Cognitive, Linguistic and Psychological Sciences

Chair
William C. Heindel

Associate Chairperson
Kathryn T. Spoehr

The Department of Cognitive, Linguistic & Psychological Sciences is dedicated to the multidisciplinary study of mind, brain, behavior, and language, and was formed through the merger of the Department of Cognitive and Linguistic Sciences and the Department of Psychology. Both departments have had a long and distinguished history at Brown: the Department of Psychology was created in 1892, and the Department of Cognitive and Linguistic Sciences was created in 1986 by merging the Department of Linguistics with the faculty participating in the Center for Cognitive Science. The two departments have typically taken complementary approaches to common scientific questions. State-of-the-art research on these problems requires spanning several levels of analysis using a range of approaches and methodologies, and the integration of the departments aims to create an environment in which this intellectual synthesis will flourish.

For additional information, please visit the department's website: http://www.brown.edu/Departments/CLPS/

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 A.B. degree

(Effective Class of 2019)

The A.B. concentration requires 12 courses. The Sc.B concentration additionally requires 1 laboratory course and 4 approved science courses, totaling to a total of 17 required courses.

Common Core

The introductory course, “CLPS 010 Mind, Brain, and Behavior,” surveys the broad territory of the scientific study of the mind, as uniquely represented by our department. The course maps the breadth of the science of the mind, focusing on fascinating questions, garnered insights, common commitments, and successful techniques and approaches. The course could be taken by students interested in the CLPS concentrations or as an introduction at the beginning of one’s college career or as an integration after having completed a number of specialized courses in a particular concentration.

Careers in Cognitive Neuroscience and related fields requires familiarity with statistics. Therefore, the Cognitive Neuroscience concentration requires a course in Quantitative Methods (CLPS 0900). CLPS 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 CLPS 0900 is too elementary can complete an approved alternative course (e.g., APMA 1650, CLPS 2906).

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. These electives must include at least two courses at the cognitive neuroscience systems level. 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 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. 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 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.

Honors Requirement

The Research Methods course will serve as a requirement for admission to the Honors program in Cognitive Science, Cognitive Neuroscience, and Psychology. Previously, any lab course served as this requirement. This practice not only demanded a large number of lab courses as part of the CLPS curriculum but also suffered from frequent mismatches between the type of research the student wished to pursue and the type of lab course available in the relevant semesters. A more general research methods course is likely to prepare students better and more broadly than any single lab course can.

FOR DETAILED UPDATES, PLEASE REFER TO THE COGNITIVE, LINGUISTIC, AND PSYCHOLOGICAL SCIENCES (CLPS) UNDERGRADUATE PAGE.

Requirements for the A.B. degree

STANDARD PROGRAM FOR THE A.B. DEGREE

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<td>CLPS 1420</td>
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For additional information, please visit the department's website: http://www.brown.edu/Departments/CLPS/
Requirements for the Sc.B. degree

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

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<td>CLPS 1400</td>
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<tr>
<td>CLPS 1480B</td>
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<td>CLPS 1480C</td>
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Total Credits: 12

**Four Approved Electives, such as:**

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<td>CLPS 1480B</td>
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<td>CLPS 1487C</td>
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<td>NEUR 1930A</td>
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<td>NEUR 1940D</td>
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Total Credits: 4

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<td>BIOL 0800</td>
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<td>CHEM 0350</td>
<td>Organic Chemistry</td>
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<td>CSCI 1430</td>
<td>Computer Vision</td>
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<tr>
<td>CSCI 1950F</td>
<td>Introduction to Machine Learning</td>
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<td>ENGN 1220</td>
<td>Neuroengineering</td>
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<tr>
<td>MATH 0100</td>
<td>Introductory Calculus, Part II</td>
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<td>NEUR 1030</td>
<td>Neural Systems</td>
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<td>NEUR 1040</td>
<td>Introduction to Neurogenetics</td>
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<tr>
<td>PHYS 0030</td>
<td>Basic Physics A</td>
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</table>

Total Credits: 17

1 For a complete list of approved courses, see the CLPS Cognitive Neuroscience page.

## Cognitive Science Concentration Requirements

**Requirements**

The field of Cognitive Science uses scientific methods of experimentation, computational modeling, and brain imaging to study mental abilities such as perception, action, memory, cognition, speech, and language, as well as the development and evolution of those processes. Students must become knowledgeable in four areas of emphasis: perception, cognition, language, and cognitive neuroscience, as well as a set of methods relevant to Cognitive Science research. Students then create their own focus area of study, potentially integrating coursework from the Cognitive, Linguistic, and Psychological Sciences department with a diverse subset of fields including Computer Science, Neuroscience, Philosophy, Anthropology, Applied Math and Education. The A.B. program is primarily for students interested in studying human mental processes and acquiring a research orientation to the study of the mind. The Sc.B. program is designed for students who wish to develop a stronger background in Cognitive Science and requires students to engage in a specific research project in the focus area of their choosing. We recommend that prospective concentrators register for one of the gateway courses at least one other core course in their first or second year.

**Concentration Requirements (Effective, Class of 2019)**

The A.B. concentration requires 12 courses. The Sc.B concentration additionally requires 1 laboratory course and 4 approved science courses, totaling a total of 17 required courses.

**Common Core**

The introductory course, “CLPS 0010 Mind, Brain, and Behavior,” surveys the broad territory of the scientific study of the mind, as uniquely represented by our department. The course maps the breadth of the science of the mind, focusing on fascinating questions, garnered insights, common commitments, and successful techniques and approaches. The course could be taken by students interested in the CLPS concentrations or as an introduction at the beginning of one’s college career or as an integration after having completed a number of specialized courses in a particular concentration.

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concentration credit of AP Statistics, regardless of score. Students who feel that CLPS 0900 is too elementary can complete an approved alternative course (e.g., APMA 1650, CLPS 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.

