Cognitive Science

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 computational methods, 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 and 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 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 Cognitive Science and related fields requires familiarity with statistics. Therefore, the Cognitive Science 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 Science concentration requires four foundation courses in Human Cognition, Perception, Language, and Computational Methods.

Electives

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

Research Methods and Capstone

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

Additional requirements for Sc.B.

In line with university expectations, the Sc.B. requirements include a greater number of courses and especially science courses. The definition of “science” is flexible. A good number of these courses will be outside of 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 Honors Program in Cognitive Science gives undergraduates a special opportunity to carry out a research project under the direction of a faculty member. The program also provides the opportunity for outstanding senior concentrators to receive their undergraduate degree with Honors. Participation in the program allows students to develop an understanding of research and acquire research skills and background.

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

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

<table>
<thead>
<tr>
<th>Two Common Core Courses</th>
<th>CLPS 0010</th>
<th>Mind, Brain and Behavior: An Interdisciplinary Approach</th>
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<tr>
<td>CLPS 0900</td>
<td>Statistical Methods</td>
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</tr>
<tr>
<td>Four Approved Foundation Courses</td>
<td>CLPS 0900</td>
<td></td>
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</tbody>
</table>

One approved course in Human Cognition, such as:

| CLPS 0200 | Human Cognition |
| CLPS 0220 | Making Decisions |

One approved course in Perception:

| CLPS 0500 | Perception and Mind |
| CLPS 0550 | Language and the Mind |
| CLPS 0300 | Introduction to Linguistics |
| CLPS 0950 | Introduction to programming |
| CLPS 1291 | Computational Methods for Mind, Brain and Behavior |

Four Approved Electives related to Cognitive Science, such as:

| APMA 1690 | Computational Probability and Statistics |
| BIOL 0480 | Evolutionary Biology |
| CLPS 0540 | Simulating Reality: The (Curious) History and Science of Immersive Experiences |
| CLPS 0550 | Science of Consciousness |
| CLPS 1100 | Animal Cognition |
| CLPS 1150 | Memory and the Brain |
| CLPS 1210 | Human Memory and Learning |
| CLPS 1470 | Mechanisms of Motivated Decision Making |
| CLPS 1500 | Perception and Action |
| CLPS 1610 | Cognitive Development |
| CLPS 1660 | Learning Compositional Language |
| CLPS 1800 | Language Processing |
### Requirements for the Sc.B. degree

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

**Two Common Core Courses**
- **CLPS 0010** Mind, Brain and Behavior: An Interdisciplinary Approach 1
- **CLPS 0900** Statistical Methods 1

**Four Approved Foundation Courses**
- One approved course in Human Cognition, such as:
  - **CLPS 0200** Human Cognition
  - **CLPS 0220** Making Decisions
- One approved course in Perception
  - **CLPS 0500** Perception and Mind
- One approved course in Language, such as:
  - **CLPS 0300** Introduction to Linguistics
  - **CLPS 0800** Language and the Mind
- One approved course in Computational Methods, such as:
  - **CLPS 0950** Introduction to programming
  - **CLPS 1291** Computational Methods for Mind, Brain and Behavior

**Four Approved Electives, such as:**
- **APMA 1690** Computational Probability and Statistics
- **BIOL 0480** Evolutionary Biology
- **CLPS 0540** Simulating Reality: The (Curious) History and Science of Immersive Experiences
- **CLPS 0550** Science of Consciousness
- **CLPS 1100** Animal Cognition
- **CLPS 1150** Memory and the Brain
- **CLPS 1210** Human Memory and Learning
- **CLPS 1470** Mechanisms of Motivated Decision Making
- **CLPS 1500** Perception and Action
- **CLPS 1610** Cognitive Development
- **CLPS 1660** Learning Compositional Language
- **CLPS 1800** Language Processing
- **CLPS 1850** Language Processing in Humans and Machines
- **CSCI 1010** Theory of Computation
- **CSCI 1480** Building Intelligent Robots
- **ENGN 1580** Communication Systems
- **PHIL 1800** Philosophy of Mind

One Independent Study or Approved Seminar, such as: 1

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### Total Credits

**12**

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### Notes

1. See the current list of approved **Foundation courses** on CLPS Cognitive Neuroscience page.
2. See the current list of approved **Electives** on CLPS Cognitive Neuroscience page.
3. See the current list of approved **Seminars** on the CLPS Cognitive Neuroscience page.
4. See the current list of approved **Laboratory courses** on the CLPS Cognitive Neuroscience page.
5. See sample **Science courses sets** on the CLPS Cognitive Neuroscience page.