philosophy, neuroscience, physics, art history, architecture, and design. This seminar will be taught by a team of faculty from the Brown/RISD Color Lab, where each class will be led by a scholar on the topic of the day. The main instructor will be present every week to integrate discussions across topics. The class time will be divided between lectures, discussions, hands-on activities, and local outings (e.g., to the RISD Museum). Instructor override required.

**CPSY 0050L. Anthropogenic Activity + Animals**.
Human activities that affect animals and their habitats are both widespread and increasing with largely negative impacts. In this first year seminar, we will examine the effects of anthropogenic disturbances on animal behavior through reading and discussion of scientific papers and conversations with expert guests. Topics include anthropogenic feeding on wildlife; noise, light and chemical pollution on aquatic and terrestrial species; recreational land and water use; technological modernization along migration routes; deforestation, hunting, and poaching. Students conduct an independent examination of environmental disturbances on a species from their country of origin or one with special personal relevance. Limited to first years.

**CPSY 0050W. Color in the world or what you see is not what you get**.
This first-year seminar will explore the science behind rainbows, peacock feathers, and your favorite color. Color is a fundamental characteristic of how we experience the world in a wide variety of ways. Color contributes to how we recognize objects (is that an apple or orange?) and navigate the world (red light or green light?). Color invades how we understand our social world (green with envy or feeling blue?) and how we present ourselves to the world (fashion anyone?). We will explore many different aspects of color, what it is, how we see it, and how we use it.

**CPSY 0100. Learning and Conditioning**.
Presents classical and contemporary approaches to the study of the prediction and control of behavior. Emphasizes theories and data derived from studies of Pavlovian conditioning and instrumental learning with nonhuman animals, but also considers implications for human behavior (e.g., drug-dependent behaviors, eating disorders, behavior modification and psychopathologies). No prerequisites.

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| Spr | CPSY0100 | S01 | 26255 | MWF | 1:00-1:50(06) | (R. Colwill) |

**CPSY 0110. Animal Behavior**.
The topic of this course is the scientific study of animal behavior, based on the theoretical framework proposed by Nobel Prize winner Niko Tinbergen. This framework addresses four basic questions about behavior: its evolutionary history, its function, its development, and its underlying mechanisms. We will focus on social behaviors, communication, and cognition in a range of animal species.

**CPSY 0120. Introduction to Sleep**.
This course uses sleep as the focal point for describing complex behavioral phenomena. How is sleep measured and defined? How does sleep differ across species? What accounts for the timing of sleep? How does sleep change with age? What are the behavioral, physiological, and cognitive concomitants of different states of sleep? How can dreaming be understood? What can go wrong with sleep? Recommended prior coursework: CLPS 0001 or NEUR 0010, or an AP course in psychology or physiology.

**CPSY 0150. Behavioral Neuroscience: Introduction to Biological Psychiatry**.
This course aims to convey fundamental knowledge and understanding of Behavioral Neuroscience with a focus on Biological Psychiatry. Biological Psychiatry represents a multidisciplinary approach towards understanding psychiatric disease with input from the fields of genetics, biochemistry, molecular biology, and neurobiology. The course will begin by introducing principles of Behavioral Neuroscience and then introduce Biological Psychiatry. We will then elucidate some of the more prevalent psychiatric disorders affecting the general population. Subsequent material will cover scientific approaches and techniques commonly used in the field of Biological Psychiatry to investigate the causes, underlying biological mechanisms, and therapeutic interventions relevant for psychiatric disorders.

**CPSY 0200. Human Cognition**.
Introduction to theoretical issues and empirical findings motivating controversies in human cognition. Basic issues in cognition - including attention, memory, categorization, reasoning, decision making and problem solving will be examined. Emphasis will be on experimental methods and formal theories.

**CPSY 0210. Human Thinking and Problem-Solving**.
An inter-disciplinary introduction to adult human thinking and reasoning. Covers logical thinking, computational models, reasoning and the scientific method, creativity, intelligence, visual thinking, problem solving in a group setting, and methods of teaching "thinking skills." Students will learn about research findings on these topics and will practice methods for improving their own skills.

**CPSY 0220. Making Decisions**.
Life is full of decisions. Some decisions are made rationally, others could be improved. This course considers the psychology of human decision-making, the analysis of optimal decision-making, and implications for individual action and social policy. Topics include: chance and preference (e.g., how do consumers weigh attributes when making purchases?); the value of information (e.g., when should physicians order expensive diagnostic tests?); risky choice (e.g., is it rational to play the lottery?).

**CPSY 0330. The Grammar of English**.
English probably has greater international utility and importance today than any other human language. This no-prerequisites course takes seriously the idea that we should be able to describe its structure accurately. Challenging two hundred years of myths and mistakes, it attempts to offer students a rigorous basis for understanding sentence structure. Enrollment limited to 40.

**CPSY 0350. Playing with Words: The Linguistic Principles Behind Word Games and Puzzles**.
In this course, we explore the use of language in a domain which is fairly unlike ordinary communication: the use of language in wordplay, alternate languages, games, and puzzles. At one level, understanding aspects of linguistic theory can provide insight into the internal workings of these various forms of wordplay. On another level, wordplay and puzzles often intentionally subvert the grammar and other rules of ordinary language use and therefore can provide a unique lens into typically implicit grammatical knowledge speakers possess and deploy in all domains of language.

**CPSY 0400. Cognitive Neuroscience**.
This course provides an introduction to the neuroscientific study of cognition. Topics surveyed in the course include the neural bases of perception, attention, memory, language, excutive function, emotion, social cognition, and decision making. In covering these topics, the course will draw on evidence from brain imaging (fMRI, EEG, MEG), transcranial magnetic stimulation, electrophysiology, and neuropsychology. The course will also consider how knowledge about the brain constrains our understanding of the mind.

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| Spr | CPSY0400 | S01 | 26257 | MWF | 2:00-2:50(07) | (S. Favila) |

**CPSY 0410. Principles of Behavioral Neuroscience**.
A lecture course that covers the bodily systems that underlie motivated behavior. Topics include the autonomic nervous system, drugs and behavior, hormones and behavior, reproductive physiology/behavior, homeostasis, biological rhythms, emotions and stress, the neurobiology of mental disorders, and biological perspectives on learning and memory. Does not cover synaptic transmission or sensory processing and perception. Prerequisite: background in psychology, neuroscience, or linguistic/cognitive science including an introductory course (CLPS 0040 (COGS 0720), CLPS 0400 (PSYC 0470), or NEUR 0010).

**CPSY 0450. Brain Damage and the Mind**.
Brain damage in humans can produce dramatic and highly selective impairments in cognitive functioning. This course provides an overview of the major neuropsychological disorders of perception, language, memory, thought, and action. It emphasizes the development of human information processing models for understanding the cognitive deficits observed in brain-damaged patients and the implications of neuropsychological findings for models of normal cognition.

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| Fall | CPSY0450 | S01 | 18270 | MWF | 10:00-10:50(14) | (W. Heindel) |

**CPSY 0500. Perception and Mind**.
How do the mind and the brain take physical energy such as light or sound and convert it into our perception of the world? This course examines the behavioral and biological bases of human and animal perceptual systems, including vision, audition, smell, taste, and touch. Particular emphasis is placed on high-level perception and how it relates to other cognitive systems.

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| Fall | CPSY0500 | S01 | 18271 | MW | 8:30-9:50(09) | (J. Song) |

**CPSY 0510. Perception, Illusion, and the Visual Arts**.
Visual art can be viewed as an exploration of perceptual questions. This course considers the representation of space and time in painting and film from the viewpoint of the science of visual perception. Topics include Renaissance linear perspective, picture perception across cultures, color, form, shape, abstraction, how film editing constructs events, and why Godzilla looks phony. Slide lectures and visual exercises.

**CPSY 0520. Art, Music, and Science: An Introduction to Aesthetics**.
Topics include: art and representation; art and the emotions; beauty, form, and aesthetic experience; and the definition of art. We will focus especially on the visual arts, though we will consider examples drawn from music as well. We will be looking throughout to understand how empirical research bears on traditional topics in the philosophy of art, drawing from empirical perception science, evolutionary biology, and cognitive neuroscience. The course will be example driven: We will try out philosophical theories against our lived reactions to many dozens of images of visual art, and against our reactions to a number of music selections.

**CPSY 0530. Making Visual Illusions**.
Visual illusions are vivid examples of the mistakes our visual systems make. This interdisciplinary course is designed for art and science students with interests in visual perception to explore how and why visual processing sometimes fails. Course work will include hands-on laboratory experiments and art construction exercises. Topics will include color, brightness, and geometric illusions. Enrollment limited to 15.

**CPSY 0540. Simulating Reality: The (Curious) History and Science of Immersive Experiences**.
Can an experimental approach enhance our critical-historical understanding of immersive experiences? We will look at the history of 3D vision from an interdisciplinary perspective combining the science of perception and the cultural history of technology. Through a series of collaborative activities and team experiments, we will learn how popular, pre-digital optical devices (such as camerae obscurae, magic lanterns, panoramas or stereoscopes) foreshadow contemporary VR, AR, or XR experiences designed for education and entertainment. Among the themes explored: virtual travel, social voyeurism and surveillance, utopian and dystopian imagination.

**CPSY 0550. Science of Consciousness**.
This course will focus on consciousness related to visual perception, attention, memory, and cognitive control. The learning goal is to understand the neural correlates of consciousness, with an emphasis on visual consciousness. We will examine 1) basic neural mechanisms of perceptual and cognitive processing; 2) philosophical and neuroscientific models of consciousness; 3) the interaction between attention, reward, and memory and visual consciousness; 4) recent advances in research of consciousness by neuroscientific experiments with animals and humans.

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| Fall | CPSY0550 | S01 | 18272 | TTh | 6:40-8:00PM(02) | (T. Watanabe) |

**CPSY 0600. Developmental Psychology**.
Children's behavior and development from infancy through adolescence. Major topics include learning, perception, parent-child attachment, language, intelligence, motivation, emotional development, and peer relations. Major developmental theories, including psychoanalytic, ethological, social learning, and cognitive, are considered as organizers of these phenomena and as a source of testable hypotheses.

