Cognitive Sciences

The School of Social Sciences

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Degree Offered: B.A.

The cognitive sciences provide a multidisciplinary study of the mind. Researchers in this field seek to understand such mental phenomena as perception, thought, memory, the acquisition and use of language, learning, concept formation, and consciousness.

Research projects in the cognitive sciences may involve observing the development of mental skills in children, programming computers to engage in complex problem solving, or analyzing the nature of meaning. Methods include observation and analysis, model building, experimentation, and the computer simulation of mental structures and processes. Some investigators focus on relationships between brain structures and behavior, some work with computer simulation, and others work at more abstract philosophical levels.

Degree Requirements for B.A. in Cognitive Sciences

Students planning to major in cognitive sciences should take 1 or more of the following courses during their first and second years: PSYC 101 Introduction to Psychology, PHIL 103 Philosophical Aspects of Cognitive Science, LING 200 Introduction to the Scientific Study of Language, PSYC 203 Introduction to Cognitive Psychology. Students should try to complete the required 200-level core courses (see below) by the end of their sophomore year.

For general university requirements, see Graduation Requirements (pages 18–20). Cognitive sciences majors will be required to take a total of 7 core courses (see below) plus 5 additional courses. For some of the core courses, students may select from two or more options. Any of these options not used to satisfy the core may be used to satisfy the additional course requirements. Among the 5 additional courses, a minimum of 3 and a maximum of 4 of these courses should be in an area of concentration. The available areas of concentration are: linguistics, philosophy, psychology, neuroscience, and applied cognitive sciences. Suitable courses in the first 3 of these areas are listed below under their respective department headings. Suitable courses in neuroscience include any of the 3- or 4-credit courses under the neuroscience course heading below or: BIOS 421
Neurobiology, CSCI 420 Brain and Behavior, ELEC 481 Fundamentals of Systems Physiology and Biophysics, LING 411 Neurolinguistics, and PSYC 362 Biopsychology. Appropriate courses in the applied cognitive sciences concentration include PSYC 441 Human-Computer Interaction (required of all students in this concentration), PSYC 340 Research Methods, PSYC 370 Introduction to Human Factors, COMP 360 Computer Graphics, and PSYC 409 Methods in Human-Computer Interaction.

Honors program. Students in the honors program will conduct an independent research project of either one or two semesters under the guidance of one or more faculty members in the cognitive sciences program. Students intending to go into this program should consult with one or more faculty about their project before the end of their junior year. Their proposals must be accepted by their adviser(s) and the director of the program by the end of the semester preceding initiation of the project—that is, during the spring of the junior year for projects beginning in the fall, and during the fall of the senior year for projects beginning in the spring. In cases where the director is the adviser, the proposal must be approved by an additional member of the Cognitive Sciences Steering Committee. Students in the program will enroll in one or both of CSCI 481 Honors Project (fall, 3 hours) and 482 Honors Project (spring, 3 hours). Students who undertake a two-semester project will be allowed to continue into the second semester only if their adviser(s) judge(s) that they have made substantial progress during the first semester. At the end of the project, each student in the honors program will make an oral presentation of his/her project at a meeting to which all cognitive science students and faculty will be invited and will submit a final written project report to his/her adviser(s) and to the director of the program.

Core Courses
COMP 200 Elements of Computer Science (3 hours)
or COMP 210 Introduction to Principles of Scientific Computation (4 hours)
COMP 440 Artificial Intelligence
or CSCI 410 Computational Modeling of Cognitive Processes
or PSYC 352 Formal Foundations of Cognitive Sciences
or LING 317 Language and Computers
LING 200 Introduction to the Scientific Study of Language
or LING 300 Linguistic Analysis
LING 306 Language and the Mind
or LING 315 Semantics
PHIL 305 Mathematical Logic
or PHIL 312 Philosophy of Mind
PSYC 203 Introduction to Cognitive Psychology
PSYC 351 Psychology of Perception
or PSYC 362 Biopsychology

Additional Courses
Cognitive Sciences
CSCI 390 Supervised Research in Cognitive Science
CSCI 410 Computational Modeling of Cognitive Processes
CSCI 420 Brain and Behavior
CSCI 481/482 Honors Project

Computer Science
COMP 212 Intermediate Programming
COMP 440 Artificial Intelligence
COMP 450 Algorithmic Robotics

Linguistics
LING 200 Introduction to the Scientific Study of Language
LING 300 Linguistic Analysis
LING 301 Phonetics and Phonology
LING 306 Language and the Mind
LING 315 Semantics
LING 317 Language and Computers
LING 402 Syntax and Semantics
LING 403 Modern Linguistic Theory
LING 411 Neurolinguistics
LING 412 Language and Intelligence
LING 467 Computational Projects
LING 490 Discourse Analysis

NEUR 500 Functional Neuroanatomy and Systems Neuroscience
NEUR 501 Cognitive Neuroscience I
NEUR 502 Cognitive Neuroscience II
NEUR 503 Molecular Neuroscience I and II
NEUR 504 Cellular Neurophysiology I and II
NEUR 505 Optical Imaging in Neuroscience
NEUR 506 Learning and Memory
NEUR 511, 512 Integrative Neuroscience Core Course (two semesters)
NEUR 515 Neural Development

Note: Many of these courses are taught by Baylor College of Medicine faculty and listings may change year to year. Check the Neuroscience website http://www.ruf.rice.edu/~neurosci/ for the latest listings.

Philosophy
PHIL 103 Philosophical Aspects of Cognitive Science
PHIL 303 Theory of Knowledge
PHIL 305 Mathematical Logic
PHIL 312 Philosophy of Mind
PHIL 353 Philosophy of Language
PHIL 357 Incompleteness, Undecidability, and Computability

See CSCI in the Courses of Instruction section.