Cognitive Science

College of Letters and Science (http://ls.berkeley.edu)

Program Office: Undergraduate and Interdisciplinary Studies, 243 Evans Hall, (510) 642-2628

Program Director: Terry Regier, PhD

Program Website: Cognitive Science (http://ugis.ls.berkeley.edu/cogsci)

Major

Cognitive science is the cross-disciplinary study of the structure and processes of human cognition and their computational simulation or modeling. This interdisciplinary program is designed to give students an understanding of questions dealing with human cognition, such as concept formation, visual perception, the acquisition and processing of natural language, and human reasoning and problem solving.

The program draws on relevant courses found within the fields of anthropology, biology, computer science, education, linguistics, philosophy, and psychology, as well as specially designed lower and upper division courses in cognitive science. The structure of the major follows.

Lower division requirements

Prerequisites for declaring major:

- Cognitive Science 1 or N1 (Introduction to cognitive science)
- Math 1A (Calculus) or Math 16A (Analytical geometry and calculus)
- Computer Science 61A (Structure and interpretation of computer programs) or Engineering 7 (Introduction to computer programming for scientists and engineers)

Note: An average GPA of 2.0 or higher in these prerequisites is required for admission to the major.

Other lower-division requirements:

- Molecular and Cell Biology 61 (Brain, mind, and behavior) or 64 (Exploring the brain: Introduction to neuroscience)
- Math 55 (Discrete mathematics) or CS 70 (Discrete mathematics and probability theory)

Upper division requirements

All students must complete a minimum of 30 upper division units. These must include 9 cognitive science courses, as follows: 6 courses fulfilling distribution requirements and 3 elective courses.

Distribution requirements:

1 course from each of the following 6 areas:

Cognitive neuroscience:

Psychology 117 (Human neuropsychology)

Cognitive Science/Psychology C127 (Cognitive neuroscience)

Psychology 133 (Psychology of sleep)

Cognitive psychology:

*Cognitive Science C100 / Psychology C120 (Basic issues in cognition)

Cognitive Science C102/Psychology C129 (Scientific approaches to consciousness)

Cognitive Science/Psychology C124 (Psycholinguistics)

Cognitive Science/Psychology C126 (Perception

Psychology 122 (Human learning and memory)

Psych 143 (Language acquisition)

Psych 164 (Social cognition)

Computational modeling:

Cognitive Science 131 (Computational models of cognition)

Computer Science 188 (Introduction to artificial intelligence)

Linguistics:

*Linguistics 100 (Introduction to linguistic science)

*Cognitive Science C101 / Linguistics C105 (The mind and language)

Cognitive Science/Linguistics C142 (Language and thought)

Cognitive Science/Linguistics C147 (Language disorders)

Philosophy:

Philosophy 122 (Theory of knowledge)

Philosophy 132 Philosophy of mind)

Philosophy 133 (Philosophy of language)

Philosophy 135 (Theory of meaning)

Philosophy 136 (Philosophy of perception)

Society, culture, and cognition:

Cognitive Science C103 / History C192 / Media Studies C104C / Information C103 (History of information)

Cognitive Science/Linguistics C104 (The mind, language, and politics)

Anthropology 166 (Language, culture, and society)

Economics 119 (Psychology and economics)

Education 140AC (Literacy: Individual and societal development)

Linguistics 150 (Sociolinguistics)

Psychology 107 (Buddhist psychology)

Psychology 160 (Social psychology)

Psychology 164 (Social cognition)

Psychology 166AC (Cultural psychology)

Sociology 150 (Social psychology)

Sociology 150A (Social psychology: Self and society)

Note: Courses that are listed within more than one area of concentration can be counted for only one requirement.

Concentrations and Electives

Cognitive science students who have completed the major requirements may wish to add an optional concentration. Courses taken toward the required 30 upper division units may be applied toward a concentration if they fall into the appropriate categories. A concentration consists of three listed courses, all within one of the six cognitive science categories. *Note: Both the cognitive psychology and linguistics concentrations must include a gateway course (designated with a *).*

Cognitive neuroscience:

Molecular and Cell Biology/Neuroscience C160 (Introduction to neurobiology)

Molecular and Cell Biology 160L (Neurobiology lab)

Molecular and Cell Biology 163 (Mammalian neuroanatomy)

Molecular and Cell Biology 164 (Sensory and integrative neurobiology)

Molecular and Cell Biology 165 (Molecular neurobiology)

Molecular and Cell Biology 166 (Biophysical neurobiology)

Psychology 110 (Biological psychology)

Psychology 111 (Sensory processes: Vision)

Psychology 114 (Biology of learning and neural plasticity)

Cognitive Science C110 / Computer Science C182 / Linguistics C109 (Neural basis of thought and language)

Integrative Biology 245/245L (Functional neuroanatomy and lab)

Cognitive psychology:

Cognitive Science/Psychology C127 (Cognitive neuroscience)

Psychology 107 (Buddhist psychology)

Psychology 111 (Sensory processes: Vision)

Psychology 121 (Animal cognition)

Psychology 133 (Psychology of sleep)

Music 108 or 108M (Music perception and cognition)

Education 224A (Mathematical thinking and problem solving)

Education 229A (Problem solving and understanding)

Computational modeling:

Cognitive Science C110 / Linguistics C109 / Computer Science C182 (Neural basis of thought and language)

Computer Science 160 (User interface design and development)

Computer Science 170 (Efficient algorithms and intractable problems)

Computer Science 186 (Introduction to database systems)

Computer Science / Vision Science C280 (Computer vision)

Computer Science 287 (Advanced robotics)

Computer Science 288 (Artificial intelligence approach to natural language processing)

Vision science 265 (Neural computation)

