### Areas of Specialization

The Department of Cognitive Science has instituted optional “areas of specialization” within the Cognitive Science major for the BS degree only.

The areas of specialization are intended to provide majors with guidance in choosing elective courses and to make the specific interests and training of a major clear to prospective employers and graduate schools. Specifying an area of specialization is optional; however, students should take into consideration that approved courses are not necessarily offered every year, when planning for their specialization.

To major in Cognitive Science with an area of specialization, student must fulfill the requirements for the BS degree and must choose 4 of the required 6 electives from the list of approved electives for that area of specialization. In addition, a Cognitive Science 199 may be allowed for elective credit within the specialization if the research project was clearly in one of the specialization areas. The specialization area will be listed on the transcript.

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**NEUROSCIENCE SPECIALIZATION**  
Major code: CG29

This area of specialization is intended for majors interested in neuroscience research or medicine. Allowed electives include courses in cognitive neuroscience, organic chemistry, biochemistry, and physiology.

**Cognitive Science**
- COGS 119: Programming/Experimental Res.  
- COGS 143: Animal Cognition  
- COGS 154: Comm. Disorders Child/Adults  
- COGS 160: Sem Special Topics (if topic applies)  
- COGS 171: Mirror neuron System  
- COGS 172: Brain Disorders and Cognition  
- COGS 174: Drugs: Brain, Mind, and Culture  
- COGS 175: Neurophy / States of Consciousness  
- COGS 176: From Sleep to Attention  
- COGS 179: Electrophysiology of Cognition  
- COGS 180: Neural Coding/Sensory Systems  
- COGS 184: Modeling the Evolution of Cognition  

**Biochemistry**
- BIBC 100: Structural Biochemistry  
- BIBC 102: Metabolic Biochemistry

**Biology-Animal Physiology and Neuroscience**
- BIPN 100: Mammalian Physiology I  
- BIPN 105: Animal Physiology Lab  
- BIPN 144: Developmental Neurobiology  
- BIPN 146: Computational Neurobiology

**Chemistry**
- CHEM 140A: Organic Chemistry  
- CHEM 140B: Organic Chemistry  
- CHEM 140C: Organic Chemistry  
- CHEM 141A: Organic Chemistry  
- CHEM 141B: Organic Chemistry  
- CHEM 143A: Organic Chemistry Laboratory  
- CHEM 143B: Organic Chemistry Laboratory  
- CHEM 143C: Organic Laboratory

**Linguistics**
- LIGN 172: Language and the Brain

**Psychology**
- PSYC 168: Psych. Disorders of Childhood  
- PSYC 169: Brain Damg and Ment. Func.  
- PSYC 179: Drugs, Add., & Ment. Disorder  
- PSYC 181: Drugs and Behavior  
- PSYC 182: Illusions and the Brain

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**COMPUTATION SPECIALIZATION**  
Major code: CG27

This area of specialization is intended for majors interested in software engineering or research in computational modeling of cognition. Allowed electives include advanced courses in neural networks, artificial intelligence, and computer science.

**Cognitive Science**
- COGS 102C: Cognitive Engineering  
- COGS 118A: Natural Computation I  
- COGS 118B: Natural Computation II  
- COGS 119: Programming/Experimental Res.  
- COGS 121: HCI Programming  
- COGS 160: Sem Special Topics (if topic applies)  
- COGS 171: Mirror neuron System  
- COGS 180: Neural Coding/Sensory Systems  
- COGS 187A: Multimedia Design I  
- COGS 187B: Multimedia Design II  
- COGS 189: Brain Computer Interfaces

**Computer Science and Engineering**

**Biology-Animal Physiology and Neuroscience**
- BIPN 146: Computational Neurobiology

**Computer Science and Engineering**
- CSE 100: Advanced Data Structures  
- CSE 101: Design and Analysis of Algorithms  
- CSE 105: Theory of Computability  
- CSE 102: Storage System Architectures  
- CSE 130: Program Lang: Prin. and Paradigms  
- CSE 131: Compiler Construction  
- CSE 150: Intro to AI: Search and Reasoning  
- CSE 151: Intro to AI: Statistical Approaches  
- CSE 160: Intro to Parallel Computation

**Math**
- MATH 170A: Numerical/Linear Algebra  
- MATH 170B: Numerical/Approx + Nonlinear  
- MATH 170C: Numerical/Differential Equations  
- MATH 180A: Introduction to Probability  
- MATH 180B: Intro to Stochastic Processes I  
- MATH 180C: Intro to Stochastic Processes II  
- MATH 189: Exploratory Data Analysis/Inference

