

COGNITIVE SCIENCE

Cognitive Science

Cognitive Science Program Director: Richard Liebendorfer.
College of Arts and Humanities
Department of Philosophy
227 Armstrong Hall Phone: 507-389-2012

Biology Concentration Advisor: Michael Bentley
Computer Science Concentration Advisor: Rebecca Bates
Philosophy Concentration Advisor: Richard Liebendorfer
Psychology Concentration Advisor: Dawn Albertson
Cognitive Science Program Core Faculty: Dawn Albertson (Psychology) Rebecca Bates (Computer Science), Michael Bentley (Biology), Sun Yu (Philosophy), Richard Liebendorfer (Philosophy), Jonathan Page (Psychology).

Cognitive Science is an interdisciplinary inquiry concerned with understanding the nature and development of such intelligent capacities as perception, language, reasoning, learning and problem-solving, whether these capacities are realized in biological or artificial systems. Such inquiry is by its very nature interdisciplinary, integrating methodological, theoretical and practical foci of Biology, Computer Science, Philosophy and Psychology into a single course of study.

The cognitive science major is a broad major and does not require that a student complete a minor in addition to the major. The major requires approximately 71-79 credits (depending on area of concentration) including prerequisites. As prerequisites for the major students must take CHEM 201, MATH 115 **OR** MATH 121, PSYC 201, **OR** STAT 354. Some of prerequisite requirements also fulfill General Education goal areas. Some of the concentrations have additional prerequisites (see course descriptions for more information). The program requirements below should be read carefully.

Each Cognitive Science major will concentrate in one of the four participating disciplines: Biology, Computer Science, Philosophy and Psychology. The concentration typically requires 24 credits of work. In addition to the concentration each student will take core courses from each of the other three participating disciplines. Each core will typically require 12 credits of course work, a total of 36 credits. A student need not do the core for her or his area of concentration since the core is already included in the concentration.

The structure of the major insures that students have a solid grounding in each of the four disciplines as well as a specific concentration in one area that draws on the interdisciplinary foundation. Graduates of the program will be prepared for a variety of post-baccalaureate options. They will be prepared for any of the careers open to graduates with degrees in one of the participating disciplines. They will be prepared for graduate study in traditional programs in Biology, Computer Science, Psychology or Philosophy. They will also be prepared for study in one of the many recently developed graduate Cognitive Science programs as well as graduate study in related programs such as cognition, brain, and behavior, cognitive neuroscience, biopsychology and human-computer interaction. Those who choose to study the law, a path frequently chosen by philosophy majors, will be well suited for legal practice concerned with the variety of legal complexities associated with the development of new technology.

Admission to the major is granted by the Cognitive Science Program. Minimum admission requirements are:

--a minimum of 32 earned semester hours.

--a minimum cumulative GPA of 2.5

Contact the Cognitive Science Program Director or the Program Advisors in one of the four participating departments.

COGNITIVE SCIENCE BS (71-79 credits, depending on concentration)

Required Prerequisites for Major:

CHEM 201 General Chemistry I (5)
MATH 115 Precalculus Mathematics (4) **OR**
MATH 121 Calculus I (4)
PSYC 201 Statistics for Psychology (4) **OR**
STAT 354 Concepts of Probability and Statistics (3)

Some of these program requirements can be fulfilled in General Education. Some of the concentrations have additional prerequisites.

All cognitive science majors must choose a concentration from one of the four areas below (Biology, Computer Science, Philosophy and Psychology) and complete the requirements for that concentration. All cognitive science majors must complete the core requirements for the remaining three participating areas

BIOLOGY

Required Core (11 credits)

BIOL 220 Human Anatomy (4)
BIOL 230 Human Physiology (4)
BIOL 324 Neurobiology (3)

Required Concentration (25 credits)

BIOL 105 General Biology I (4)
BIOL 106 General Biology II (4)
BIOL 220 Human Anatomy (4)
BIOL 230 Human Physiology (4)
BIOL 324 Neurobiology (3)

Choose two courses from the following:

BIOL 211 Genetics (3)
BIOL 434 Development and Human Embryology (3)
BIOL 436 Animal Behavior (3)
BIOL 438 General Endocrinology (3)
BIOL 460 Introduction to Toxicology (3)
BIOL 466 Principles of Pharmacology (3)