**CPSY 0610. Children's Thinking: The Nature of Cognitive Development**.
An examination of children's thinking and cognitive development from infancy to early elementary school. Considers a range of topics including memory, reasoning, categorization, perception, and children's understanding of concepts such as space, time, number, mind, and biology. Major theories of cognitive development are described and evaluated in light of the available psychological data.

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| Spr | CPSY0610 | S01 | 26261 | TTh | 9:00-10:20(05) | (D. Buchsbaum) |

**CPSY 0611. Children's Thinking**.
An examination of children's thinking and cognitive development from infancy to middle childhood. Considers a range of topics including memory, reasoning, categorization, perception, and children's understanding of concepts such as space, time, number, mind, and biology. Major theories of cognitive development are described and evaluated in light of the available psychological data.

**CPSY 0620. Social and Moral Development**.
This course examines children’s social and moral development from infancy to adolescence. There are no prerequisites. The course is designed for students anywhere from their first to their final semester at Brown. Some of the topics we will consider are children’s social cognition, moral reasoning, social learning, attachment, parent-child interaction, prosocial behavior, and the role of culture and SES in development. We will evaluate theories of social and moral development in light of the available psychological data. We will also integrate behavioral work with issues in developmental cognitive neuroscience.

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| Fall | CPSY0620 | S01 | 18273 | MWF | 11:00-11:50(16) | (J. Marshall) |

**CPSY 0640. Developmental Psychopathology**.
A comprehensive introduction to child and adolescent psychological disorders. Focuses on risk, vulnerability, and protective factors in order to probe why some children develop significant psychological problems when others do not. Emphasis on how biological, psychological, and sociocultural factors interactively contribute to the development of psychopathology. Examines effective treatments, as well as educational and social policy implications. Prerequisite: CLPS 0010, 0020, or 0600.

**CPSY 0700. Social Psychology**.
Examines the theories, findings, and methods of social psychology. Topics include: social cognition (person perception, attitudes), social influence (cultural sources of attitudes, conformity), and social relations (aggression, altruism, prejudice). Students become better informed consumers of empirical research and acquire a new framework for interpreting social behavior. Applications to historic and current events.

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| Fall | CPSY0700 | S01 | 18274 | TTh | 2:30-3:50(12) | (O. FeldmanHall) |

**CPSY 0701. Personality Theory**.
A survey of the major perspectives (psychoanalytic, behavioral, humanistic, existential, trait, and evolutionary) within the theories of personality. Particular emphasis will be placed on those theories that inform clinical practice.

**CPSY 0710. The Psychology and Philosophy of Happiness**.
The course explores four fundamental questions about happiness: What is happiness—pleasure, life satisfaction, something else? How is happiness achieved—what are the myths and realities about what conduces to happiness? Can happiness be achieved—are we naturally well suited to be happy? Why pursue happiness—is it sufficient, or even necessary, for a good life? The course examines classic contributions from philosophy and psychology, the two disciplines that have studied happiness most extensively. Team-taught by professors from both philosophy and psychology, it invites students to compare and combine both approaches.

**CPSY 0720. Thinking About the Social World**.
Acting in and understanding the social world require, among other things, the process of abstraction. Abstraction broadens mental horizons, integrates new experiences, and allows communication with other people. In this course we will discuss the different ways in which abstraction has been defined in the literature and look into some surprising implications of abstraction for people's understanding of, and actions in, the social world. This is a mid-level seminar for students with introductory background to psychology, cognitive science, or cognitive neuroscience.

**CPSY 0800. Language and the Mind**.
Explores fundamental issues in psycholinguistics: what is the nature of language; what are its biological underpinnings; how does the mind process speech, recognize words, parse sentences, comprehend discourse; what do effects of brain injuries on language reveal about the organization of language in the mind? Syntheses of results from multiple modes of analysis – linguistic, psychological, computational, and neurophysiological – are emphasized.

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| Fall | CPSY0800 | S01 | 18275 | MWF | 2:00-2:50(01) | (R. Feiman) |

**CPSY 0810. The Biology and Evolution of Language**.
Human language is made possible by specialized anatomy and brains that can regulate speech production, complex syntax, and acquiring and using thousands of words. This course examines Darwin's theory of evolution and the archaeological and fossil records of human evolution; studies of chimpanzee communication, culture, and language which provide insights on human evolution; the physiology of human speech; and recent studies of the brain bases of human language and thought.

**CPSY 0900. Statistical Methods**.
A survey of statistical methods used in the behavioral sciences. Topics include graphical data description, probability theory, confidence intervals, principles of hypothesis testing, analysis of variance, correlation, and regression, and techniques for categorical data. Emphasizes application of statistical methods to empirical data.

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| Fall | CPSY0900 | S01 | 18277 | MWF | 1:00-1:50(08) | (J. Trost) |
| Spr | CPSY0900 | S01 | 26263 | MWF | 12:00-12:50(01) | (J. Trost) |

**CPSY 0950. Introduction to programming**.
This course provides an introduction to programming and computational thinking. We will use the Matlab programming language as a starting point because it is concise and easy to read. It is also one of the most popular scientific programming languages. We will then transition to Python which has now become the main programming language used in data science. The course is designed for students in psychology, cognitive science, neuroscience, and other non-computer science majors interested in learning to program and, more generally, in developing computational thinking skills. Beyond teaching specific coding skills, this course will support students' development as computational thinkers. Mastering these skills will enable students to more richly understand the cognitive, linguistic, and psychological sciences — and impact society.

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| Spr | CPSY0950 | S01 | 26265 | MWF | 2:00-2:50(07) | 'To Be Arranged' |

**CPSY 1080A. Intentionality**.
The purpose of this seminar course is to familiarize students with the topic of "theory of mind" - how we understand other's mental states. In particular, we will focus on how children develop an understanding of others intentions and beliefs. While the majority of the reading will be in developmental psychology, cognitive, social, clinical and comparative literatures will also be examined.

**CPSY 1080C. Evolution of the Brain Bases of Creativity**.
Humans share virtually all of our genes with chimpanzees, yet you are reading this sentence on a device that no chimpanzee could have made. For that matter, your grandparents would have been baffled had they encountered email. Creativity - the drive to think of new concepts, new ways of doing things, and new things - marks us. In this vein, we will read and discuss the findings of new studies that are exploring the neural bases and evolution of human creativity. We will also consider the alternative, that we are ruled by genes that evolved more than 50,000 years ago. Enrollment limited to 40.

**CPSY 1090. Research Methods in Psychology**.
This upper division laboratory course is designed to provide CLPS concentrators (psychology/cognitive science/cognitive neuroscience) with the tools to comprehend, conduct, and report on psychological research. Students will learn about the central aspects of research, including reviewing literature, formulating hypotheses, designing experiments, collecting/analyzing data, and presenting findings in written and oral reports. Lectures and laboratory exercises will survey a variety of methods to prepare students to design and execute their own research projects. Class time will be divided between lectures, discussion, labs, and student presentations. Prerequisites: CLPS 0010 or CLPS 0020 and CLPS 0900 or APMA 1650. Enrollment limited to 25.

**CPSY 1092. Psychological Theory**.
An examination of types of explanations used in psychology, with an emphasis on quantitative models of perception, learning, and motivation. Students implement models on a computer and compare theoretical predictions to observed facts. No previous experience with computers assumed; students will learn to implement and develop theories based upon spreadsheets.

**CPSY 1100. Animal Cognition**.
A seminar focusing on the experimental analysis of animal mental processes such as perception, attention, learning, memory, and decision-making. Some specific topics include navigation, visual search, working memory, time perception and memory, song learning in birds, and concept formation. Prerequisite: advanced lab.

**CPSY 1110. Behavior Modification**.
Examines basic principles of learning theory as applied to the development and change of human behavior. Topics include: experimental design in clinical research, addictive behavior, fear and anxiety reduction, cognitive behavior modification, self management, child behavior modification, and clinical therapy. Prerequisites: CLPS 0701 (PSYC 0300) or CLPS 1700 (PSYC 1330). Enrollment limited to 50.

**CPSY 1120. Physiological Psychology**.
Research articles focusing on the neural regulation of behavior are discussed, with an emphasis on experimentation in animal models. Topics vary from year to year but may include the neural and molecular mechanisms regulating social behaviors, the mechanisms and site of action of drugs of abuse, development of neural systems, sensory information processing and genetic analysis of behavior. Prerequisites: CLPS 0410 (PSYC 0750) or NEUR 0010. Enrollment limited to 25.

**CPSY 1130. Psychology of Timing**.
Topics include temporal perception, memory, and preferences; cognitive, biological, and quantitative theories of timing; biological rhythms; pharmacological influences on time perception and timed performance; altered timing in abnormal states; and timing in sports and music. Enrollment limited to 20.

**CPSY 1140. Psychophysiology of Sleep and Dreams**.
Overview of sleep, biological timing, dreaming, and sleep disorders. Topics include physiology of NREM and REM sleep, circadian rhythms, determinants and measurement of daytime sleepiness, development and phylogeny, dreaming, and sleep functions. Biological bases and behavioral concomitants of sleep disorders are assessed. Prerequisites: CLPS 0010 (PSYC 0010) and NEUR 0010, or CLPS 0110 (PSYC 0500), or other background in NREM science or physiology. Students who have taken CLPS 0120 (PSYC 0550) should not take this course. Not open to Freshmen or Sophomores.

**CPSY 1150. Memory and the Brain**.
This flipped course is for undergraduate and beginning graduate students of psychology, cognitive neuroscience, and biology who are interested in biological research on memory. There are three parts: 1) the genesis of modern research on memory, 2) the hippocampus and beyond, and 3) multiple brain memory systems. The course is designed to be accessible to students in a variety of disciplines, but requires background in psychology, cognitive science, or neuroscience. Class will include online lectures, writing assignments, reading primary research articles, and presenting research articles. Prerequisite: CLPS 0010, CLPS 0020, CLPS 0040, CLPS 0200, or NEUR 0010.

**CPSY 1160. Evolution and Development of the Brain**.
What is unique about the human brain? In this course, we will investigate this question from an evolutionary, comparative perspective. Drawing upon research from many disciplines including psychology, neuroethology, cognitive science, biology, biological anthropology, and neuroscience, we will identify changes in the nervous system that have occurred over phylogeny and over ontogeny to allow the development of complex social behaviors, cognition, language, and consciousness.