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**Honors Requirement**

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<th>Course</th>
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<tr>
<td>CLPS 0010</td>
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<td>CLPS 0200</td>
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<td>One approved course in Perception:</td>
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<td>CLPS 0500</td>
<td>Perception and Mind</td>
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<td>CLPS 0800</td>
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<td>One approved course in Computational Methods, such as:</td>
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### Requirements for the Sc.B. degree

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<td>CLPS 1470</td>
<td>Mechanisms of Motivated Decision Making</td>
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| One Independent Study or Approved Seminar, such as: |
Linguistics Concentration Requirements

Language is a uniquely human capacity that enables us to communicate a limitless set of messages on any topic. While human languages can differ greatly in certain respects, all are intricate, complex, rule-governed systems. Linguistics is the scientific study of these systems, their use in communicative and other social settings, and their cognitive and neural underpinnings. The linguistics concentration at Brown gives students a background in the "core" aspects of the language system: phonetics/phonology (the study of speech sounds and their patterning), syntax (the study of combinatorics of words, phrases, and sentences), and semantics/pragmatics (the study of the meanings of words, sentences, and conversation). Beyond this, students may focus more heavily in one or more of these areas and/or explore related questions such as how children and adults learn language (language acquisition), how utterances are produced and understood in real time (psycholinguistics), or how speaking and understanding are anchored in underlying neural systems (neurolinguistics). Other areas such as historical linguistics, sociolinguistics, philosophy of language, and linguistic anthropology can also be pursued in conjunction with offerings in other departments.

Requirements (10 courses)

**Prerequisite Course**

CLPS 0030 Introduction to Linguistic Theory (may be waived in special instances) 1

**Required Courses**

CLPS 1310 Introduction to Phonological Theory 1

CLPS 1330 Introduction to Syntax 1

AND one of:

CLPS 1341 Lexical Semantics

CLPS 1342 Formal Semantics

Total Credits 10

- **CLPS 1400** The Neural Bases of Cognition
- **CLPS 1480C** Cognitive Control Functions of the Prefrontal Cortex
- **CLPS 1495** Affective Neuroscience
- **CLPS 1560** Visually-Guided Action and Cognitive Processes
- **CLPS 1990** Senior Seminar in Cognition
- **CLPS 1900** Research Design and Methods 1

One Approved Laboratory Course, such as:

CLPS 1192 Experimental Analysis of Animal Behavior and Cognition

CLPS 1193 Laboratory in Genes and Behavior

CLPS 1492 Computational Cognitive Neuroscience

CLPS 1510 Auditory Perception Laboratory

CLPS 1590 Visualizing Vision

CLPS 1791 Laboratory in Social Cognition

CLPS 1890 Laboratory in Psycholinguistics

Four Approved Science Courses, such as:

BIOL 0200 The Foundation of Living Systems

BIOL 0800 Principles of Physiology

CHEM 0350 Organic Chemistry

CSCI 1430 Computer Vision

CSCI 1950F Introduction to Machine Learning

ENGH 1220 Neuroengineering

MATH 0100 Introductory Calculus, Part II

NEUR 1030 Neural Systems

NEUR 1040 Introduction to Neurogenetics

PHYS 0030 Basic Physics A

Total Credits 17

1 For the current list of approved course in all categories, see the CLPS Cognitive Science page.

Other Courses Routinely Fulfilling Linguistics Concentration Requirements (in consultation with the Concentration Advisor):

NOTE: This is NOT an exhaustive list of courses that can be applied towards the Linguistics Concentration requirements.

- **CLPS 0800** Language and the Mind
- **CLPS 1650** Child Language Acquisition
- **CLPS 1800** Language Processing
- **CLPS 1820** Language and the Brain
- **CLPS 1821** Neuroimaging and Language
- **CLPS 1890** Laboratory in Psycholinguistics

or any Topics Course in Language Acquisition or Language Processing

5 additional appropriate electives forming a thematically related set to be determined in consultation with the Concentration Advisor. At least one of these must be drawn from the list of advanced courses listed below, and we strongly recommend that at least one course be an appropriate methods and a topics course. No more than 2 of these courses may be drawn from below 1000 level courses. The electives can be drawn from any of the above courses, or any of the other linguistic/language related courses in the CLPS department. Electives may also be drawn from courses in other in consultation with the Concentration Advisor; a list of courses which standardly count towards the Linguistics Concentration (provided they form part of the thematically related set) is appended below.

Advanced Courses

- **CLPS 1320** The Production, Perception, and Analysis of Speech
- **CLPS 1332** Issues in Syntactic Theory
- **CLPS 1342** Formal Semantics
- **CLPS 1360** Introduction to Corpus Linguistics
- **CLPS 1363** A course from the 1381 series (Topics in Phonetic & Phonology)
- **CLPS 1364** A course from the 1383 series (Topics in Syntax and Semantics). For example:
  - **CLPS 1383D** Topics in Syntax and Semantics
  - **CLPS 1385** A course from the 1385 series (Topics in Language Acquisition)
  - **CLPS 1387** A course from the 1387 series (Topics in Neurolinguistics)
  - **CLPS 1389** A course from the 1389 series (Topics in Language Processing)
- **CLPS 1390** Linguistic Field Methods
- **CLPS 1821** Neuroimaging and Language
- **CLPS 1880** A course from the 1380 series (Topics in Psycholinguistics)
- **CLPS 1890** Laboratory in Psycholinguistics

- **CLPS 1365** Introduction to Historical Linguistics
- **CSCI 1460** Computational Linguistics
- **EAST 1510** Chinese: A History of the Language
- **EGYT 2310** History of the Ancient Egyptian Language
- **SLAV 1300** Sociolinguistics (with Case Studies on the Former USSR and Eastern Europe)
- **PHIL 0540** Logic
- **PHIL 1760** Philosophy of Language

Total Credits 5

- **CLPS 1370** Introduction to Pragmatics

One course in Psycholinguistics to be drawn from the following: 1

- **CLPS 0800** Language and the Mind
- **CLPS 1650** Child Language Acquisition
- **CLPS 1800** Language Processing
- **CLPS 1820** Language and the Brain
- **CLPS 1821** Neuroimaging and Language
- **CLPS 1890** Laboratory in Psycholinguistics

or any Topics Course in Language Acquisition or Language Processing
It is recommended that students take CLPS 1310 and CLPS 1330 before higher level courses.

Honors (12 courses)
Candidates for Honors in Linguistics must meet all of the requirements above, write an Honors thesis, and take two additional courses. One course is normally CLPS 1980 (Directed Research in Cognitive, Linguistic, and Psychological Sciences) - intended for work on the Honors thesis.

