

# Cognitive Sciences

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## 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 16–18). 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*

**Neuroscience**

- NEUR 500 *Functional Neuroanatomy and Systems Neuroscience*  
 NEUR 501 *Computational and Cognitive Neuroscience*  
 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 311, 512 *Integrative Neuroscience Core Course*  
 (two semesters)

**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*

**Psychology**

- PSYC 308 *Memory*  
 PSYC 309 *Psychology of Language*  
 PSYC 340 *Research Methods*  
 PSYC 351 *Psychology of Perception*  
 PSYC 352 *Formal Foundations of Cognitive Science*  
 PSYC 360 *Thinking*  
 PSYC 362 *Biopsychology*  
 PSYC 409 *Methods in Human-Computer Interaction*  
 PSYC 441 *Human-Computer Interaction*

**Other Departments**

- ANTH 406 *Cognitive Studies in Anthropology and Linguistics*  
 BIOS 421 *Neurobiology*  
 ELEC 201 *An Introduction to Engineering Design*  
 ELEC 481 *Fundamentals of Systems Physiology and Biophysics*  
 ELEC 498 *Introduction to Robotics*  
 SOCI 353 *Conceptions of Human Nature*  
 STAT 300 *Model Building*

**See CSCI (page 307) in the Courses of Instruction section.**