**CPSY 1180A. Canine Behavior**.
Topics covered in this seminar include canine perception, cognition, vocalization, and social behavior. The behavior of wolves and other wild canids is explored to facilitate our understanding of dog behavior. Observational field work is required in addition to regular class meetings. Prerequisites: CPSY 0050E, CPSY 0100, CPSY 0110, CPSY 1191, or CPSY 1192. Not open to first year students.

**CPSY 1180B. Animal Languages**.
Most animals – fishes, frogs, birds, bats, whales, monkeys, and humans – communicate using sounds. Are these acoustic communication systems complex enough to be considered as animal languages, or is human language unique? We will examine the structure, function, and neural control of animal acoustic communication systems and search for evidence of evolutionary continuities between animal sounds and human language. Topics to be studied include vocal learning and imitation, the evolution of cooperative vocal exchange, syntax in bird and whale songs, and symbolic communication in primates.

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| Fall | CPSY1180B | S01 | 18278 | TTh | 2:30-3:50(12) | (A. Simmons) |

**CPSY 1181A. Canine Behavior**.
This discussion-based online course focuses on the psychology of dogs using primary readings on canine perception, cognition, communication, development, genetics, social behavior, and common behavioral pathologies. Case studies of domestic dogs are used to illustrate the diagnosis and treatment of aggression, fear, anxiety, and obsessive-compulsive disorders. The natural behavior of wolves and other wild canids is explored to facilitate our understanding of the domestic dog. After taking this course, you will be so much closer to knowing a dog!

**CPSY 1181C. The Psychology of Pandemics**.
Through a psychological lens, we will examine how pandemic-related emotional reactions (e.g. fear, anxiety, distress) and behavioral problems (e.g., nonadherence, avoidance, stigmatization of out-groups) influenced the effects of the pandemic, its disproportionate impacts on various communities both during and after 2020, and how these psychological factors shaped individual and national political shifts, including trends toward radicalization. What can we do to buffer the adverse effects of future pandemics on society and to mitigate the deleterious consequences of pandemics on mental health and sociality? In addition to reading and discussing the scientific literature, students will participate in group and individual authentic research projects, public service announcements, and policy recommendations. Visit our Google course site for more information. Enrollment limited to 18.

**CPSY 1190. Techniques in Physiological Psychology**.
Laboratory course in behavioral neuroscience for advanced students of psychology or or neuroscience. The goal is to gain "hands on" research experience with a variety of behavioral assays used to assess the effects of genetic mutations on behavior. Over the course of the semester, students will examine the behavioral phenotype of three mouse models of human disease and prepare a manuscript suitable for publication in a scientific journal. Prerequisites: CPSY 0410 or NEUR 0010, and CPSY 0900.

**CPSY 1191. Observing Animals: Methods for Animal Behavior Research**.
This course is designed for students with a serious interest in animal behavior research. Topics include methods in lab and field research, enrichment programs for captive species and conditioning procedures for managing zoo and shelter animals. Prerequisites: CPSY 0900 or equivalent or instructor permission. Enrollment limited to 18.

**CPSY 1192. Experimental Analysis of Animal Behavior and Cognition**.
A laboratory course on the prediction, control, and explanation of the behavior of animals in simple environments. Prerequisite: CPSY 0900.

**CPSY 1193. Laboratory in Genes and Behavior**.
Laboratory course in behavioral neuroscience designed to provide research experience in assessing effects of genetic alterations on behavior. Students examine the behavioral phenotype of a mouse model of human disease. Mice are tested on behavioral batteries to assess, for example cognitive, affective, and sensorimotor behavior. Recent classes tested models of early life stress, Fragile X Mental Retardation, and Alzheimer's Disease. Students will test the mice, analyze the data, and prepare a manuscript suitable for publication in a scientific journal. Prerequisites: CPSY 0410 or NEUR 0010, and CPSY 0900 or instructor permission. Enrollment limited to 10; not open to first-year students

**CPSY 1194. Sleep and Chronobiology Research**.
Part of a summer immersion experience, this course and research apprenticeship provide a fully textured research and academic experience in human sleep and chronobiology research. The course addresses direct technical instruction for research procedures that enable students to participate in the apprenticeship research projects. In support of the technical skills learning, students are provided background in the physiological, theoretical, and conceptual bases of the methodologies and the research program. This information provides a framework for understanding the methods and the research project's design and rationale. Oral presentation skills and conference attendance planning are also included. Recommended prerequisite: CPSY 0120 is preferred; NEUR 0010 is also acceptable.

Course open only to students admitted to the Sleep and Chronobiology Research Apprenticeship. Must apply here: www.sleepforscience.org/academic/apprenticeship.php (http://www.sleepforscience.org/academic/apprenticeship.php)

CLPS 1194 has a commitment from Memorial day through the third week of August.

**CPSY 1195. Life Under Water in the Anthropocene**.
Aquatic ecosystems are under intense pressure from a variety of anthropogenic stressors. Through lectures, discussion and authentic research projects, this course explores the impact of some of those stressors on the development and behavior of the most vulnerable, the developing young. Topics for Fall 2020 include the impact of anthropogenic stressors on local and global ecosystems; the behavioral biology, embryonic development, and behavior of zebrafish; basic research techniques for studying the development and behavior of zebrafish; and skills needed to conduct authentic scientific research. Students will design, conduct and present an authentic research project using zebrafish. No prior research experience required.

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| Fall | CPSY1195 | S01 | 18280 | T | 1:00-5:00 | (R. Colwill) |

**CPSY 1196. Sleep, Circadian Rhythms, and Behavioral Health**.
The goal of this course is to engage in an in-depth study of sleep from the context of a specific topic (to be determined). An upper-level seminar, the course is strengthened by discussion and student-led exploration of the topic. Because of the extensive core knowledge base required to begin exploring the area in depth, the class starts with lectures and readings providing an overview of background material, including definitions/vocabulary, measurement, neural systems, regulatory processes, and typical experimental paradigms and measures. As the semester progresses, students will pick specific components of the topic for leading seminar sessions/discussions and preparing a final paper. CPSY 0010 and NEUR 0010 are recommended but not required.

**CPSY 1200. Thinking**.
An investigation of conceptual structure, judgment, and inferential processes. The focus is on the relation between empirical evidence, theories, and models of cognitive process and structure. Prerequisite: CPSY 0200.

**CPSY 1210. Human Memory and Learning**.
How does human memory work and why are some things easier to learn and remember than others? This course covers experimental and behavioral studies of human memory including long- and short-term memory for text, pictures, spatial information, and autobiographical events. Emphasis on real-world situations, including education, in which memory and learning play a role. Prerequisite: CPSY 0200.

**CPSY 1211. Human and Machine Learning**.
How is human memory like a search engine? Is human knowledge like the internet? What can artificial intelligence and machine learning tell us about the mind? How can studying the mind help machine learning? This seminar explores parallels between human cognition and contemporary research in computer science, emphasizing common problems. In addition to the above, topics include simplicity, object recognition, categorization, and causality.

**CPSY 1220. Concepts and Categories**.
Our knowledge of the world is organized into concepts and categories. What is the basis of this organization? What information is used to make category judgments? How do children acquire concepts and categories? How are our concepts related to the language we speak? This course will examine these questions from an interdisciplinary perspective, combining relevant work in cognitive and developmental psychology, philosophy, linguistics, and computational modeling. Recommended prerequisite: CPSY 0200.

**CPSY 1230. Seminar in Decision Making**.
No description available.

**CPSY 1240. Reasoning and Problem Solving**.
How do people reason about informal events in everyday life and more formal subject domains? What are the fallacies that people endorse and how can they be averted? What are some strategies for developing critical reasoning skills? A presentation of theories of human reasoning and problem solving and their applications to educational practice. Prerequisite: CPSY 0200.

**CPSY 1241. Causal Reasoning**.
This seminar will concern the principles and processes by which people learn causal knowledge and engage in causal inference, including prediction, explanation, and counterfactual reasoning. Some emphasis will be on probabilistic models of causal inference and on the development of causal reasoning in young children. Enrollment limited to 20 juniors, seniors, and graduate students.

**CPSY 1250. Human Factors**.
The application of knowledge of human characteristics to the design of equipment, facilities, and environments for human use. Research on attention, perception, learning, and decision making will be applied to problems in various areas including: aviation, highway safety, industrial safety, consumer products, human-computer interaction, and aging. Enrollment limited to 25.

**CPSY 1271. Cognition in the Classroom: Seminar in the Science of Teaching and Learning**.
Most university students believe they are good learners, and most professors believe they teach well, yet the strategies each group employs are often the ones found to be least effective when examined from a scientific standpoint. This seminar examines what the basic scientific research in human cognition, as well as some well-designed applied studies, tell us about effective teaching and learning inside and outside of the classroom. Emphasis will be on K-12 learners and teachers, but with some extensions to college. Pre-Requisites: At least one CPSY course at the 1000-level or above or permission of the instructor.

**CPSY 1280A. Moral Reasoning**.
A review of research on how people make moral judgments. We will discuss and attempt to integrate diverse perspectives and research on cognition, action, and emotion from cognitive science, cognitive neuroscience, and philosophy.

**CPSY 1280B. Special Topics in Cognition: Collective Cognition**.
As individuals, we know little. We overestimate our knowledge of common objects and political policies, and the depth of our arguments. But humanity has achieved great things using its mental powers. The most likely reason is that we live in a community of knowledge, guided by shared intentionality. Communities understand how things work, and individuals fail to distinguish what they know from the knowledge that resides in other people's heads. In this course, we will evaluate these claims and discuss how they constrain theorizing in cognitive science. We will draw from literatures in psychology, philosophy, and computer science.

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| Spr | CPSY1280B | S01 | 26280 | M | 3:00-5:30(13) | (W. Warren) |

**CPSY 1280C. Topics in Cognition: Information and Decision Making**.
Why do people expose themselves primarily to media that aligns with their prior beliefs? When two people from opposing political parties read the same exact news article, how can they end up with even stronger conflicting opinions? What underlying mechanisms might be driving people's decisions to post specific clickbait on Facebook? Despite the fact that neoclassical economic theory dictates that individuals should seek out a diverse array of information in order to make the best judgments and decisions, there is abundant evidence that they do not. We will explore these types of questions throughout this course as we investigate how people engage with information across three distinct stages: exposure to, consumption of, and sharing of information. Through the readings and discussion, you will be exposed to relevant literatures in decision science, experimental economics, behavioral economics, and social psychology.