Three of the total 12 courses must be drawn from the advanced list above (the Directed Research course counts as one of the advanced courses). Normally a 3.5 grade-point average in the concentration is required for admission to the Honors program. Honors candidates should formalize their projects in consultation with their advisors by the end of September 6.

Refer to the CLPS Honors Program page for detailed information about the Linguistics Honors program.

Independent Study
Independent study is encouraged for the A.B. degree. Students should sign up for CLPS 1980 with a faculty advisor who is a member of the Department of Cognitive and Linguistic Sciences (CLPS). Arrangements should be made in Semester 6 for students expecting to do independent study during Semesters 7 and/or 8.

Do Foreign Language Courses Count?
Foreign language courses will generally not count towards the concentration requirements, except those that focus on the structure or history of the language. Students are, however, advised to gain familiarity with a foreign language, and are encouraged to take at least one course which deals with the structure of a language other than English.

NOTE: Please refer to the Cognitive, Linguistic, and Psychological Sciences concentration page for updates not listed here.

Psychology Concentration Requirements
Psychology encompasses a range of phenomena and levels of analysis in pursuit of three goals: to deepen understanding of cognitive and neural mechanisms of sensation, perception, learning, and emotion; to probe the biological and evolutionary foundations of animal behavior; and to clarify the social perception and assessment of individuals and groups. The concentration offers an array of course options, including study in quantitative methods, laboratory techniques, and senior seminars on specialized topics. Students take upper-level courses in the field’s major sub-disciplines, including perception and cognition, behavioral neuroscience, and social psychology. The concentration in Psychology prepares students for careers in clinical psychology, business, policy-related research positions, law, and education.

The A.B. concentration requires 12 courses. The Sc.B concentration additionally requires 1 laboratory course and 4 approved science courses, totaling to a total of 17 required courses.

Common Core
The introductory course, “CLPS 0010 Mind, Brain, and Behavior,” surveys the broad territory of the scientific study of the mind, as uniquely represented by our department. The course maps the breadth of the science of the mind, focusing on fascinating questions, garnered insights, common commitments, and successful techniques and approaches. The course could be taken by students interested in the CLPS concentrations or as an introduction at the beginning of one’s college career or as an integration after having completed a number of specialized courses in a particular concentration.

Careers in Psychology and related fields require familiarity with statistics. Therefore, the Psychology concentration requires a course in Quantitative Methods (CLPS 0900). CLPS 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 CLPS 0900 is too elementary can complete an approved alternative course (e.g., APMA 1650, CLPS 2906).

Foundation
To provide students with a solid foundation of knowledge in their area of concentration and to minimize redundancy, the Psychology concentration requires four foundation courses in Social/Personality, Perception/Cognition, Development, and Learning/Animal Behavior/Behavioral Neuroscience.

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., Social/Personality, Perception/Cognition, Development, and Learning/Animal Behavior/Behavioral Neuroscience). 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 Psychology 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 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.

Honors Requirement
The Research Methods course will serve as a requirement for admission to the Honors program in Cognitive Science, Cognitive Neuroscience, and Psychology. Previously, any lab course served as this requirement. This practice not only demanded a large number of lab courses as part of the CLPS curriculum but also suffered from frequent mismatches between the type of research the student wished to pursue and the type of lab course available in the relevant semesters. A more general research methods course is likely to prepare students better and more broadly than any single lab course can.

FOR DETAILED UPDATES, PLEASE REFER TO THE COGNITIVE, LINGUISTIC, AND PSYCHOLOGICAL SCIENCES (CLPS) UNDERGRADUATE PAGE.

Requirements for the A.B. degree

<table>
<thead>
<tr>
<th>STANDARD PROGRAM FOR THE A.B. DEGREE 1</th>
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<tbody>
<tr>
<td>CLPS 0010 Mind, Brain, and Behavior</td>
<td>1</td>
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<tr>
<td>CLPS 0900 Statistical Methods</td>
<td>1</td>
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<tr>
<td>One approved course in Social/Personality, such as:</td>
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<tr>
<td>CLPS 0700 Social Psychology</td>
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<td>CLPS 0701 Personality</td>
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<td>CLPS 1700 Abnormal Psychology</td>
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<tr>
<td>One approved course in Perception/Cognition:</td>
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<tr>
<td>CLPS 0200 Human Cognition</td>
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<tr>
<td>CLPS 0220 Making Decisions</td>
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<tr>
<td>CLPS 0500 Perception and Mind</td>
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<tr>
<td>One approved course in Development, such as:</td>
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<tr>
<td>CLPS 0600 Developmental Psychology</td>
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1 Cognitive, Linguistic and Psychological Sciences
### Requirements Specific for the Sc.B. degree

#### STANDARD PROGRAM FOR THE SC.B. DEGREE

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>0610</td>
<td>Children’s Thinking: The Nature of Cognitive Development</td>
</tr>
<tr>
<td>0700</td>
<td>Social Psychology</td>
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<tr>
<td>0701</td>
<td>Personality</td>
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<td>1700</td>
<td>Abnormal Psychology</td>
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<tr>
<td>0200</td>
<td>Human Cognition</td>
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<tr>
<td>0220</td>
<td>Making Decisions</td>
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<tr>
<td>0500</td>
<td>Perception and Mind</td>
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<tr>
<td>0600</td>
<td>Developmental Psychology</td>
</tr>
<tr>
<td>0610</td>
<td>Children’s Thinking: The Nature of Cognitive Development</td>
</tr>
<tr>
<td>0100</td>
<td>Learning and Conditioning</td>
</tr>
<tr>
<td>0110</td>
<td>Animal Behavior</td>
</tr>
</tbody>
</table>

#### Four Approved Electives, such as:
- BIOL 0480 Evolutionary Biology
- CLPS 1150 Memory and the Brain
- CLPS 1140 Animal Behavior
- CLPS 1140B Cognitive Aging and Dementia
- CLPS 1150 Perception and Action
- CLPS 1150B Auditory Perception Laboratory
- CLPS 1150C Cognitive Control Functions of the Prefrontal Cortex
- CLPS 1150D Affective Neuroscience
- CLPS 1150E Visually-Guided Action and Cognitive Processes
- CLPS 1170 Thinking about the Social World
- CLPS 1170A Nudge: Social Psychology for Social Change
- CLPS 1190 Research Design and Methods
- CLPS 1190A Canine Behavior
- CLPS 1191 Animal Behavior Laboratory
- CLPS 1193 Laboratory in Genes and Behavior
- CLPS 1195 Laboratory in Cognitive Processes
- CLPS 1196 Functional Magnetic Resonance Imaging: Theory and Practice
- CLPS 1197 Computational Cognitive Neuroscience
- CLPS 1198 Auditory Perception Laboratory
- CLPS 1199 Visualizing Vision
- CLPS 1190 Laboratory in Developmental Psychology
- CLPS 1191 Laboratory in Social Cognition
- CLPS 1190 Laboratory in Psycholinguistics