**Linguistics**
- LIGN 170: Psycholinguistics  
- LIGN 171: Child Lang Acquisition  
- LIGN 174: Gender and Language in Society*  
- LIGN 175: Sociolinguistics  
- LIGN 180: Language Representation in the Brain  
- LIGN 181: Language Processing in the Brain

**Psychology**
- PSYC 115: Lab in Cognitive Psychology  
- PSYC 119: Psycholinguistics/Cognition Lab

**Sociology**
- SOCI 116: Gender and Language in Society*  
- SOCI 118E: Sociology of Language

*student can take either LIGN 174 or SOCI 116 but not both
This area of specialization is intended for majors interested in human computer interaction, web, visualization, and applications of cognitive science in design and engineering. Additional electives may be petitioned from communication, computer science, computer engineering and visual arts. Please note: We cannot guarantee enrollment in non-COGS courses (i.e., CSE, ECE, ICAM) for HCI students since many of these majors are very impacted and priority is given to students in those majors.

### Cognitive Science
- COGS 154: Communication Disorders in Children and Adults
- COGS 171: Mirror neuron System
- COGS 172: Brain Disorders and Cognition
- COGS 174: Drugs: Brain, Mind and Culture
- COGS 175: The Neuropsychological Basis of Alternate States of Consciousness
- COGS 176: From Sleep to Attention

### Biochemistry
- BIBC 100: Structural Biochemistry
- BIBC 102: Metabolic Biochemistry

### Biology-Animal Physiology and Neuroscience
- BIPN 100: Mammalian Physiology I
- BIPN 105: Animal Physiology Lab

### Chemistry
- CHEM 140A: Organic Chemistry I
- CHEM 140B: Organic Chemistry II
- CHEM 141A: Organic Chemistry
- CHEM 141B: Organic Chemistry

### Psychology
- PSYC 120: Learning and Motivation
- PSYC 125: Clinical Neuropsychology Assessment
- PSYC 124: Introduction to Clinical Psychology
- PSYC 140: Lab/Human Behavior
- PSYC 163: Abnormal Psychology
- PSYC 168: Psych, Disorders of Childhood
- PSYC 169: Brain Damage and Mental Functions
- PSYC 179: Drugs, Addiction, Mental Disorders
- PSYC 181: Drugs and Behavior
- PSYC 188: Impulse Control Disorders

### Computing and the Arts
- ICAM 101: Digital Imaging: Image and Interactivity
- ICAM 102: Digital Media I: Time, Movement, Sound
- ICAM 120: Virtual Environments
- ICAM 130: Seminar in Contemporary Computer Topics

### Computer Science
- CSE 100: Advanced Data Structures
- CSE 101: Design and Analysis of Algorithms
- CSE 102: Storage System Architectures
- CSE 111: Object Oriented Software Design
- CSE 118: Ubiquitous Computing
- CSE 130: Programming Languages: Principles and Paradigms
- CSE 132A: Database System Principles
- CSE 132B: Database Systems Applications
- CSE 133: Information Retrieval
- CSE 134A: Web Server Languages
- CSE 134B: Web Client Languages
- CSE 135: Server-side Web Applications
- CSE 150: Introduction to Artificial Intelligence: Search and Reasoning
- CSE 151: Introduction to Artificial Intelligence: Statistical Approaches

### Communication
- COMM 101E: Media Production Lab: Ethnographic Methods for Media Production
- COMM 101M: Media Production Lab: Communicating and Computers
- COMM 102C: Practicum in New Media & Community Life
- COMM 110T: Language, Literacy and Communication: Language, Thought, and the Media
- COMM 120N: Advanced Media Production: News Media Workshop
- COMM 151: The Information Age: In Fact and Fiction

### Electrical and Computer Engineering
- ECE 161A: Introduction to Digital Signal Processing
- ECE 161B: Digital Signal Processing I
- ECE 161C: Applications of Digital Signal Processing
- ECE 172A: Introduction to Intelligent Systems: Robotics and Machine Intelligence
- ECE 187: Introduction to Biomedical Imaging and Sensing

### Engineering
- *ENG 100A: Team Engineering*
- *ENG 100L: Team Engineering Laboratory*

(*) Note: Both ENG100A/100L must be taken together to receive credit. Student can take either ENG100A/100L or Cogs 199 but not both.)