**CPSY 1290. Laboratory in Cognitive Processes**.
Presents the experimental way of thinking by pursuing several topics in an interactive computer-based laboratory. Students run experiments as a class and, by the end of the course, run their own experiment. Focus is on experimental design, procedure, analysis, and reporting. Topics include attention, visual imagery, memory, and reasoning. Prerequisite: CLPS 0900 (COGS/PSYC 0090), and either CLPS 0200 (COGS 0420) or CLPS 0500 (COGS 0440); or permission of the instructor.

**CPSY 1291. Computational Methods for Mind, Brain and Behavior**.
Provides an introduction to computational modeling of cognition, summarizing traditional approaches and providing experience with state-of-the-art methods. Covers pattern recognition and connectionists networks as well as Bayesian probabilistic models, and illustrates how they have been applied in several key areas in cognitive science, including visual perception and attention, object and face recognition, learning and memory as well as decision-making and reasoning. Focuses on modeling simple laboratory tasks from cognitive psychology. Connections to contemporary research will be emphasized highlighting how computational models may motivate the development of new hypothesis for experiment design in cognitive psychology.

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| Fall | CPSY1291 | S01 | 18282 | TTh | 10:30-11:50(13) | (T. Serre) |

**CPSY 1292. Introduction to Programming for the Mind, Brain and Behavior**.
This winter session course will provide an introduction to MATLAB programming for students in the life sciences with no prior programming experience. At the end of this course, students will be able to implement MATLAB functions independently to solve many common programming challenges associated with the study of the mind, brain and behavior — from conducting statistical data analyses to basic input/output functions for parsing a file to implementing their own psychophysics experiments. A life-long learning outcome is for students to develop computational thinking skills, a way of solving problems that draws on fundamental concepts borrowed from computer science.

**CPSY 1320. The Production, Perception, and Analysis of Speech**.
An introduction to the basis of the acoustic analysis of speech, the anatomy and physiology of speech production, and the perception of speech. Discussion and demonstration of quantitative computer-implemented methods for speech analysis. Linguistic and cognitive theories are discussed in relation to the probable neural mechanisms and anatomy that make human speech possible. Lectures, discussion, and laboratory demonstrations.

**CPSY 1340. Introduction to Semantics**.
An introduction to a variety of issues in linguistic semantics and in the related philosophical literature. Topics include: the nature of semantic representations; the relationship between meaning and the world; truth-conditional and "logical" semantics; word-meaning; the interaction of semantics and pragmatics; presupposition; the interaction of semantics with syntax.

**CPSY 1381C. Topics in Phonetics and Phonology: Laboratory Phonology**.
This course presents some of the primary methods of experimental phonology and examines basic elements of experimental design. The course will help students read phonology articles and design their own research projects. The first unit introduces laboratory phonology and the connections between phonological theory and experimentation. Subsequent units explore experimental methods for a range of phonological questions, incorporating information from phonetics and psycholinguistics. We will discuss some of the seminal studies as well as more recent literature to establish a framework of key questions, the resources for answering these questions, and factors to consider when designing experiments and interpreting results. Pre-requisites- CLPS 0030. CLPS 1310 strongly recommended.

**CPSY 1382. Sounds of the World's Languages**.
This course will introduce you to phonetics: the study of the physical aspects of speech. You will learn how to produce, perceive, describe, and transcribe the sounds of the world's languages. You will learn the fundamentals of acoustic and articulatory phonetics to better understand the properties of and mechanisms behind each speech sound. You will also gain practical skills in recording and measuring acoustic data, transcribing data in the International Phonetic Alphabet (IPA), and producing both familiar and foreign sounds in isolation as well as in real and hypothetical words. Prerequisite: LING 0100.

**CPSY 1385. Topics in Language Acquisition: Language Acquisition and Cognitive Development**.
What is the relationship between how we think and how we speak? This course explores the concurrent development of children's linguistic and cognitive abilities. Topics include the relationship between word meanings and concepts, the structure of the mental lexicon, pragmatic development, and the Whorfian hypothesis (whether speakers of different languages think differently). Students will read and discuss empirical and theoretical articles, and complete a set of writing assignments and problem sets. Prerequisite: CPSY 0610 or equivalent, or permission of the instructor. Appropriate for students interested in developmental/cognitive psychology, linguistics, and applied fields such as speech-language pathology.

**CPSY 1387. Topics in Neurolinguistics**.
No description available.

**CPSY 1389. Discourse Processing**.
Over the last decades psycholinguists have converged on a generally accepted framework for describing how humans process language at the sentence level. Much less is understood, however, about processing at the discourse level, where multiple sentences are understood to form a coherent whole. In this course we take an in-depth look at the question of discourse processing. We begin with a review of early models of discourse and narrative structure, turning next to findings from the sentence processing literature which implicate discourse structure. We consider both behavioral and neuro-imaging data in a critical analysis of past and current theories.

**CPSY 1400. The Neural Bases of Cognition**.
Research using animal models has informed and guided many of the recent advances in our understanding of the brain mechanisms underlying cognition. This seminar course will addresses related to animal models of human cognition. Students learn how different aspects of the neural bases of cognition are modeled in animals by reviewing the primary research literature. The course is divided into three sections, each addressing a different topic. Topics vary each year, but may include, for example, learning, memory, attention, decision-making, or cognitive impairment associated with neuropathology or aging. Enrollment limited to 20. Not open to first year students.

**CPSY 1420. Cognitive Neuropsychology**.
This foundation course in cognitive neuropsychology will explore the effects of brain damage on cognitive function. The goals of cognitive neuropsychology are to understand the effects of brain pathology within the context of modern theories of cognition, and to draw inferences about normal or intact cognitive function from patterns of dysfunction observed with brain pathology. Readings will focus on research investigations of brain damaged populations within one or more areas of cognition (e.g., perception, memory, or attention) that address topics of current relevance. Pre-Requisites: CPSY 0010 or CPSY 0200 or CPSY 0400 or NEUR 0010. CPSY 0900 is also strongly recommended.

**CPSY 1470. Mechanisms of Motivated Decision Making**.
How do we make decisions? This course considers the factors and mechanisms involved in motivated decision making, as informed by cognitive, neuroscientific, and computational modeling approaches. Readings will span a range of populations (e.g., healthy adults, adults with acquired brain damage, monkeys) and methods (e.g., behavioral, genetic, pharmacological and neuroimaging studies, electrophysiological recordings). Computational models will be prominently featured as a means for formalizing decision making theories across multiple levels of analysis, some focusing on high-level cognitive computations and others on neural mechanisms. Prerequisite: CPSY 0010, 1291, 1400, 1491, 1492, or NEUR 0010. Enrollment limited to 20. Not open to first year students.

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| Fall | CPSY1470 | S01 | 18283 | M | 3:00-5:30(03) | (M. Frank) |

**CPSY 1478. Translational Models of Neuropsychiatric Disorder**.
This course will be an upper level seminar course focused on reading and understanding the primary literature related to the use of animals to model human neuropsychiatric disorders. Throughout the course we will discuss the appropriateness, use, and limitations of animal models for studying human pathology. We will discuss a range of topics building from basic concepts of evolution, development, and genetics to the practice of using animals to study aging and memory function, affective pathology, and developmental disorders. Prerequisites: CLPS 0010 or NEUR0010; and preferably at least one of the following: CPSY 1150, CPSY 1480, CPSY 0400, CPSY 0100, CPSY 2100, NEUR 1740; NEUR 1540.

**CPSY 1480A. Cognitive Neuroscience of Emotion**.
Topics discussed in this course include: visual attention, awareness, emotional perception, and emotional memory. Classes will be structured around the discussion of current papers in the literature. Active participation in class is required, including the presentation of papers from the literature. Enrollment limited to 20.

**CPSY 1480B. Cognitive Aging and Dementia**.
This seminar examines the cognitive changes associated with normal aging and age-related dementia (e.g., Alzheimer's Disease). Topics covered will include changes in the neurocognitive systems mediating memory, perception, and attention. The course is primarily intended as an advanced seminar for junior and senior concentrators in Psychology, but is also intended for other students interested in aging and the neuropsychology of cognition. Recommended prerequisites: An introductory course in cognitive neuroscience (CPSY 0400, CPSY 0450, CPSY 0200) or permission of the instructor. CPSY 0900 or a comparable Statistics course is strongly recommended. Preference will be given to senior CPSY concentrators.

**CPSY 1480C. Cognitive Control Functions of the Prefrontal Cortex**.
The prefrontal cortex has long been known to support higher cognitive functions, including working memory, planning, reasoning, and decision making. This seminar offers an in-depth review of recent empirical and theoretical approaches to understanding prefrontal cortex function. This year the course will focus on prefrontal contributions to the cognitive control of declarative memory. Enrollment limited to 20.

**CPSY 1480D. Cognitive Neuropsychiatry**.
Will provide a broad survey of the field of cognitive neuropsychiatry. The approach taken is based upon the knowledge of brain-behavior-cognition relationship and allows explaining psychiatric phenomena in terms of deficits in normal cognitive mechanisms, as well as drawing conclusions about normal cognitive functioning based on patterns of impaired and intact cognition observed in clinical populations. Topics surveyed include delusions, hallucinations, social-emotional symptoms of schizophrenia, thought and language disorders, conversion disorder, obsessive-compulsive disorder, bipolar disorder, major depression, Parkinson's and Alzheimer's Disease. Prerequisite: CPSY 0400, or instructor permission. Enrollment limited to 25 juniors, seniors and graduate students concentrating in CPSY or LING.

**CPSY 1480H. Disorders of Memory**.
In his 1882 treatise on Diseases of Memory, Ribot wrote that “the disorders and maladies of this faculty, when classified and properly understood, are no longer to be regarded as a collection of amusing anecdotes of only passing interest. They will be found to be regulated by certain laws which constitute the very basis of memory and from which its mechanism is easily laid bare.” In that spirit, this seminar will examine how both organic (e.g., Korsakoff syndrome, herpes encephalitis, semantic dementia) and functional (e.g., fugue, posthypnotic amnesia, multiple personality disorder) amnesias can inform our understanding of human memory.