#### One Approved Laboratory Course, such as:
- BIOL 0200 The Foundation of Living Systems
- BIOL 0800 Principles of Physiology
- CHEM 0350 Organic Chemistry
- CSCI 1430 Computer Vision
- CSCI 1950F Introduction to Machine Learning
- ENGN 1220 Neuroengineering
- MATH 0100 Introductory Calculus, Part II
- NEUR 1030 Neural Systems
- NEUR 1040 Introduction to Neurogenetics
- PHYS 0030 Basic Physics A

#### Total Credits: 17

1 For the current list of approved courses in all categories, see the CLPS Psychology page.

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### Behavioral Decision Sciences

#### Concentration Requirements

**Standard Program for the AB Degree**

**CLPS Classes:**
- CLPS 0220 Making Decisions
Choose one of the following:  
CLPS 0040  Mind and Brain: Introduction to Cognitive Neuroscience  
CLPS 0200  Human Cognition  
CLPS 0700  Social Psychology  

Choose two of the following:  
CLPS 1470  Mechanisms of Motivated Decision Making  
CLPS 1495  Affective Neuroscience  
CLPS 1730  Psychology in Business and Economics  
CLPS 1760  The Moral Brain  

Distribution Requirements:  
Select one Introductory Course from the following:  
ECON 0110  Principles of Economics  
CSCI 0040  Introduction to Scientific Computing and Problem Solving  
or CSCI 0150  Introduction to Object-Oriented Programming and Computer Science  
or CSCI 0180  Computer Science: An Integrated Introduction  
or CSCI 0190  Accelerated Introduction to Computer Science  

Select Two Advanced Courses From:  
CSCI 1410  Artificial Intelligence  
CSCI 1420  Machine Learning  
ECON 1110  Intermediate Microeconomics  
or ECON 1130  Intermediate Microeconomics (Mathematical)  
ECON 1660  Big Data  
ECON 1820  Behavioral Economics  
ECON 1870  Game Theory and Applications to Economics  
PHIL 0580  Philosophy of Economics  
PHIL 1550  Decision Theory: Foundations and Applications  

Methods Classes:  
Choose One From the Following:  
APMA 0650  Essential Statistics  
APMA 1650  Statistical Inference I  
CLPS 0900  Statistical Methods  
CSCI 0100  Data Fluency for All  
CSCI 1450  Probability and Computing  
ECON 1820  Introduction to Econometrics  

Plus One of the Following:  
CLPS 1791  Laboratory in Social Cognition  
CSCI 0150  Introduction to Object-Oriented Programming and Computer Science  
CSCI 0170  Computer Science: An Integrated Introduction  
ECON 1629  Applied Research Methods for Economists  
ECON 1630  Econometrics I  
PHIL 0540  Logic  

Electives:  
Students will choose three additional courses in consultation with a concentration advisor that will constitute an integrated specialization in some area of decision science. Such courses might include, but are not limited to:  

Psychology and Cognitive Science  
CLPS 0950  Introduction to Programming  
CLPS 1292  Introduction to Programming for the Mind, Brain and Behavior  
CLPS 1370  Introduction to Pragmatics  
CLPS 1970  Directed Reading in Cognitive, Linguistic and Psychological Sciences  

Economics:  
ECON 1820  Behavioral Economics  
ECON 1870  Game Theory and Applications to Economics  

Applied Mathematics:  
APMA 0200  Introduction to Modelling  
APMA 1690  Computational Probability and Statistics  
APMA 2640  Theory of Probability  
APMA 2821V  Neural Dynamics: Theory and Modeling  

Philosophy:  
PHIL 0500  Moral Philosophy  
PHIL 1650  Moral Theories  
PHIL 1750  Epistemology  

Computer Science:  
CSCI 1430  Computer Vision  
CSCI 1460  Computational Linguistics  
CSCI 1951A  Data Science  

Political Science:  
POLS 1090  Polarized Politics  
POLS 1150  Prosperity: The Ethics and Economics of Wealth Creation  
POLS 1470  International Negotiation and Conflict Resolution  

Public Health:  
PHP 1740  Principles of Health Behavior and Health Promotion Interventions  

Capstone:  
Fall seminar in which students write an integrative paper or do a project covering their areas of study in their senior year.  

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. No more than 2 courses can be transferred from another institution to count toward concentration credit.  

Honors  
Students interested in honors should identify a faculty honor's sponsor and sign up with the concentration advisor during Semester 6. Although there is no minimum grade point average to enter the program, admission to the program is limited to students who have accumulated a strong academic record, and show evidence that they will meet the program's requirements. It is expected that honors candidates will conduct a year-long research project under the direction of a faculty sponsor culminating in a written thesis at the end of Semester 8. Honors theses can serve to satisfy the capstone requirement, although honors students are expected to attend the capstone seminar in the fall of their senior year.  

Cognitive, Linguistic and Psychological Sciences Graduate Program  
The department of Cognitive, Linguistic, and Psychological Sciences is a unique multidisciplinary department that offers Doctor of Philosophy (Ph.D.) degrees in three fields: Cognitive Science, Linguistics, 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:  
http://www.brown.edu/academics/gradschool/programs/cognitive-linguistic-and-psychological-sciences
Courses
Cognitive, Linguistic and Psychological Sciences

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? WRIT

Fall CLPS0010 S01 16238 MWF 1:00-1:50(06) (E. Festa)

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.

CLPS 0030. Introduction to Linguistic Theory.
The ability to speak and understand a language involves having mastered (quite unconsciously) an intricate and highly structured rule-governed system. Linguists seek to model that rule system. This course introduces the principles underlying phonology (the principles which govern how sounds are put together), syntax (the rule system governing sentence structure), and semantics (the system which relates sentences to meanings).

