**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 143: Animal Cognition
COGS 154: Comm. Disorders Child/Adults
COGS 160: Sem Special Topics (if topic applies)
COGS 170: Nat/Art Sym. Rep. Systems
COGS 171: Mirror neuron System
COGS 172: Brain Disorders and Cognition
COGS 174: Drugs: Brain, Mind, and Culture
COGS 175: Neurophysiology of Sleep and Attention
COGS 179: Electrophysiology of Cognition
COGS 184: Modeling the Evolution of Cognition

**Biochemistry**

BIBC 100: Structural Biochemistry
BIBC 102: Metabolic Biochemistry

**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, Addis., & Ment. Disord.
PSYC 181: Drugs and Behavior

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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 121: HCI Programming
COGS 160: Seminar on Special Topics (if topic applies)
COGS 187A: Multimedia Design I
COGS 187B: Multimedia Design II

**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 102: Storage System Architectures
CSE 133: Program Lang: Prin. and Paradigms
CSE 133: 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
MATH 180C: Intro. to Stochastic Processes II

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**HUMAN COGNITION SPECIALIZATION**

Major Code: CG28

This area of specialization is intended for majors whose primary interests include human psychology and applications of cognitive science in design and engineering. Allowed electives include courses in cognitive development, language, laboratory research of cognition, anthropology, and sociology.

**Cognitive Science**

COGS 110: The Developing Mind
COGS 143: Animal Cognition
COGS 151: Analogy and Conceptual Systems
COGS 152: Cognitive Foundations of Math
COGS 153: Language Comprehension
COGS 154: Comm. Disorders Child/Adults
COGS 155: Gesture and Cognition
COGS 156: Language Development
COGS 160: Seminar Topics (if topic applies)

**Linguistics**

LIGN 170: Psycholinguistics
LIGN 171: Child Lang Acquisition
LIGN 172: Language and the Brain
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 118A: Real-time Exam. of Lang. Processing
PSYC 118B: Real-time Exam. of Lang. Processing
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

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*We cannot guarantee these courses for Cog Sci majors as many CSE courses are very impacted. Also, CSE 102, 133, 160, and 164 may not be offered on a regular basis.
CLINICAL ASPECTS of COGNITION SPECIALIZATION
Major Code: CG31

This area of specialization is intended for majors interested in cognitive neuropsychology, psychiatry, cognitive disorders, and the effects of drugs and brain damage on cognitive functions. Allowed electives include courses in those topics, as well as organic chemistry, biochemistry and physiology.

Cognitive Science
COGS 154: Communication Disorders in Children and Adults
COGS 172: Brain Disorders and Cognition
COGS 174: Drugs: Brain, Mind and Culture
COGS 175: The Neuropsychological Basis of Alternate States of Consciousness

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 161: Introduction to Engineering Psychology

HUMAN-COMPUTER INTERACTION SPECIALIZATION
Major Code: CG30

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 120: Human Computer Interaction
COGS 121: Human Computer Interaction Programming
COGS 160: Upper-Division Seminar on Special Topics
COGS 183: Artificial Life
COGS 187A: Cognitive Aspects of Multimedia Design
COGS 187B: Cognitive Aspects of Multimedia Design II
COGS 188: Representation, Search, and the Web

Plus any COGS 102 not used for core sequence

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 Language: 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
CSE 152: Intro Computer Vision
CSE 167: Computer Graphics
CSE 171: User Interface Design

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 158 but not both.)