**CPSY 1480I. Memory, Space, and the Hippocampus**.
Although the hippocampus is one of the most studied brain structures of the last century, there is still considerable disagreement about its core function. In one view, the hippocampus is essential for forming memories of the unique episodes in our lives. In another, the hippocampus is devoted to spatial navigation, encoding a spatial map of the world and our location in it. Reconciling these viewpoints has posed a significant scientific challenge. This seminar examines differing perspectives on how the hippocampus contributes to cognition and behavior, with the goal of integrating evidence from multiple subfields of psychology and neuroscience.

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| Fall | CPSY1480I | S01 | 19218 | MW | 3:00-4:20(10) | (S. Favila) |

**CPSY 1490. Functional Magnetic Resonance Imaging: Theory and Practice**.
This course will train students in the practice and use of functional magnetic resonance imaging (fMRI) as a cognitive neuroscience methodology. Topics covered include MRI physics, the physiological basis of the BOLD signal, experimental design, data collection, statistical analysis, and inference. A practical component of the course includes the opportunity to collect and analyze fMRI data at the Brown MRF. Prerequisites: (CPSY 0400 or NEUR 0010) and CPSY 0900, or instructor permission. Enrollment limited to 20.

**CPSY 1491. Neural Modeling Laboratory**.
Numerical simulations of cognitively oriented nervous system models. Discussion of parallel, distributed, associative models: construction, simulation, implications, and use. Prerequisites: MATH 0090, 0100, or equivalent; knowledge of a computer language; some background in neuroscience or cognitive science is helpful.

**CPSY 1492. Computational Cognitive Neuroscience**.
We explore neural network models that bridge the gap between biology and cognition. Begins with basic biological and computational properties of individual neurons and networks of neurons. Examines specialized functions of various brain systems (e.g., parietal cortex, frontal cortex, hippocampus, ganglia) and their involvement in various phenomena, including perception, attention, memory, language and higher-level cognition. Includes a lab component in which students get hands on experience with graphical neural network software, allowing deeper appreciation for how these systems work. Prerequisites: CPSY 0200 or NEUR 0010.

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| Spr | CPSY1492 | S01 | 26266 | TTh | 10:30-11:50(09) | (M. Frank) |

**CPSY 1495. Affective Neuroscience**.
This course will survey key topics and methods in research on the neuroscience of affect and emotion. It is ideally suited for advanced undergraduates or graduate students who have taken an introductory cognitive neuroscience and/or psychology course. This course will use a variety of behavioral and neuroscientific data to examine the structure of affect/emotion; how affective processes shape cognition and action; how cognition in turn shapes affect; and the nature of variable affective reactions within/across individuals. The course will include in-class presentations, discussions, short lectures, short and long forms of reading responses, and a final research proposal.

**CPSY 1500. Perception and Action**.
The ecological approach treats perceiving and acting as activities of agent-environment system rather than an isolated "mind," and offers an alternative to the prevailing computational/representational view. Topics include inferential and direct perception, perception of the 3D environment, visual control of action, dynamics of motor coordination, and self-organization of behavior. Lecture and discussion. Prerequisite (any one of the following): CPSY 0010, CPSY 0020, CPSY 0500, or CPSY 0510.

**CPSY 1510. Laboratory in Auditory Perception**.
This course considers how we sense and comprehend the world through sound. Laboratory sessions focus on basic acoustics and demonstrations of loudness, pitch, and musical timbre. Class discussions explore topics such as pitch perception, speech perception, music cognition, and auditory scene analysis. Students record and analyze original soundscapes, and then conduct their own experiments to analyze listeners' responses to these soundscapes.

**CPSY 1520. Computational Vision**.
An introduction to computational models of biological vision summarizing traditional approaches and providing experience with state-of-the-art methods. We will sample topics from low- and mid-level vision including fundamental aspects of image, stereo, motion, surface and color processing to high-level vision including object and action recognition as well as scene understanding. Connections to contemporary research in computer vision and computational neuroscience will be emphasized highlighting how computational models may motivate the development of new hypothesis for the design of experiments in visual perception. Prerequisite: comfort with basic linear algebra and at least one introductory course in Computer Science or programming, or instructor permission.

**CPSY 1530. 3D Shape Perception**.
Our ability to move in the environment, recognize and grasp objects, depends enormously on the capacity that the brain has in organizing the visual stimulation in the perceived 3D layout. 3D objects in the world project on the human retina flat images. How does the brain re- transform these flat images into a 3D representation? Enrollment limited to 40.

**CPSY 1540. Perceiving and Acting in 3D**.
How does visual stimulation inform the brain about the three-dimensional structure of the world? What information is important for complex organisms, like humans and other primates, to be able to successfully interact with the surrounding environment? In this course we will examine how different sources of visual information such as stereo, contours, texture gradients, shading, and optic flow contribute to the vivid experience of 3D shape by the human visual system. Moreover, connections will be made to the mechanisms that govern goal directed actions, in order to unveil the commonalities between 3D processing for conscious perception and visuomotor mappings.

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| Fall | CPSY1540 | S01 | 18284 | TTh | 9:00-10:20(05) | (F. Domini) |

**CPSY 1550. The Psychology of Aversion**.
Explores what is aversive to us and why. In particular, the ways in which sensory preception (e.g., smell, taste, vision), cognition, culture, personal experience and neurobiology mediate our avoidance responses will be analyzed. The purpose of avoidance from an evolutionary perspective and how the emotion od disgust is uniquely human will be a theme throughout the course. Topics will range from neuropsychological disorders to our social behavior and morality. Additionally, why we are attracted to stimuli that "should" inspire avoidance (e.g., horror movies, roller coaster rides) will be examined. Students will acquire a broad knowledge of the psychology of aversion through course readings, discussions, projects and active participation. In addition to presentations and discussion, class time activities may include completing questionnaires, watching vidoes and assessing various sensory stimuli. Prerequisite: CPSY 0010, CPSY 0020, or NEUR 0010.

**CPSY 1555. The Sensory and Psychological Science of Food and Eating Behavior**.
How do our senses—what we see, hear, smell, feel and taste, influence what, when, and how much we eat? How do our moods, expectations, and the situation we are in influence our feelings of hunger and satiety, and even how we metabolize food? How does what we eat influence our emotions, and how do our moods and personalities influence what we eat? What are the factors that negatively or positively influence our cravings, and how can we control them? How does what we eat affect our moral and social behavior with others, and how might all the ideas covered in this course (“neurogastronomy”) be applied towards sustainability? These topics and more will be explored in this seminar course through critical reading, class presentations, writing and research projects, and active discussion.

**CPSY 1560. Visually-Guided Action and Cognitive Processes**.
One of the main purposes of encoding visual information is to perform visually-guided actions to directly interact with the external world. This seminar will shed light on the behavioral and underlying neural mechanisms involved in integrating perception and cognitive processes, and converting them into action. We will also explore how visuo-motor behavior can provide a useful tool to study a wide range of conscious and unconscious cognitive processes including the current locus of attention, the nature of language representation, spatial representation of number, and high-level decision-making. Prerequisite: CPSY 0010, CPSY 0020, or NEUR 0010.

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| Spr | CPSY1560 | S01 | 26267 | T | 4:00-6:30(16) | (J. Song) |

**CPSY 1561. The Nature of Attention**.
In daily life, most visual scenes are complex and crowded so that our visual system faces a daunting task of processing an enormous amount of information at any given moment. Thus, attentional mechanisms are necessary to select relevant objects or events and to guide actions. In this course, we will understand behavioral and underlying neural mechanisms involved in visual attention and their interaction with memory, learning, and goal-directed action. We will also study investigations of spared and impaired patterns of attention-based performance following brain injury. Prerequisites: CPSY 0500.

**CPSY 1565. The Sense of Smell: Perception, Cognition, Health & Technology**.
In this course students will discover the fascinating and unique features of the human sense of smell with a special focus on how the sensory, perceptual, and psychological mechanisms of olfaction are involved in our emotions, thoughts, behavior, health, and the latest innovations and applications in technology. These topics will be addressed in a seminar format with critical reading, class presentations, research idea development, written assignments, and active participation.

**CPSY 1570. Perceptual Learning**.
This course will focus on perceptual learning and visual plasticity. The goal of this course is to understand the mechanisms of visual perceptual learning and visual and brain plasticity. Perceptual learning is defined as long-term performance improvement as a result of visual experiences. Enrollment limited to 20.

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| Spr | CPSY1570 | S01 | 26268 | F | 3:00-5:30(15) | (T. Watanabe) |

**CPSY 1571. Visual Consciousness**.
This course will focus on consciousness related to visual perception. The goal of this course is to understand the neural correlates of visual consciousness. 1) We will learn about basic neural mechanisms of visual processing and other brain functions. 2) We will discuss philosophical and neuroscientific models of visual consciousness. 3) We will examine the roles of attention, reward, and memory in visual consciousness. 4) We will evaluate recent neuroscientific experiments with animals and humans and their potential to advance the research of consciousness.

**CPSY 1580A. Visually-Guided Action and Cognitive Processes**.
One of the main purposes of encoding visual information is to perform visually-guided actions to directly interact with the external world. This seminar will shed light on the behavioral and underlying neural mechanisms involved in integrating perception and cognitive processes, and converting them into action. We will also explore how visuo-motor behavior can provide a useful tool to study a wide range of conscious and unconscious cognitive processes including the current locus of attention, the nature of language representation, spatial representation of number, and high-level decision-making. Prerequisite: CPSY 0010, CPSY 0020, or NEUR 0010. Enrollment limited to 40.

**CPSY 1580C. Visualizing Information**.
There has been an explosion of interest in how to present information in a visual way rather than as a bunch of boring numbers. Visualizations can be outstanding at conveying information, but there have also been colossal failures. We will explore the good, the bad, and the ugly and harness knowledge of visual perception to understand why some are more successful than others. Someone interested in how to create effective visual displays (posters, infographics) would benefit from this course. Some background in visual perception is recommended such as a CPSY or NEUR course about vision or familiarity with graphic design.

**CPSY 1580D. Seminar in Spatial Cognition**.
How do we perceive, learn, remember, and interact with space? This seminar explores spatial knowledge in humans, animals, and robots, its sensory and neural basis, and how it is used to navigate and think spatially. We will investigate how desert ants find their way home, Nobel prize-winning ‘place’ and 'grid' cells, what your cognitive map of campus is really like, differences in spatial ability, and the effects of GPS on human wayfinding.