Linguistics:

Linguistics 110 (Introduction to phonetics and phonology)

Linguistics 120 (Introduction to syntax and semantics)

Linguistics 106 (Metaphor)

Cognitive Science / Linguistics C108 (The challenge of cognitive science to Western philosophy)

Cognitive Science C110 / Linguistics C109 / Computer Science C182 (Neural basis of thought and language)

Linguistics 115 (Phonology and morphology)

Linguistics 121 (Logical semantics)

Linguistics 123 (Pragmatics)

Linguistics 158 (Computational methods)

Cognitive Science C140 / Linguistics C160 (Quantitative methods in linguistics)

Linguistics 181 (Lexical semantics)

Cognitive Science/Psychology C124 (Psycholinguistics)

Psychology 143 (Language acquisition)

Philosophy:

Philosophy 128 (Philosophy of science)

Philosophy 130 (Philosophy of social science)

Philosophy 138 (Philosophy of society)

Philosophy 140A,B (Intermediate logic)

Philosophy 174 (Locke)

Philosophy 176 (Hume)

Philosophy 178 (Kant)

Philosophy 185 (Heidegger)

Philosophy 186 (Wittgenstein)

Philosophy 188 (Phenomenology)

Cognitive Science/Linguistics C108 (The challenge of cognitive science to Western philosophy)

Society, culture, and cognition:

Anthropology 149 (Psychological anthropology)

Anthropology 160AC (Forms of folklore)

Anthropology 161 (Narrative folklore)

Information 146 (Foundations of new media)

Linguistics 130 (Comparative and historical linguistics)

Linguistics C139 / Slavic C139 (Language spread)

Linguistics 151 (Language and gender)

Linguistics 170 (History, structure and sociolinguistics of a particular language)

Native American Studies 151 (Native American philosophy)

Philosophy 153 (Chinese philosophy)

Political Science 161 (Public opinion, voting and participation)

Political Science 164A (Political psychology and involvement)

Psychology 167AC (Stigma and prejudice)

Rhetoric 103A (Approaches and paradigms in the history of rhetorical theory)

Rhetoric 105 (Rhetorical theory and practice in historical eras)

Rhetoric 110 (Advanced argumentative writing)

Rhetoric 170 (Rhetoric of social science)

Rhetoric 174 (Rhetoric of scientific discourse)

Rhetoric 175 (Rhetoric of philosophical discourse)

Rhetoric 177 (Language, truth, and dialogue)

Honors Program

Cognitive science majors who wish to graduate with honors must have an overall GPA of 3.30 or higher in all work completed at the university and a 3.30 GPA or higher in the major program at the time of their graduation. In addition, they must complete a thesis of high quality, based upon independent study with a member of the cognitive science faculty and marked by satisfactory completion of at least three units of course H195A-H195B or 199.

Students interested in the major should consult with the student academic advisor in 243 Evans Hall, (510) 642-2628.

COG SCI 1 Introduction to Cognitive Science 4 Units
Department: Cognitive Science
Course level: Undergraduate
Terms course may be offered: Fall and spring
Grading: Letter grade.
Hours and format: 3 hours of Lecture and 2 hours of Laboratory per week for 15 weeks.
This course introduces the interdisciplinary field of cognitive science. Lectures and readings will survey research from artificial intelligence, pyschology, linguistics, philosophy, and neuroscience, and will cover topics such as the nature of knowledge, thinking, remembering, vision, imagery, language, and consciousness. Sections will demonstrate some of the major methodologies.
Students will receive no credit for Cognitive Science 1 after taking Cognitive Science C1/Education C1.

COG SCI N1 Introduction to Cognitive Science 3 Units
Department: Cognitive Science
Course level: Undergraduate
Term course may be offered: Summer
Grading: Letter grade.
Hours and format: 3 hours of Lecture and 2 hours of Laboratory per week for 15 weeks. 7.5 hours of Lecture per week for 6 weeks.
This course introduces the interdisciplinary field of cognitive science. Lectures and readings will survey research in such fields as artificial intelligence, psychology, linguistics, philosophy, and neuroscience, and will cover topics such as the nature of knowledge, thinking, remembering, vision, imagery, language, and consciousness. Sections will demonstrate some of the major methodologies.
Students will receive no credit for N1 after taking Education C1. Formerly known as C1.

COG SCI 98 Directed Group Study 1 - 4 Units
Department: Cognitive Science
Course level: Undergraduate
Terms course may be offered: Fall and spring
Grading: Offered for pass/not pass grade only.
Hours and format: 1 to 4 hour of Directed group study per week for 15 weeks.
Seminar for the group study of selected topics. Topics may be initiated by students subject to the approval of the major advisor.
Course may be repeated for credit. Course may be repeated for credit when topic changes. Enrollment is restricted; see the Introduction to Courses and Curricula section of this catalog.

COG SCI 99 Supervised Independent Study and Research 1 - 4 Units
Department: Cognitive Science
Course level: Undergraduate
Terms course may be offered: Fall and spring
Grading: Offered for pass/not pass grade only.
Hours and format: Zero hours of Independent study per week for 15 weeks.
Prerequisites: Restricted to freshmen and sophomores; consent of instructor.
Independent study and research by arrangement with faculty.
Course may be repeated for credit. Course may be repeated for credit when topic changes.

COG SCI 100 Basic Issues in Cognitive Science 4 Units
Department: Cognitive Science
Course level: Undergraduate
Term course may be offered: Summer
Grading: Letter grade.
Hours and format: 3 hours of Lecture and 1 hour of Discussion per week for 15 weeks. 5.5 hours of Lecture and 1.5 hours of Discussion per week for 8 weeks.
Theoretical foundations and current controversies in cognitive science will