Cognitive science is concerned with how humans, non-human animals, and computers acquire, represent, manipulate, and use information. As an interdisciplinary field it combines research and theory from computer science (e.g., artificial intelligence), cognitive psychology, philosophy, linguistics, and neuroscience, and to some extent evolutionary biology, math, and anthropology. Complex issues of cognition are not easily addressed using traditional intra-disciplinary tools. Cognitive researchers in any discipline typically employ a collection of analytic and modeling tools from across traditional disciplinary boundaries. Thus, the methods and research agenda of cognitive science are broader than those of any of the fields that have traditionally contributed to cognitive science. The Cognitive Science Program is designed to provide students with the broad interdisciplinary foundation needed to approach issues of cognition.

THE CONCENTRATION

The concentration in Cognitive Science consists of six courses, including an introductory course, four electives, and a senior seminar. Minds, Brains, and Intelligent Behavior (COGS 222) is the entry point into the concentration, and provides an interdisciplinary perspective on issues of cognition. Ideally, it should be taken before the end of the sophomore year. Emphasizing the highly interdisciplinary nature of the field, the four electives must be distributed over at least three course prefixes. In the fall of the senior year, concentrators will participate in a senior seminar (COGS 493).

REQUIRED COURSES

- COGS/PHIL/PSYC 222 Minds, Brains, and Intelligent Behavior: An Introduction to Cognitive Science
- COGS 493 Senior Seminar

ELECTIVES

Four electives are required, chosen from at least three prefixes, at most two of which can be at the 100 level.

- CS 201 Introduction to Computer Science
- CS 203 Artificial Intelligence
- CS 211 Machine Learning
- JAP 101 Introduction to Linguistic Analysis
- JAP 231 Survey of Linguistic Diversity: Meaning, Context, and Communication
- NS 210/BIOL 212/PSYC 212 Neuroscience
- PHIL 206 Philosophy of Language and Philosophy of Mind
- PHIL 331 Contemporary Epistemology
- PHIL 388 Consciousness
- PSYC 222 Cognitive Psychology
- PSYC 223 Concepts: Mind, Brain, and Culture
- PSYC 324 Great Debates in Cognition
- PSYC 326 Choice and Decision Making
- PSYC 327 Human Learning and Memory
- REL 288/PHIL 288 The Embodied Mind: A Cross-Cultural Exploration

RECOMMENDED

The following courses are recommended for students seeking a richer background in cognitive science. These will not count as electives for the cognitive science concentration.

- BIOL 204 Animal Behavior
- BIOL 305 Evolution
- MATH 211 Linear Algebra
- MATH 433 Mathematical Modeling and Control Theory
- PHIL 209 Philosophy of Science
- PSYC 201 Experimentation and Statistics
- STAT 101 Elementary Statistics and Data Analysis
- STAT 201 Statistics and Data Analysis
- STAT 231 Statistical Design of Experiments

THE DEGREE WITH HONORS IN COGNITIVE SCIENCE

Formal admission to candidacy for honors will occur at the end of the fall semester of the senior year and will be based on promising performance in COGS 493. This program will consist of COGS W31-494(S), and will be supervised by members of the advisory committee from at least two departments. Presentation of a thesis, however, should not be interpreted as a guarantee of a degree with honors.

STUDY ABROAD

Students who wish to discuss plans for study abroad are invited to meet with any member of the Cognitive Science advisory committee.

COGS 222(F) Minds, Brains, and Intelligent Behavior: An Introduction to Cognitive Science (Same as PHIL 222 and PSYC 222)

This course will emphasize interdisciplinary approaches to the study of intelligent systems, both natural and artificial. Cognitive science synthesizes research from cognitive psychology, computer science, linguistics, neuroscience, and contemporary philosophy. Special attention will be given to the philosophical foundations of cognitive science, representation and computation in symbolic and connectionist architectures, concept acquisition, problem solving, perception, language, semantics, reasoning, and artificial intelligence.


Prerequisites: PSYC 101 or any introductory course in PHIL or CS 134 or permission of instructor. Background in more than one of these is recommended. Enrollment limit: 25 (expected: 25). Preference given to first-and second-year students. Satisfies one semester of the Division II requirement.

Hour: 1:10-2:25 MR

COGS 493(F) Senior Seminar

The goal of the cognitive science senior seminar is threefold. Firstly, we will revisit the foundations of cognitive research by reading some of the classics that established cognitive science as a field in the middle of the 20th century. Secondly, we will engage current research trends in cognitive studies by looking at work published in the last five years on cognitive neuroscience, embodied cognition, dynamic systems theory, empirical approaches to consciousness, and situated robotics. In addition to attending to the specific empirical details of this latter work, we will also discuss how current research elaborates, expands, and sharpens early conceptions of the domain and methodology of cognitive science. Our final goal will be the preparation of individual research papers by members of the class. These will be on topics determined in collaboration with the instructor. Students will be responsible for presentations on the assigned readings, and for the development of a final paper involving independent research.

Format: seminar or tutorial, depending on enrollment. Requirements: several short papers, attendance and participation.

Prerequisites: required of, and open only to, senior cognitive science concentrators (though in unusual circumstances non-concentrators may take the class with permission of the cognitive science advisory committee). Enrollment limit: number of senior concentrators.

Hour: TBA

COGS 497(F), 498(S) Independent Study

The senior concentrator, having completed the senior seminar and with approval from the advisory committee, may devote winter study and the spring semester to a senior thesis based on the fall research project.