**CPSY 1580E. Perception, Attention, and Consciousness**.
This seminar will examine how recent neuroscientific research on perception, attention, and consciousness relates to fundamental questions of mental causation, the mind-body problem, and free will. We will address these important questions at the level of NMDA receptors, synapses, dendrites, neurons, and neuronal circuits. We will also consider the psychological and philosophical implications of having such an architecture realized in our brains.

**CPSY 1590. Visualizing Vision**.
This course provides hands-on experience in studying vision using computer graphics combined with visual psychophysics. Students will gain a better understanding of how images are formed, how one employs properties of image formation in the experimental study of vision, and how the perception of complex images function in biological systems. Labs will rely on matlab and several computer graphics packages (e.g; Lightwave). Enrollment limited to 20.

**CPSY 1591. Experimental Analysis of Vision for Action and Vision for Perception: Are There Separate Mechanisms?**.
A dominant theory of how humans perceive the world and perform actions in it postulates the existence of two visual systems for perception and action. In this lab class, students will learn standard experimental paradigms to test this theory. They will conduct research projects aimed at challenging its basic assumptions. Specifically, (1) they will formulate scientific hypotheses; (2) design appropriate empirical tests; (3) build the experimental apparatus in a lab equipped with a complex system that can track motor movements within a virtual reality environment; (4) collect behavioral data and analyze it in order to produce a complete scientific report.

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| Spr | CPSY1591 | S01 | 26269 | TTh | 1:00-2:20(08) | (F. Domini) |

**CPSY 1610. Cognitive Development**.
How do infant and preschoolers learn about the world? We will examine children's understanding of the physical world, psychological kinds, biological entities, number, objects, and space. Students are expected to read and comment on both empirical and theoretical primary source articles, to participate in weekly discussions, and complete a set of writing assignments. Prerequisites: CPSY 0600 or CPSY 0610 or EDUC 0800.

**CPSY 1611. Cognitive Development in Infancy**.
The acquisition of knowledge during the first year of life. Special attention to the infant's emerging concepts of space, objects, intermodal sensory connections, and speech as well as to such issues as the role of innate knowledge and the nature of the infant's concepts and categories.

**CPSY 1620. Developmental Cognitive Neuroscience**.
This course will examine fundamental topics in cognitive development from the point of view of the developing brain. Topics of interest will include developing abilities in perception, attention, action, object concepts, memory, learning, planning, language, and social cognition. Typical and atypical brain development will be considered. Prerequisite: One of CPSY 0600, CPSY 0610, EDUC 0800, or permission of the instructor. Enrollment limited to 40.

**CPSY 1621. The Developing Brain**.
Analysis of brain development, focusing on neural substrates of psychological processes in both animals and humans. Prerequisites: CPSY 0010 or NEUR 0010. Not open to first year students or sophomores. Instructor permission required.

**CPSY 1630. Perceptual Development**.
No description available.

**CPSY 1640. Relationships and Human Development**.
Explores formation and maintenance of relationships across childhood and early adulthood, as well as their importance for the development of social-emotional competence. Topics include: early caregiver-child relationships, peer relationships emerging in the school years, relationships with significant adults outside the family, family relationships and functioning, and marital relationships. Also considers approaches to intervention, particularly with respect to peer relationships. Instructor permission required. Enrollment limited to 20 senior or graduate-level Psychology concentrators.

**CPSY 1650. Child Language Acquisition**.
All normally developing children acquire language, yet there is little agreement about how this takes place. This class explores the course of language acquisition from birth to babbling and first words to the use of complex syntax, discussing philosophical, theoretical, and methodological approaches to the problem. Includes practical experience analyzing child language data. Prerequisite: CPSY 0800 or permission of the instructor.

**CPSY 1660. Learning Compositional Language**.
Babies come into the world not knowing a word. Within three years, they know enough of their first language to understand the difference between, "your doll is a toy" and "the stove is not a toy". By age five, they can't yet be trusted to look both ways before crossing the road, but their language is close to native adult speakers. How is this possible?
This course looks at how children learn how language expresses meaning; how they go from understanding individual words to putting words together to compose and express complex, meaningful ideas – the development of syntax, semantics, and pragmatics.

**CPSY 1680A. Topics in Development: Social Learning**.
How do we learn from other people? If a child was raised in the absence of any social interaction, what cognitive structures would s/he have? This course will focus on what and how children learn from others, including concepts like language, rituals, religion, biology. Emphasis will also be on "selective trust" - whether we learn from all informants equally or are rational in how we learn from others. Prerequisite: CPSY 0600, 0610, or 0700. Enrollment limited to 20 juniors and seniors.

**CPSY 1680B. Topics in Development - Developmental Disorders**.
This course will examine developmental disorders from a developmental cognitive neuroscience perspective. We will examine issues general to studying developmental disorders. What is the role of understanding typical development in examinations of atypical development? What are proper experimental strategies for studying disorder? Readings will focus on the neurobiological substrates of disorder, associated cognitive impairments, and clinical symptoms. We will then focus on specific disorders include Autism, ADHD, Dyslexia, Learning Disabilities etc. Enrollment limited to 20. Prerequisite: CPSY 0600, or 0610.

**CPSY 1680C. Topics in Development: Theory of Mind**.
How do we understand others' mental states? How do we acquire our knowledge of mental states at all? This course will focus on how human beings acquire knowledge of our own and others' mental states. Emphasis will be placed on integrating empirical data with particular theories of cognitive development.

**CPSY 1680F. Topics in Development: The Developmental and Evolutionary Origins of Mind**.
Human behavior can sometimes appear strikingly different from other animals: we create complex tools, plan for the future, and have sophisticated cultural traditions and group behaviors. What cognitive processes underlie these behaviors, and to what extent are they shared with other animals or unique to humans (and is that even the right question to ask)? What "counts" as intelligence or as having a mind? To explore these exciting questions, we will examine research and theoretical perspectives from psychology, biology, behavioral ecology and philosophy, and look at diverse aspects of learning and cognition in human and non-human primates along with a sampling of other species. Possible topics include spatial and numerical cognition, physical and causal reasoning, cooperation, communication, social learning and theory of mind, culture, morality, emotions, memory, foresight, and self-control in both human children and non-human animals.

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| Fall | CPSY1680F | S01 | 18285 | Th | 4:00-6:30(04) | (D. Buchsbaum) |

**CPSY 1690. Laboratory in Developmental Psychology**.
Conceptual and methodological foundations of research design and analysis in developmental psychology, with particular reference to techniques commonly used in studying cognitive development. We will cover general principles of experimental design, measurement and assessment, and strategies of data analysis. Practical and ethical issues involved in conceiving, designing, executing, interpreting, and presenting research will be considered. Recommended prerequisites: CPSY 0610, and CPSY 0900 or equivalent. Enrollment limited to 15.

**CPSY 1700. Abnormal Psychology**.
The study of anxiety, stress, and neurotic disorders, psychosomatic disorders, deviant social behavior, affective disorders, and schizophrenia. Considers theories of etiology (causes) and methods of therapeutic treatment, case studies, experimental research, and clinical research.

**CPSY 1701. Controversial Issues in Mental Health Practice**.
Examination of controversies involving scientific, clinical and social practices concerning mental health and illness. Topics will include: classification and diagnosis, biases in psychiatric research and practice, specific conditions (e.g., gender identity disorder, ADHD, depression), treatment issues (e.g., ECT, medicating children with psychiatric drugs), screening for mental illness in public schools, and social-legal issues (e.g., insanity defense, duty to warn, involuntary treatment). Enrollment limited to 20.

**CPSY 1703. Forensic Psychology**.
This course will examine the intersection between psychology and the law as pertaining to both civil and criminal matters. Students will learn the nature of forensic psychology as it applies to the assessment of criminal defendants, including the insanity defense, fitness to stand trial, offender recidivism, risk of dangerousness assessments, expert testimony, justice for minoritized groups, and psycholegal issues. This course will also review civil legal scenarios involving a psychological component, such as civil commitment, disability, fitness for duty, personal injury, child custody, fitness to parent, etc.

**CPSY 1710. Political Psychology**.
This seminar explores topics at the intersection of psychology and political science. Topics include political attitudes, perceptions and behaviors. The psychology of ordinary individuals, political leaders, and groups will be studied in contexts where their interests do and do not coincide. As conflicts among these agents are particularly interesting, this course will stress psychological aspects of wars, oppression, and terrorism. Enrollment limited to 20.

**CPSY 1720. Human Resilience**.
This course explores answers to the question of what enables some individuals to escape the worst psychological consequences of extreme personal disruption caused by a range of human-made and natural disasters. It examines personal accounts, pertinent psychological research, theoretical discussions, and the creative works of catastrophe survivors. Enrollment limited to 20.

**CPSY 1730. Psychology in Business and Economics**.
The goal of this course is to explore emerging themes at the intersection of psychological science, business, and behavioral economics. Psychologists are primarily interested in detecting limits to human rationality, whereas economics tends to proceed within the rational-actor model. In business, questions arise of how theoretical models and empirical findings related to the practice of managerial decision-making. Investigations of power and the psychological impact of money are relatively recent additions to the suite of research topics. New methodologies, such as neuro-imaging have led to advances not represented in the traditional framework of organizational psychology. Enrollment limited to 20 junior and senior Psychology and Behavioral Decision Making concentrators.

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| Spr | CPSY1730 | S01 | 26270 | TTh | 9:00-10:20(05) | (J. Krueger) |

**CPSY 1750. Blame and Punishment**.
This hybrid lecture/seminar course provides a scientific investigation of two related but distinct forms of human moral regulation: blame and punishment. Students learn about the interdisciplinary literature on moral judgment and moral sanctions, drawing on psychology, cognitive science, behavioral economics, sociology, history, law, and anthropology. Students investigate the cognitive, social, and affective differences between blame and punishment, about their distinct cultural history and institutional dynamics, and about their functional and dysfunctional uses. Students critically examine core research articles on the topics, and they present, discuss, and write about their responses to the work.