COMPUTER SCIENCE

Required Core (11-12 credits)

CS 110 Computer Science I (4)
CS 230 Intelligent Systems (4)
Choose one course from the following:
CS 430 Artificial Intelligence (3)
CS 431 Computational Linguistics (3)
ISYS 482 Human Computer Interaction (3) **OR**
IT 482 Human Computer Interaction (3)

Recommended

CS 111 Computer Science II (4)

Required Concentration (24-25 credits)

CS 110 Computer Science I (4)
CS 111 Computer Science II (4)
CS 210 Data Structures (4)
Choose four or more of the following:
CS 310 Algorithm Analysis (3)
CS 370 Concepts of Programming Languages (3)
CS 410 Formal Languages/Abstract Machines (3)
CS 415 High Performance Computing (3)
CS 430 Artificial Intelligence (3)
CS 431 Computational Linguistics (3)
CS 433 Data Mining and Machine Learning (3)
ISYS 482 Human Computer Interaction (3)
IT 482 Human Computer Interaction (3)
CS 498 Senior Thesis (4)

PHILOSOPHY

Required Core (12 credits)

PHIL 101 Philosophical Problems: The Mind Body Problem (3)
Choose three of the following:
PHIL 410 Philosophy of Language (3)
PHIL 474 Philosophy of Mind (3)
PHIL 475 Philosophical Issues in Cognitive Science (3)
PHIL 480 Philosophy of Science (3)
PHIL 481 Philosophy of Biology (3)

COGNITIVE SCIENCE

Required Concentration (24 credits)

PHIL 101 Philosophical Problems: The Mind Body Problem (3)

PHIL 495 Senior Thesis I (2)

PHIL 496 Senior Thesis II (1)

Choose three of the following:

PHIL 311 Symbolic Logic (3)

PHIL 410 Philosophy of Language (3)

PHIL 474 Philosophy of Mind (3)

PHIL 475 Philosophical Issues in Cognitive Science (3)

PHIL 480 Philosophy of Science (3)

PHIL 481 Philosophy of Biology (3)

Choose three of the following which have not already been chosen under the preceding requirement:

PHIL 311 Symbolic Logic (3)

PHIL 334 History of Philosophy: Classical Philosophy (3)

PHIL 336 History of Modern and Renaissance Philosophy (3)

PHIL 410 Philosophy of Language (3)

PHIL 437 Contemporary Philosophy (3)

PHIL 450 Special Topics (3)

PHIL 455 Existentialism and Phenomenology (3)

PHIL 473 Knowledge and Reality (3)

PHIL 474 Philosophy of Mind (3)

PHIL 475 Philosophical Issues in Cognitive Science (3)

PHIL 480 Philosophy of Science (3)

PHIL 481 Philosophy of Biology (3)

PSYCHOLOGY

Required Core (12 credits)

PSYC 101 Psychology (4)

PSYC 416 Cognitive Psychology (4)

Choose one of the following:

PSYC 415 Human Memory (4)

PSYC 413 Sensation and Perception (4)

PSYC 421 Biopsychology (4)

Required Concentration (24 credits)

PSYC 101 Psychology (4)

PSYC 416 Cognitive Psychology (4)

Choose four of the following:

PSYC 206 The Human Mind (4)

PSYC 405 Motivation (4)

PSYC 413 Sensation and Perception (4)

PSYC 415 Human Memory (4)

PSYC 420 Drugs and Behavior (4)

PSYC 421 Biopsychology (4)

PSYC 423 Neuroscience (4)

PSYC 424 Physiological Psychology Laboratory (4)

PSYC 433 Child Psychology (4)

PSYC 436 Adolescent Psychology (4)

PSYC 455 Abnormal Psychology (4)

PSYC 458 Cultural Psychology (3)

PSYC 466 Psychology of Aging (3)

* PSYC 211 is a prerequisite for Psychology majors. With the consent of an instructor, Cognitive Science majors may have this prerequisite waived. This holds for all courses for which PSYC 211 is a prerequisite.

Required Minor: None.