CLPS 0040. Mind and Brain: Introduction to 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, executive 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.

CLPS 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. FYS

Fall CLPS0050A S02 16293 MWF 11:00-11:50(16) (J. Anderson)

In a series of theoretical articles, Melvyn Goodale and his collaborators have proposed that separate, but interacting visual systems have evolved 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 20 first year students. FYS

CLPS 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 20. FYS

CLPS 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 20 first year students. FYS

CLPS 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. I will outline the major approaches that animal behaviorists, neurobiologists, psychologists and ethologists take to studying animal minds. I will introduce students to prominent researchers in the field and to 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 20 first year students. FYS

CLPS 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 20 first year students. FYS

CLPS 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 20 first year students. FYS WRIT

CLPS 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 20 first year students. FYS

CLPS 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 20 first year students. FYS

Spr CLPS0050J S01 24933 MWF 9:00-9:50(02) (J. Krueger)
CLPS 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.

CLPS 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. FYS WRT

CLPS 0050M. 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. FYS Spr CLPS050M/S01 24931 MWF 12:00-12:50(05) (S. AnderBois)

CLPS 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.
Spr CLPS0100 S01 24932 MWF 1:00-1:50(06) (R. Colwill)

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 causation (underlying mechanisms). Using Tinbergen’s framework, we will study two major categories of behavior – mating and aggression – in a range of animal species.

CLPS 0120. Introduction to Sleep.
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 prerequisite: CLPS 0010, CLPS 0020 or NEUR 0010; or an AP course in psychology or physiology.
Fall CLPS0120 S01 16157 M 3:00-5:30(15) (M. Carskadon)

CLPS 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.
Spr CLPS0200 S01 24935 MWF 8:30-9:50(01) "To Be Arranged"

CLPS 0210. Human Thinking and Problem-Solving.
An interdisciplinary 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.

CLPS 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?).
Fall CLPS0220 S01 16158 TTh 10:30-11:50(13) (S. Sloman)

CLPS 0300. Introduction to Linguistics.
The ability to speak and understand a language involves having mastered (quite unconsciously) an intricate and highly structured rule-governed system. Linguists seek to model that rule system. This course introduces the principles underlying phonology (the principles that govern how sounds are put together), syntax (the rule system governing sentence structure), and semantics (the system that relates sentences to meanings).
Fall CLPS0300 S01 16704 TTh 1:00-2:20(10) (U. Cohen Priva)

CLPS 0330. The Grammar of English.
English probably has greater international utility and importance today than any other human language. This no-requisites 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.

CLPS 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, executive 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.
Spr CLPS0400 S01 25357 MWF 10:00-10:50(03) (D. Badre)

CLPS 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).

CLPS 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.
Fall CLPS0500 S01 16159 TTh 9:00-10:20(08) (J. Song)

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.
CLPS 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.

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.

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. Fall CLPS0550 S02 16703 TTh 6:40-8:00PM(05) (T. Watanabe)

CLPS 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. Spr CLPS0600 S01 25447 TTh 9:00-10:20(01) (D. Amso)

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. Fall CLPS0610 S01 16160 MWF 10:00-10:50(14) (D. Sobel)

CLPS 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, attachment, parenting styles and parent-child interaction, temperament, 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. Spr CLPS0620 S01 25094 TTh 10:30-11:30(09) (D. Sobel)

CLPS 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.

CLPS 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. WRIT Fall CLPS0700 S01 16161 TTh 2:30-3:50(03) (B. Malle)

CLPS 0701. Personality. 
A survey of the major perspectives (psychoanalytic, behavioral, humanistic, etc.) within theories of personality. Particular emphasis is placed on the integration of research and theory. Fall CLPS0701 S01 16162 TTh 9:00-10:20(08) (B. Hayden)

CLPS 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.

CLPS 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.

CLPS 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. Spr CLPS0800 S01 24936 MWF 2:00-2:50(07) (J. Morgan)

CLPS 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.

CLPS 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. Fall CLPS0900 S01 16163 TTh 10:30-11:50(13) (K. Speehr)

Spr CLPS0900 S01 24937 MWF 11:00-11:50(04) (J. Wright)
CLPS 0950. Introduction to programming.
This 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 sophisticated data analyses to parsing complex data files to implementing psychophysics experiments. The course is designed for students in psychology, cognitive science, neuroscience and other non-computer science majors interested in learning MATLAB. Beyond teaching specific coding skills, this course will support students’ development as computational thinkers.

Fall CLPS0950 S01 16700 TTh 2:30-3:50(03) (T. Serre)

CLPS 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.

CLPS 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.

CLPS 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.

CLPS 1091. 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. (Previously CLPS1091)

CLPS 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.

CLPS 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.

CLPS 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 1300). Enrollment limited to 50.

CLPS 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.

CLPS 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.

CLPS 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.

CLPS 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.

CLPS 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. WRIT Spr CLPS1160 S01 25002 TTh 1:00-2:20(10) (A. Simmons)

CLPS 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: CLPS 0050E, CLPS 0100, CLPS 0110, CLPS 1191, or CLPS 1192. Not open to first year students.

CLPS 1180B. Biology of Communication.
The study of animal communication systems from mechanistic, developmental, ecological, and evolutionary perspectives. The uses of auditory, chemical, and visual cues for mediating interspecific communication in both vertebrate and invertebrate animals. Recommended prerequisites: CLPS 0110 (PSYC 0500), CLPS 1192 (PSYC 1200), BIOL 0450, or equivalent.
CLPS 1190. Techniques in Physiological Psychology. Laboratory course in behavioral neuroscience for advanced students of psychology 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: CLPS 0410 (PSYC 0750) or NEUR 0010, and CLPS 0900 (PSYC/COGS 0090). Enrollment limited to 12; not open to first year students.

CLPS 1191. Animal Behavior Laboratory. 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: CLPS 0900 (COGS/PSYC 0090). Enrollment limited to 12; not open to first year students.

Fall CLPS1191 S01 16166 M 1:00-1:50(06) (R. Colwill)
Fall CLPS1191 L01 16359 W 12:30-3:30 (R. Colwill)

CLPS 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: CLPS 0900 (PSYC/COGS 0090).

