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 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 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 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 1

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CLPS 0010</td>
<td>Mind, Brain and Behavior: An Interdisciplinary Approach</td>
<td>1</td>
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<tr>
<td>CLPS 0900</td>
<td>Statistical Methods</td>
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<tr>
<td>One approved course in Human Cognition</td>
<td>such as:</td>
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<tr>
<td>CLPS 0200</td>
<td>Human Cognition</td>
<td>1</td>
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<tr>
<td>CLPS 0220</td>
<td>Making Decisions</td>
<td>1</td>
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<tr>
<td>One approved course in Perception</td>
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<tr>
<td>CLPS 0500</td>
<td>Perception and Mind</td>
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<tr>
<td>One approved course in Language, such as:</td>
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<tr>
<td>CLPS 0800</td>
<td>Language and the Mind</td>
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<tr>
<td>CLPS 0300</td>
<td>Introduction to Linguistics</td>
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<tr>
<td>One approved course in Computational Methods, such as:</td>
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<tr>
<td>CLPS 0950</td>
<td>Introduction to Programming</td>
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<tr>
<td>CLPS 1291</td>
<td>Computational Methods for Mind, Brain and Behavior</td>
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<tr>
<td>Four Approved Electives related to Cognitive Science, such as:</td>
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<tr>
<td>APMA 1690</td>
<td>Computational Probability and Statistics</td>
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<td>BIOL 0480</td>
<td>Evolutionary Biology</td>
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<td>CLPS 1100</td>
<td>Animal Cognition</td>
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<tr>
<td>CLPS 1470</td>
<td>Mechanisms of Motivated Decision Making</td>
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<tr>
<td>CLPS 1500</td>
<td>Perception and Action</td>
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<tr>
<td>CLPS 1610</td>
<td>Cognitive Development</td>
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<tr>
<td>CLPS 1800</td>
<td>Language Processing</td>
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<tr>
<td>CSCI 1010</td>
<td>Theory of Computation</td>
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<tr>
<td>CSCI 1480</td>
<td>Building Intelligent Robots</td>
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<td>EDUC 1260</td>
<td>Emotion, Cognition, Education</td>
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<td>ENGN 1580</td>
<td>Communication Systems</td>
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<tr>
<td>PHIL 1770</td>
<td>Philosophy of Mind</td>
<td></td>
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<tr>
<td>One Independent Study or Approved Seminar, such as:</td>
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<tr>
<td>CLPS 1400</td>
<td>The Neural Bases of Cognition</td>
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<td>CLPS 1480B</td>
<td>Cognitive Aging and Dementia</td>
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<td>CLPS 1480C</td>
<td>Cognitive Control Functions of the Prefrontal Cortex</td>
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Requirements for the Sc.B. degree

STANDARD PROGRAM FOR THE Sc.B. DEGREE

1. CLPS 0010 Mind, Brain and Behavior: An Interdisciplinary Approach 1
2. CLPS 0900 Statistical Methods 1
3. One approved course in Human Cognition, such as:
   - CLPS 0200 Human Cognition
   - CLPS 0220 Making Decisions
4. One approved course in Perception:
   - CLPS 0500 Perception and Mind
5. One approved course in Language, such as:
   - CLPS 0800 Language and the Mind
6. CLPS 0300 Introduction to Linguistics
7. One approved course in Computational Methods, such as:
   - CLPS 0950 Introduction to Programming
   - CLPS 1291 Computational Methods for Mind, Brain and Behavior
8. Four Approved Electives related to Cognitive Science, such as:
   - APMA 1690 Computational Probability and Statistics
   - BIOL 0480 Evolutionary Biology
   - CLPS 1100 Animal Cognition
   - CLPS 1470 Mechanisms of Motivated Decision Making
   - CLPS 1500 Perception and Action
   - CLPS 1610 Cognitive Development
   - CLPS 1800 Language Processing
   - CSCI 1010 Theory of Computation
   - CSCI 1480 Building Intelligent Robots
   - EDUC 1260 Emotion, Cognition, Education
   - ENGN 1580 Communication Systems
   - PHIL 1770 Philosophy of Mind
9. One Independent Study or Approved Seminar, such as:
   - 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
10. CLPS 1900 Research Design and Methods 1
11. 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
12. 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
    - 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

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

This document should contain certain fonts with restrictive licenses. For this draft, substitutions were made using less legally restrictive fonts. Specifically:

- Helvetica was used instead of Arial.

The editor may contact Leepfrog for a draft with the correct fonts in place.