**CPSY 1760. The Moral Brain**.
How do we learn to cooperate, help others in need, and appropriately respond after being treated unfairly? The human mind strives to resolve the competing pressures of self-interest against the greater good. By drawing upon many disciplines including philosophy, social and affective neuroscience, abnormal psychology, law, and experimental economics, this course covers topics from 18th-century philosophy to modern-day neuroscience. We will examine 1) the philosophical and epistemological foundations of moral thought, 2) the influence of emotion and contextual framing on moral action, 3) the psychopathology of immoral choice, and 4) the underlying cognitive and neurobiological processes that guide moral decision-making. Registration for this course will be determined by the faculty on the first day of class. The final class list is determined by 1) some working knowledge in cognitive neuroscience (evidence by taking at least 1 prior class in the

**CPSY 1770. Stigma and Prejudice**.
This seminar focuses on empirical research ranging across several topics in the psychology of prejudice, stereotyping, discrimination, and social stigma. We will read, interpret, and discuss quantitative research in social psychology (i.e., studies that contain statistics in their results) and the implications of these scholarly contributions to our knowledge of the inner workings of intergroup behavior. This includes understanding individual differences and contexts related to exhibiting prejudicial behaviors (prejudice/bias), the implications of this behavior for targets of discrimination (stigma), and contributions of each of these to how groups and group members interact with one another in society (intergroup relations).

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| Spr | CPSY1770 | S01 | 26271 | MW | 8:30-9:50(02) | (J. Okonofua) |

**CPSY 1781. Thinking about the Social World**.
Understanding and acting in the social world require, among other things, the process of thinking in abstractions. Abstraction broadens mental horizons, integrates new experiences, and allows communication with other people. In this course we will discuss the different ways in which abstraction has been defined in the literature and look into some surprising implications of abstraction for people's understanding of, and actions in, the social world.

**CPSY 1783. Nudge: How to Use Social Psychology to Create Social Change**.
How can we make people eat healthier food, protect the environment, save money for retirement, or behave ethically? How can we reduce negative behaviors such as police violence and discrimination of underrepresented groups? Using an interdisciplinary approach, this course will introduce how to "nudge"—how to change people's behavior through psychological insights, without forbidding options or changing economic incentives. In particular, we will learn about cognitive and emotional biases in decision-making; then we will focus on "nudging remedies" for these systematic biases in various domains, such as health and wealth; finally, we will actively tackle some problems in an in-class nudging workshop.

**CPSY 1790. Personality and Clinical Assessment**.
Examines methods used in the study of child and adult personality, including microanalysis of social interactions, observer report, self report, test data, and life outcome data. Standardized personality assessment instruments will be examined in the context of their reliability, predictive and construct validity. Students will design research projects using these methods, collect and analyze data, give oral presentations, and prepare a written report of their research. Prerequisites: CPSY 0701 and CPSY 0900 or equivalent. Enrollment limited to 27.

**CPSY 1791. Laboratory in Social Cognition**.
Examines principles of experimental design and analysis in the context of classic and contemporary research in social cognition. Students replicate and extend several studies on topics such as person perception, social stereotyping, or judgment and decision making. Students will participate in the design of these studies, gather their own data, analyze them, and report the findings in oral presentations and written reports. Prerequisites: CPSY 0010, CPSY 0700, and CPSY 0900. Enrollment limited to 24.

**CPSY 1800. Language Processing**.
When you have a thought, how are you able to express it in a sentence? How does hearing a sentence cause you to think a thought? And why is Siri still worse at understanding sentences than a typical 5-year-old? Our focus will be on how words are put together into sentences, and then into narratives -- on syntactic, semantic, pragmatic, and discourse processing. We will consider and try to integrate multiple sources of evidence: formal analyses, computational models, and behavioral and neuropsychological experiments. Prerequisite: one of CPSY 0200, LING 0100, or CPSY 0800.

**CPSY 1810. Syntactic Theory and Syntactic Processing**.
The interface between work in theoretical syntax and psycholinguistic research on syntactic processing. Consideration of how results in psycholinguistics support various models of human language processing. Recommended prerequisite: CPSY 1330.

**CPSY 1820. Language and the Brain**.
This course will examine the neural systems underlying language and its parts – sounds, words, sentences, and meaning. We will examine effects of brain injury on speaking and understanding in individuals with left hemisphere injury, right hemisphere injury, and with the two hemispheres split. We will also study brain plasticity by examining recovery of language in aphasia and the effects on language when there is deprivation to areas of the brain specialized for hearing in the deaf and seeing in the blind. Behavioral, electrophysiological and neuroimaging evidence will be investigated in those with and without brain injury. Prerequisites: one of the following – CPSY 0010, LING 0100, CPSY 0450, NEUR 0010.

**CPSY 1821. Neuroimaging and Language**.
Examines neuroimaging approaches to language processing including fMRI, PET, TMS, and ERP. Consideration of the neural systems underlying speaking and understanding. Topics include neural basis of speech, lexical/semantic, and syntactic processing, mirror neurons and language, multisensory integration, meanings of words, literacy, and special populations. Recommended: either NEUR0010, CPSY 0020 or CPSY 0800 and one of the following: CPSY 0400, CPSY 0410, CPSY 1820, CPSY 1822, NEUR1030, NEUR1660, or by permission.

**CPSY 1822. Subcortical Brain Bases of Language and Thought**.
Recent studies indicate that the neural bases of human language and thought derive from a complex network of circuits within and connecting subcortical and cortical structures. Students prepare to evaluate published papers, noting the relationships that hold between data and theories. Relates neurophysiologic studies to current linguistic and cognitive theories and provides the background for independent research. Prerequisites: CPSY 0810, CPSY 1820, CPSY 1821, or NEUR 0010.

**CPSY 1850. Language Processing in Humans and Machines**.
Understanding language requires transforming sequences of sounds into words, combining words into meaningful thoughts, and incorporating thoughts into an ongoing discourse. Psychologists and linguists have been trying to reverse-engineer how humans do this so easily, at the speed of conversation. In parallel, computer scientists have been trying to engineer machines to solve the same problems, leading to products like Siri and Alexa. This class will explore how these two kinds of research can help each other, bringing recent insights from machine learning into the study of human language processing, and insights from human processing into the architectures of machine language systems.

**CPSY 1860. Logic in Language and Thought**.
The best theories of how language conveys meaning propose that word meanings have an abstract and formal logical structure. Looking at the most abstract and logical words words as case studies -- e.g. not, and, or, every, some, if… then -- we will first try to understand the relation between these word meanings and the corresponding logical operators. We will then ask, how could these words be learned? How are adults representing their meanings? How are these meanings used in reasoning by both children and adults? We'll draw on existing research across the cognitive sciences, and come up with proposals of our own for what the next research steps might be.

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| Spr | CPSY1860 | S01 | 26272 | Th | 4:00-6:30(17) | (R. Feiman) |

**CPSY 1880A. Speech Prosody**.
The broad aim of this seminar is to discuss the various ways in which linguistic and paralinguistic meanings can be conveyed by the way that speakers produce their utterances. The topics will include the effect of pitch variation and phrasing on pragmatic meanings and discourse functions, turn-taking strategies, cue phrases and filled pauses, new-given information, or prosody of deceptive speech. Recommended prerequisite: CPSY 0030.

**CPSY 1880B. Cognitive Neuroscience of Language Acquisition**.
The ability to acquire language is unique to humans. This class explores our language-specific biological endowments. Topics include: Genetics and evolution of language; the brain-basis of acquisition; effects of age on language learning ability; effects of environmental differences (such as growing up blind or deaf) on acquisition; and language in special populations such as autism. Students will read and discuss empirical and theoretical articles, and complete writing assignments and problem sets. Prerequisite: CPSY 0060, 0610, 0800, or EDUC 0800, or instructor permission. Enrollment limited to 20. Not open to first year students.

**CPSY 1880D. Topics in Psycholinguistics: Language + Memory**.
Memory is an integral part of language comprehension. Research suggests that memory follows various divisions (time, modality, task, etc), and this course examines whether language processing follows the same divisions and to what extent it overlaps qualitatively with memory in different cognitive contexts and timescales. Students will read and discuss research on language comprehension, classic memory tasks, and computational models of memory.

**CPSY 1890. Laboratory in Psycholinguistics**.
An advanced course in methodological approaches to the study of psycholinguistics. Processes (e.g. with adult lexical access, sentence processing, corpus linguistics, etc.) Recommended prerequisites: CPSY 0800 and CPSY 0900, or equivalent.

**CPSY 1891. Research Methods in Physiologic and Acoustic Phonetics**.
Introduction to laboratory techniques and the analysis of data relevant to physiologic and acoustic phonetics. Emphasis on the use and interpretation of wave-form and spectrum analysis, electromyography, cineradiography, high-speed motion pictures, computer modeling of oral tract output, and experimental techniques involving the perception of synthetic and natural speech.

**CPSY 1900. Research Methods And Design**.
This course is designed to provide CLPS concentrators (psychology/ cognitive science/cognitive neuroscience) with a variety of tools needed to conduct research: sources of data, standard designs (e.g., factorial experimental, correlational, longitudinal), research ethics, and best practices of literature review (e.g., meta-analysis). The course will include lectures, laboratory exercises, data collection, statistical analysis, and presentation of findings in written and oral reports.

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| Fall | CPSY1900 | S01 | 18288 | TTh | 1:00-2:20(06) | (L. Welch) |
| Fall | CPSY1900 | C01 | 18308 | T | 9:00-10:20 | (L. Welch) |
| Fall | CPSY1900 | C02 | 18309 | Th | 9:00-10:20 | (L. Welch) |
| Fall | CPSY1900 | C03 | 18310 | W | 5:40-7:00 | (L. Welch) |
| Spr | CPSY1900 | S01 | 26274 | TTh | 1:00-2:20(08) | (A. Simmons) |

**CPSY 1901. Research Methods**.
This course is designed to provide CLPS concentrators (Cognitive Science/ Cognitive Neuroscience/Psychology) with a variety of tools needed to conduct research: sources of data, standard experimental designs, and research ethics. The course will include lectures, section meetings, data collection, statistical analyses, and written and oral reports. This is a flipped course with content material (lectures) available as videos to be viewed before class meetings. Course includes one 80-min lecture meeting and one 80-min lab section each week, and students are expected to attend both. This course is enrollment capped at 60 students.