Spr CLPS1192 S01 24986 TTh 9:00-10:20(01) (R. Church)

CLPS 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 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: CLPS 0410 or NEUR 0010, and CLPS 0900 or instructor permission. Enrollment limited to 10; not open to first-year students. WRIT

Spr CLPS1193 S01 24940 TTh 3:00-5:50(11) (K. Bath)

CLPS 1194. Sleep and Chronobiology Research. Part of a summer immersion in behavioral science research in human sleep and chronobiology. Instruction in human sleep and circadian rhythms, research techniques in basic physiology, laboratory skills, ethics of research, and basic CPR. Research seminars explore other techniques and career paths. Recommended prerequisite: CLPS 0010 is preferred; NEUR 0010 is also acceptable. Enrollment limited to 12.

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 late May to Aug 2017.

CLPS 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: CLPS 0200 (COGS 0420).

CLPS 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: CLPS 0200 (COGS 0420).

CLPS 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.
CLPS 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 connectionist 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. Prerequisite: comfort with basic linear algebra.

Spr CLPS1291 S01 25001 TTh 2:30-3:50(11) (T. Serre)

CLPS 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.

CLPS 1310. Introduction to Phonological Theory. Examines some of the classic and current issues regarding sound structure in the world's languages and introduces the theoretical tools needed to solve them. After an introduction to articulatory phonetics and phonemic analysis, it focuses on phonological analysis of different languages, and discusses rule-based and constraint-based approaches to phonology. Implications for language learning and language change are discussed. Prerequisite: CLPS 0030.

Spr CLPS1310 S01 24943 TTh 10:30-11:50(09) (C. Sanker)

CLPS 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.

CLPS 1330. Introduction to Syntax. An in-depth investigation of natural language syntax, an intricate yet highly organized human cognitive system. Focuses primarily on the syntax of English as a means of illustrating the structured nature of a grammatical system, but the broader question at issue is the nature of the rule system in natural language syntax. Prerequisite: CLPS 0030 (COGS 0410).

Fall CLPS1330 S01 16168 TTh 9:00-10:20(08) (P. Jacobson)

CLPS 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.

CLPS 1341. Lexical Semantics. The representation of word meaning and generalizations about the way in which meanings are packaged into words. Topics include: "fuzzy" meanings, natural kind terms, how word meanings are decomposed. Special emphasis on how temporal properties are encoded, on the status of "thematic relations," and on how the fine-grained structure of word meanings impacts on the syntax. Recommended prerequisite: CLPS 0030 (COGS 0410).

CLPS 1342. Formal Semantics. Model-theoretic approaches to the study of the semantics of natural languages. Develops the tools necessary for an understanding of "classical" formal semantics (the lambda calculus, intensional logic; Montague's treatment of quantification, etc.); then applies these tools to the analysis of natural language semantics; and finally turns to recent developments in formal semantic theory. Prerequisite: some familiarity with syntax or semantics or basic set theory and logic.

Spr CLPS1342 S01 24944 TTh 9:00-10:20(01) (P. Jacobson)

CLPS 1360. Introduction to Corpus Linguistics. The study of Linguistics relies on language production data. Language corpora contain various sources of such data, often annotated to include additional information such as syntactic, semantic and phonological properties. Such databases often complement or even replace data sources used in other disciplines. This class aims to train students in the use of some of the tools that are commonly used to access and evaluate data in linguistic corpora. Prerequisite: CLPS 0030. Enrollment limited to 26.

Spr CLPS1360 S01 24945 TTh 1:00-2:20(10) (U. Cohen Priva)

CLPS 1365. Introduction to Historical Linguistics. This course is a survey of the basic mechanisms of how languages change over time and of the methods used to reconstruct these developments. We examine phonological change, morphological change, syntactic change, and semantic change, as well as interactions between these types of changes. Students will learn about types of evidence in reconstruction of change and about theoretical models of change. We will cover language relationships and the methods of establishing familial groupings, and we will compare patterns due to familial descent, language contact, and borrowing. Examples will be drawn from a variety of languages, both ancient and modern.

Spr CLPS1365 S01 24946 MWF 9:00-9:50(02) (C. Sanker)

CLPS 1370. Introduction to Pragmatics. Any time we utter a sentence in conversation, the perceived meaning of that sentence interacts with the discourse context in a rich variety of ways. On the one hand, aspects of a sentence's meaning are "filled in" or enriched by the prior conversation as well as non-linguistic context. On the other hand, utterances shape the future of the conversation in various ways too. This course is an introduction to the scientific study of such phenomena. Specific topics include: presupposition, implicature, speech acts, deixis, anaphora, (in)definiteness, and information structure.

Fall CLPS1370 S01 16169 TTh 10:30-11:50(13) (S. AnderBois)

CLPS 1380. Laboratory in Phonetics. This course is an introduction to phonetics, covering articulation, acoustics, and perception. Students will gain basic skills in experimental phonetics, focusing on instrumental analysis of speech and behavioral responses in listening tasks. The first unit will provide training in methods of acoustic analysis using phonetic software (Praat), as well as looking at the relationship between articulation and the resulting speech sounds. The second unit will look at physiological and cognitive aspects of speech perception. The final unit will cover a selection of advanced topics in phonetics, including connections between perception and production and issues in the interface of phonetics and phonology.

Fall CLPS1380 S01 16696 TTh 6:40-8:00PM(05) (C. Sanker)

CLPS 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.
CLPS 1381D. Topics in Phonology: Lenition.
Consonant shortening, voicing, and deletion are just a few of many phonological processes that are considered to be lenition (softening, weakening) processes. But is lenition a valid category? What functional forces are capable of causing such a wide variety of different processes, and what do they have in common? In this class we will study and criticize the different meanings of the term lenition and discuss several functionally-motivated causes for lenition. Spr CLPS1381D S01 25128 Th 4:00-6:30(17) (U. Cohen Priava)

CLPS 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: CLPS 0030 or equivalent.

CLPS 1383A. The Boundary of Semantics and Pragmatics.
This course will examine some recent controversies regarding the question of just what is accounted for by grammatical apparatus as opposed to what can be accounted for by “Gricean” pragmatics (i.e., inferences that listeners draw that are not encoded in the grammar). Particular attention will be paid to some topics surrounding negation, including the distribution of “Negative Polarity Items”. Prerequisite: CLPS 1330, 1340, or 1341. Enrollment limited to 40.

