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.

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 163: Metabolic Disorders of the Brain
COGS 164: Neurobiology of Motivation
COGS 170: Natl./Art Sym. Rep. Systems
COGS 171: Mirror neuron System
COGS 172: Brain Disorders and Cognition
COGS 175: Neurophy / States of Consciousness
COGS 176: From Sleep to Attention
COGS 177: Space and Time in the Brain
COGS 178: Electrophysiology of Cognition
COGS 180: Neural Coding/Sensory Systems
COGS 184: Modeling the Evolution of Cognition
Plus any COGS 107 not used for core sequence

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 145: Computational Neurobiology
BIPN 148: Cellular Basis of Learning and Memory

Chemistry
CHEM 140A: Organic Chemistry
CHEM 140B: Organic Chemistry
CHEM 140C: Organic Chemistry
CHEM 141A: Organic Chemistry
CHEM 141B: Organic Chemistry
CHEM 142A: Organic Chemistry Laboratory
CHEM 142B: Organic Chemistry Laboratory
CHEM 143C: Organic Chemistry 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, Addts., & Ment. Disord.
PSYC 181: Drugs and Behavior
PSYC 182: Illusions and the Brain

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 119A: Natural Computation I
COGS 119B: Natural Computation II
COGS 121: H# 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

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 Architecture
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

*We cannot guarantee these courses for Cog Sci majors as many CSE courses are very impacted. Also, CSE 102, and 160 may not be offered on a regular basis.

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 119: Programming/Experimental Res.
COGS 143: Animal Cognition
COGS 151: Analog 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 157: Music and the Mind
COGS 160: Sem Special Topics (if topic applies)
COGS 171: Mirror neuron System

Plus COGS 102A or 102B when not used for core sequence

Linguistics
LIGN 155: Evolution of Language
LIGN 170: Psycholinguistics
LIGN 171: Child Lang Acquisition
LIGN 174: Gender and Language in Society*
LIGN 175: Sociolinguistics

SOCI 116: Language Representation in the Brain
LIGN 181: Language Processing in the Brain

Psychology
PSYC 115: Lab in Cognitive Psychology
PSYC 118B: Real-time Exam. of Lang. Process.
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
### 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 + Adults
- COGS 163: Metabolic Disorders of the Brain
- 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

### 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 119: Programming/Experimental Res.
- COGS 120: Human Computer Interaction
- COGS 121: HCI Programming
- COGS 160: Seminar on Current Topic Applies
- COGS 171: Mirror neuron System
- COGS 187A: Cognitive Aspects of Multimedia Design
- COGS 187B: Cognitive Aspects of Multimedia Design II
- COGS 188: AI Algorithm & Social Language
- COGS 189: Brain Computer Interfaces

#### 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 105C: Computer Games Studies
- COMM 106: Internet Industry
- COMM 110T: LLC Language, Thought & Media
- COMM 111D: Critical Design
- COMM 112M: Communication and Social Machines

#### 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 131: Database System Principles
- CSE 132: 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 100D: Design for Development

#### Philosophy
- PHIL 164: Technology and Human Values

#### Psychology
- PSYC 161: Introduction to Engineering Psychology

### Visual Arts
- VIS 140: Digital Imaging: Image and Interactivity
- VIS 145A: Digital Media I: Time, Movement, Sound
- VIS 145B: Time- and Process-Based Digital Media II
- VIS 147A: Electronic Technologies for Art I
- VIS 147B: Electronic Technologies for Art II
- VIS 149: Seminar in Contemporary Computer Topics
- VIS 176: 16mm Filmmaking
- VIS 177: Scripting Strategies
- VIS 180A: Documentary Filmmaking and the Construction of Authenticity in Current Media Practices
- VIS 180B: Fiction and Allegory in Current Media Practices
- VIS 182: Advanced Editing
- VIS 188: Advanced Filmmaking Strategies

(updated 3/2/16)