**CPSY 1950. Deep Learning in Brains, Minds and Machines**.
In recent years, a class of machine learning algorithms called deep neural networks have brought about a revolution in the field of artificial intelligence. Deep learning networks have pushed the state of the art on a range of challenging problems that had until now seemed out of reach for machines. At the same time, these neural networks have also led to progress in computational neuroscience with improved models of neural responses in higher visual cortical areas. The goal of this course is to provide an advanced introduction to deep learning from the joint perspective of machine learning and neuroscience.

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| Spr | CPSY1950 | S01 | 26275 | TTh | 2:30-3:50(11) | (T. Serre) |

**CPSY 1960. Senior Seminar in Behavioral Decision Sciences**.
This is the capstone course for the Behavioral Decision Sciences (BDS) concentration. It entails a research project that serves as a culmination of each student's experience within the concentration. Students should choose a research topic compatible with the three electives that they have taken or will take as part of the concentration. They will also need a faculty advisor for the project. The course entails presentation of your ideas and plans, as well as your final results.

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| Fall | CPSY1960 | S01 | 18289 | F | 3:00-5:30(11) | (S. Sloman) |

**CPSY 1970. Directed Reading in Cognitive and Psychological Sciences**.
Independent study or directed research in cognitive science. Section numbers vary by instructor. Please check Banner for the correct section number and CRN to use when registering for this course. Instructor permission required.

**CPSY 1980. Directed Research in Cognitive and Psychological Sciences**.
Required of all ScB concentrators and Honors students in psychology. Instructor permission required. Section numbers vary by instructor. Please check Banner for the correct section number and CRN to use when registering for this course.

**CPSY 1990. Senior Seminar in Cognitive Science**.
Examines general philosophical and theoretical issues that cut across cognitive science. Each student writes a substantial paper on a topic in cognitive science. Required of cognitive science concentrators. Enrollment limited to concentrators in the 7th semester or beyond, and, by permission, to others who have significant course background in cognitive science.

**CPSY 2000. Graduate Proseminar**.
Introduces students to the CLPS Department and the University; provides a brief history of the disciplines, philosophical foundations, and ethical treatment of human subjects; provides professional training, such as preparation of CV and research statement, practice in grant writing, and foundations in scientific writing and presentation; and supports students' early stages of developing a first-year project.

**CPSY 2001. Core Concepts in Cognitive and Psychological Sciences I**.
This course is the first of a two-course sequence that provides graduate students with background in the core topics and themes in the cognitive and psychological sciences. Topics include sensory systems, perception, action, evolution and development, phonetics and phonology, attention, learning, memory, and executive function. Students are also introduced to a wide range of approaches and levels of analysis that scientists adopt to study these topics. Weekly topics are addressed in lectures and assigned readings. A separate seminar session involves presentation of current papers by students and discussion with faculty. Open to graduate students only.

**CPSY 2002. Core Topics in Cognitive and Psychological Sciences II**.
An advanced overview of fundamental issues in philosophy of cognitive science, higher-level cognition (concepts, similarity, reasoning, inference, judgment, and decision-making), higher-level language (syntax, semantics, and pragmatics), cognitive development, and social cognition. Domains will be introduced by classic readings and then followed up discussion on modern and contemporary issues in the seminar portion. All topics will be connected throughout by common themes.

**CPSY 2091. Graduate First Year Project Research**.
Please check Banner for the correct section number and CRN to use when registering for this course.

**CPSY 2092. Graduate First Year Project Research**.
Please check Banner for the correct section number and CRN to use when registering for this course. Instructor permission required.

**CPSY 2095. Practicum in Teaching**.
Each student will assist a designated faculty member in teaching a course in cognitive science or related discipline. Section numbers vary by instructor. Please check Banner for the correct section number and CRN to use when registering for this course. Instructor permission required.

**CPSY 2096. Directed Graduate Research**.
No description available. Instructor permission required.

**CPSY 2100. Core Topics in Animal and Comparative Behavior**.
No description available.

**CPSY 2132. Graduate Seminar in Learning**.
Advanced topics in animal and human learning. Topics vary from year to year; examples include theories of associative learning, animal cognition, computational models of learning and performance, and neurobiological models of basic associative processes.

**CPSY 2180. Duration Discrimination**.
No description available.

**CPSY 2181. Advanced Topics in Animal and Human Learning**.
Topics vary from year to year, examples include theories of associative learning, animal cognition, computational models of learning and performance, and neurobiological models of basic associative processes. Open to graduate students only.

**CPSY 2200. Core Topics in Cognition**.
No description available.

**CPSY 2210. Current Topics in Memory Research**.
A graduate seminar addressing selected topics in memory, including theories of normal and pathological memory, animal models of human memory, and the neural substrates of memory. Topics vary from year to year. Permission required for undergraduates.

**CPSY 2400. Biological Foundations of the Mind**.
The goal of this course is to introduce students to the study of the biological foundations of cognitive science and psychology. We will use readings from neuroanatomy, cell and molecular biology, genetics, evolutionary biology, neuroethology, and behavioral neuroscience to elucidate principles and to understand methods for exploring the neural control of complex behaviors.

**CPSY 2410. Auditory Neuroscience**.
An in-depth analysis of the neural bases of auditory cognition. Topics to be discussed include object perception, spatial processing, auditory memory, illusions, cocktail party phenomena, and representation of speech signals.

**CPSY 2450. Exchange Scholar Program**.

**CPSY 2455. The Mind Asleep**.
Seminar on selected topics in sleep, incorporating the core disciplines of psychology (Behavioral Neuroscience, Sensation and Perception, Cognitive Processes, and Social). Discussion based classes will examine sleep and affect/mood, dreaming, sleep and learning and memory, sensation/perception processes during sleep, effects of sleep deprivation and sleep disorders.

**CPSY 2500. Core Topics in Perception**.
No description available. Open to graduate students only.

**CPSY 2510. Graduate Seminar in Vision**.
Selected topics in vision, including optics of the eye, anatomy of the visual system, photochemistry of vision, psychophysics of color, acuity, models of color vision, and light as a visual stimulus. Specific topics vary.

**CPSY 2700. Core Topics in Social Psychology**.
A survey of classic and contemporary research in social psychology, including attitude formation and change, person and self perception, stereotyping, and intergroup relations. Open to graduate students only.

**CPSY 2750. Seminar in Social Psychology**.
No description available.

**CPSY 2800. Core Topics in Language**.
No description available. Open to graduate students only.

**CPSY 2900. Statistical Methods**.
A survey of statistical methods used in the behavioral sciences. Topics include graphical data description, probability theory, confidence intervals, principles of hypothesis testing, analysis of variance, correlation, and regression, and techniques for categorical data. Emphasizes application of statistical methods to empirical data.

**CPSY 2902. Quantitative Methods in Research**.
No description available.

**CPSY 2906. Experimental Design**.
The course designed for students at the intermediate level or above and will cover t-tests, power analysis, correlation, simple and multiple linear regression, logistic regression, analysis or variance, non-parametric tests, randomization and bootstrapping, among others. Instructor permission required. Open to graduate students only.

**CPSY 2908. Multivariate Statistical Techniques**.
This course covers the basic multivariate techniques currently used in psychology and related sciences: multiple regression, logistic regression, principal components and factor analysis, multivariate analysis of variance, discriminant function analysis, and log-linear analysis. Students will learn these techniques' conceptual foundations, their proper selection for a given data set, and the interpretation of computer output from statistical analysis packages (primarily SPSS). Enrollment limited to 20 graduate students.

**CPSY 2970. Preliminary Examination Preparation**.
For graduate students who have met the tuition requirement and are paying the registration fee to continue active enrollment while preparing for a preliminary examination.

**CPSY 2980. Foundations of Advanced Statistics**.
This course lays the foundation of graduate-level statistics concepts for all Ph.D. students in the CLPS Department. The course covers the basic multivariate techniques currently used in social and cognitive sciences: multiple regression, factorial and mixed between/within ANOVA, MANOVA, and linear approaches to categorical data analysis. The course does not cover mixed-effects (multi-level) analysis, covariance structure analysis (PCA, FA, SEM), or Bayesian statistics. The minimum prerequisite statistics knowledge assumed for the course will be undergraduate statistics, as covered in CLPS 0900 or comparable courses. Thus, the course assumes knowledge of such basics as point estimates, confidence intervals, normal distributions, hypothesis testing, t tests, univariate linear regression, and one-way ANOVA. Students will have assigned readings, attend lectures, complete weekly homeworks, and write two take-home exams.

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| Spr | CPSY2980 | S01 | 26276 | TTh | 2:30-3:50(11) | (J. Trost) |

**CPSY 2981. Advanced Statistics Module I: Categorical Data Analysis**.
This course is a half-semester advanced statistics module. The module covers basic and advanced categorical data analysis techniques. It starts with such topics as the binomial test, McNamar's, various uses of the chi-square test, means and correlation tests for rank data. It then reviews log-linear regression, logit, and logistic regression and expands on logistic regression (e.g., Poisson, multinomial). Finally, it introduces linear and generalized mixed-effects models.

**CPSY 2982. Advanced Statistics Module II: Applied Bayesian Statistics I**.
CPSY 2982 covers basic and advanced topics in Bayesian Statistics. It will include both the theoretical development of the core ideas of Bayesian Statistics, as well as hands-on data analysis on using data and models common in psychology, cognitive science, and social sciences more broadly.

**CPSY 2983. Advanced Statistics Module III: Mixed Effects Modeling**.
Course Overview: This 7-week module provides a comprehensive introduction to mixed effects modeling, a powerful statistical technique for analyzing data with multiple levels of variability. This course is designed to introduce students to the theoretical underpinnings of mixed effects models and provide opportunity for application and interpretation. Topics include introduction to multilevel structures, multilevel logistic regression, estimation and statistical inference, and causal inference using multilevel models.

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| Fall | CPSY2983 | S01 | 18903 | TTh | 2:30-3:50(12) | (J. Trost) |

**CPSY 2984. Advanced Statistics Module IV: Machine Learning**.
This graduate module focuses on using advanced machine learning techniques to model nonparametric data with complex, high-dimensional associations commonly found in cognitive and psychological research. The course covers a variety of algorithms and models, including ensemble methods, regularized regression, decision trees, and social network models. Emphasis will be placed on understanding the strengths and limitations of different machine learning approaches in the context of psychological and cognitive phenomena.

**CPSY 2990. Thesis Preparation**.
For graduate students who have met the residency requirement and are continuing research on a full time basis.