CLPS 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: CLPS 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. Fall CLPS1385 S01 16170 TTh 2:30-3:50(03) (J. Morgan)

CLPS 1387. Topics in Neurolinguistics.
No description available.

CLPS 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.

CLPS 1390. Linguistic Field Methods.
A lab/practicum course introducing the methodologies needed to collect, manage, and interpret primary data pertaining to the phonetic, phonological, morphosyntactic, semantic, and pragmatic properties of an understudied language. The course takes a hands-on approach, with students working in groups and individually with a native speaker consultant of an unfamiliar language. Students will learn how to test hypotheses about the language as well as construct grammatical descriptions. In addition, the course will cover a variety of practical, technological, interpersonal, cultural, and ethical issues typically encountered in fieldwork. Pre Requisite: CLPS 1310 and one other 1300-level course in CLPS or instructor permission. WRIT

CLPS 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 address 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. Spr CLPS1400 S01 24948 M 3:00-5:30(13) (R. Burwell)

CLPS 1420. Cognitive Neuropsychology.
This seminar will explore the effects of brain damage on cognitive function. The goal of cognitive neuropsychology is 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. Selected papers 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: CLPS0040 or CLPS0200 or CLPS0400. CLPS0900 is strongly recommended. WRIT Spr CLPS1420 S01 24949 MWF 10:00-10:50(03) (E. Festa)

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 neuromaging 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: CLPS 0010, 0040, 1291, 1400, 1491, 1492, or NEUR 0100. Enrollment limited to 20. Not open to first year students.

CLPS 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: CLPS0010 or NEUR0010; and preferably at least one of the following: CLPS1150, CLPS1480, CLPS0400, CLPS0100, CLPS2100, NEUR1740; NEUR1540.

CLPS 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.

CLPS 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 (CLPS 0040 (COGS 0720), CLPS 0400 (PSYC 0470)) or permission of the instructor. Preference will be given to senior concentrators in Psychology and related areas. Enrollment limited to 20. WRIT
CLPS 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.
Spr CLPS1480C S01 24979 M 3:00-5:30(13) (D. Badre)

CLPS 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: CLPS 0400 or 0400, or instructor permission. Enrollment limited to 25 juniors, seniors and graduate students concentrating in Cognitive, Linguistic and Psychological Studies. WRIT

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: CLPS 0400 (COGS 0720), CLPS 0400 (PSYC 0470), or NEUR 0010; and CLPS 0900 (COGS/COGS 0900), or instructor permission. Enrollment limited to 20.

CLPS 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.

CLPS 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: CLPS 0400 or CLPS 0200 or NEUR 0010.
Spr CLPS1492 S01 24978 TTh 1:00-2:20(10) (M. Frank)

CLPS 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.
Fall CLPS1495 S01 16701 Th 4:00-6:30(04) (A. Shenhab)

CLPS 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): CLPS 0010 (PSYC 0010), CLPS 0020 (COGS 0010), CLPS 0500 (COGS/PSYC 0440), or CLPS 0510 (COGS 0110).
Spr CLPS1500 S01 24950 TTh 10:30-11:50(09) (W. Warren)

CLPS 1510. Auditory Perception Laboratory.
This course considers how we sense and comprehend the world through sound. Laboratory sessions will focus on recording and analyzing sounds, creating sound effects, and completing experiments on the psychology of loudness, pitch, and musical timbre. Class discussions will explore topics in music perception, instrumental design, room acoustics, the emotional impact of sounds, and development of hearing sensitivity and hearing loss. The final project for this course is recording and analyzing the soundscape of Brown, with the overall goal of developing an acoustic map of campus. WRIT
Fall CLPS1510 S01 16172 M 3:30-5:30(15) (A. Simmons)

CLPS 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.

CLPS 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.

CLPS 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.

CLPS 1550. The Psychology of Aversion.
Explores what is aversive to us and why. In particular, the ways in which sensory perception (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 of 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 videos and assessing various sensory stimuli. Prerequisite: CLPS 0010 (PSYC 0010), CLPS 0020 (COGS 0010), or NEUR 0010. Enrollment limited to 20 students. Not open to first year students.
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: CLPS 0010, CLPS 0020, or NEUR 0010. Enrollment limited to 40.
Fall CLPS1560 S01 16496 M 3:00-5:30(15) (J. Song)

CLPS 1561. Visual Attention and Memory.
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 a given movement. Thus, attentional mechanisms are crucial to select relevant objects/events and guide actions. In this seminar, we will understand behavioral and underlying neural mechanisms involved in visual attention and their interaction with visual cognition such as memory, learning and goal-directed actions. We will also study investigations of spared and impaired patterns of attention-based performances following brain injury. Prerequisite: CLPS 0010 or 0020.

CLPS 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. Recommended prerequisites: CLPS 1291, 1500, and 1520.
Spr CLPS1570 S01 24974 F 3:00-5:30(15) (T. Watanabe)

CLPS 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.

CLPS 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: CLPS 0010 (PSYC 0010), CLPS 0020 (COGS 0010), or NEUR 0010. Enrollment limited to 40.

CLPS 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 CLPS or NEUR course about vision or familiarity with graphic design.
Fall CLPS1580C S01 16174 TTh 2:30-3:50(03) (L. Welch)

CLPS 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.

CLPS 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.
Spr CLPS1580E S01 25091 TTh 2:30-3:50(11) (T. Watanabe)

CLPS 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.
Spr CLPS1590 S01 24954 TTh 10:30-11:50(09) (F. Domini)

CLPS 1600. History and Theories of Child Development (EDUC 1710).
Interested students must register for EDUC 1710.

How do infants and preschoolers learn about the world? We will examine children’s understanding of the physical world, psychological kinds, biological entities, number, observation and action. 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: CLPS 0600 (PSYC0810) or CLPS 0610 (COGS0630)

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.

CLPS 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 CLPS 0800 (PSYC 0810), CLPS 0610 (COGS 0630), EDUC 0800, or permission of the instructor. Enrollment limited to 40.

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

CLPS 1630. Perceptual Development.
No description available.

CLPS 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.
CLPS 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: CLPS 0030 (COGS 0410) or CLPS 0800 (COGS 0450), or permission of the instructor.

CLPS 1670. Cross-Cultural Perspectives on Child Development (EDUC 1580).
Interested students must register for EDUC 1580.

CLPS 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: CLPS 0600, 0610, or 0700. Enrollment limited to 20 juniors and seniors.

CLPS 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: CLPS 0040, 0600, or 0610. WRIT

CLPS 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.
Spr CLPS1680CS01 25338 TTh 1:00-2:20(10) (D. Sobel)

CLPS 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: CLPS 0610 (COGS 0630), and CLPS 0900 (COGS/PSCY 0090) or equivalent. Enrollment limited to 15.

CLPS 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. Spr CLPS1700 S01 24955 TTh 9:00-10:20(01) (B. Hayden)

CLPS 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.

CLPS 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.

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.
Spr CLPS1720 S01 24956 TTh 1:00-2:20(10) (J. Wright)

CLPS 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 concentrators.
Fall CLPS1730 S01 16153 TTh 10:30-11:50(13) (J. Krueger)

Interested students must register for EDUC 1750.

CLPS 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.
Spr CLPS1760 S01 25448 Th 4:00-6:30(17) (O. Feldman-Hall)

CLPS 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.

CLPS 1782. The Social Self.
This course will explore various factors that influence how people perceive themselves, judge others, and make decisions in a social context. Drawing from theories of egocentrism, rationality, morality, and cultural evolution, we will explore the inner workings of the social self. The course will take a primarily experimental approach to understand how individuals should behave (as prescribed by social norms and models of rationality) and how they actually behave. Students in this course will be armed with theoretical and methodological knowledge to understand the components of the social self and appreciate both accuracy and bias in self-judgments and social judgments.
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.

Fall CLPS1783 S01 17550 M 3:00-5:30(15) (E. Amit)

CLPS 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: CLPS 0701 (PSYC 0300), and CLPS 0900 (PSYC/COGS 0090) or equivalent. Enrollment limited to 27.
Fall CLPS1790 S01 16176 WF 2:00-3:20(07) (J. Wright)

CLPS 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: CLPS 0010 (PSYC 0010), CLPS 0700 (PSYC 0210), and CLPS 0900 (PSYC/COGS 0090). Enrollment limited to 24.

CLPS 1800. Language Processing.
Explores the nature of language processing with the goal of understanding how we produce and comprehend language. Topics include speech production and speech perception, lexical processing, and syntactic processing. Experimental investigations are studied in an attempt to understand the processes and mechanisms employed in the everyday use of language. Prerequisite: one of CLPS 0020 (COGS 0010), CLPS 0030 (COGS 0410), or CLPS 0800 (COGS 0450).

CLPS 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: CLPS 1330 (COGS 1310).

CLPS 1820. Language and the Brain.
This course will examine the neural systems underlying language processing. Major focus will be on effects of brain injury on speaking and understanding in left hemisphere-damaged patients who have aphasia, right hemisphere-damaged patients, and split-brain patients. Behavioral, electrophysiological and neuroimaging evidence will be investigated. WRIT

Fall CLPS1820 S01 16702 TTh 6:40-8:00PM(05) (L. Welch)

CLPS 1821. 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: CLPS 0810 (COGS 0320), CLPS 1820 (COGS 1480), CLPS 1821 (PSYC 1100), or NEUR 0010.

CLPS 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: CLPS 0030 (COGS 0410).

CLPS 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: CLPS 0800, 0910, 0990, or EDUC 0850, or instructor permission. Enrollment limited to 20. Not open to first year students. WRIT

CLPS 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.

CLPS 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: CLPS 0800 (COGS 0450) and CLPS 0900 (COGS/PSYC 0090), or equivalent. Spr CLPS1890 S01 24977 TTh 2:30-3:50(11) (J. Morgan)

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, high-speed motion pictures, computer modeling of oral tract output, and experimental techniques involving the perception of synthetic and natural speech.

CLPS 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. (Previously CLPS 1091)

Fall CLPS1900 S01 16702 TTh 6:40-8:00PM(05) (L. Welch)
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.

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.

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. Instructor permission required.

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. (Previously numbered CLPS 1900.)

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.

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.

CLPS 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.

CLPS 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.

CLPS 2096. Directed Graduate Research.
No description available. Instructor permission required.

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

CLPS 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.

CLPS 2180. Duration Discrimination.
No description available.

CLPS 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.

CLPS 2200. Core Topics in Cognition.
No description available.

CLPS 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.

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.

CLPS 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.

CLPS 2450. Exchange Scholar Program.
Fall CLPS2450 S01 14958 Arranged ‘To Be Arranged’

CLPS 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.

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

CLPS 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.

CLPS 2750. Seminar 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.

CLPS 2750. Seminar in Social Psychology.
No description available.

CLPS 2800. Core Topics in Language.
No description available. Open to graduate students only.
CLPS 2902. Quantitative Methods in Research.
No description available.

CLPS 2906. Experimental Design.
The course is 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 of variance, non-parametric tests, randomization and bootstrapping, among others. Instructor permission required. Open to graduate students only.
Fall CLPS2906 S01 16180 TTh 9:00-10:20(08) (W. Heindel)

CLPS 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.
Spr CLPS2908 S01 24959 TTh 10:30-11:50(09) (B. Malle)

CLPS 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.
Fall CLPS2970 S01 14959 Arranged 'To Be Arranged'
Spr CLPS2970 S01 23988 Arranged 'To Be Arranged'

CLPS 2990. Thesis Preparation.
For graduate students who have met the tuition requirement and are paying the registration fee to continue active enrollment while preparing a thesis.
Fall CLPS2990 S01 14960 Arranged 'To Be Arranged'
Spr CLPS2990 S01 23989 Arranged 'To Be Arranged'

LING 0030. Introduction to Linguistic Theory (CLPS 0030).
Interested students must register for CLPS 0030.

LING 0030G. Pidgins, Creoles, and the Emergence of Language (CLPS 0050G).
Interested students must register for CLPS 0050G.

LING 0330. The Grammar of English (CLPS 0330).
Interested students must register for CLPS 0330.

LING 0800. Language and the Mind (CLPS 0800).
Interested students must register for CLPS 0800.

LING 0810. The Biology and Evolution of Language (CLPS 0810).
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