Areas of Specialization

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 169: Genetic Information for Behavior
COGS 170: Brain Waves Across Scales
COGS 171: Mirror neuron System
COGS 172: Brain Disorders and Cognition
COGS 174: Drugs: Brain, Mind, and Culture
COGS 175: Neuropsychological States of Consciousness
COGS 176: From Sleep to Attention
COGS 177: Space and Time in the Brain
COGS 178: Genes, Brains, and Behavior
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
BIPN 105: Animal Physiology Lab
BIPN 144: Developmental Neurobiology
BIPN 146: Computational Neurobiology
BIPN 148: Cellular Basis of Learning and Memory

CHEM 143B: Organic Chemistry Laboratory
CHEM 143C: Organic Chemistry Laboratory

LING 180: Language Representation in the Brain
LING 181: Language Processing in the Brain

Psychology
PSYC 123: Cognitive Control and Frontal Lobe Function
PSYC 132: Hormones and Behavior
PSYC 133: Circadian Rhythms – Biological Clock
PSYC 150: Cognitive Neuroscience of Vision
PSYC 168: Psych. Disorders of Childhood
PSYC 169: Brain Damg and Ment. Func.
PSYC 174: Visual Cognition
PSYC 179: Drugs, Addds., & Ment. Disorder.
PSYC 181: Drugs and Behavior
PSYC 182: Illusions and the Brain

MACHINE LEARNING AND NEURAL COMPUTATION SPECIALIZATION
Major code: CG35

This area of specialization is intended for majors interested in computational and mathematical approaches to modeling cognition or building cognitive systems, theoretical neuroscience, as well as software engineering and data science. Allowed electives include advanced courses in neural networks, artificial intelligence, and computer science.

Cognitive Science
COGS 108: Modeling and Data Analysis
COGS 118A: Intro to Machine Learning I *
COGS 118B: Intro to Machine Learning II *
COGS 118C: Neural Signal Processing *
COGS 118D: Math. Stat. for Behavioral Data Analysis *
COGS 160: Sem Special Topics (if topic applies)
COGS 180: Neural Coding/Sensory Systems
COGS 185: Adv. Machine Learning Methods
COGS 188: Al Algorithm and Social Language
COGS 189: Brain Computer Interfaces

Biology-Animal Physiology and Neuroscience
BIPN 146: Computational Neurobiology

Computer Science and Engineering**

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
LING 167: Deep Learning for Nat. Lang. Understanding

Sociology
LING 171: Language Processing in the Brain

Language and Culture Specialization
Major code: CG34

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 Research
COGS 143: Animal Cognition
COGS 144: Social 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 157: Music and the Mind
COGS 160: Sem Special Topics (if topic applies)
COGS 171: Mirror Neuron System

Plus COGS 101C when not used for core sequence

Psychology
PSYC 115A: Lab in Cognitive Psychology I
PSYC 115B: Lab in Cognitive Psychology II
PSYC 128: Psychology of Reading
PSYC 145: Psychology of Language
PSYC 156: Cognitive Development in Infancy

Sociology
SOCI 116: Gender and Language in Society *
SOCI 117: Language, Culture, and Education
SOCI 118E: Sociology of Language

* Students 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

#### Psychology
- PSYC 100: Clinical Psychology
- PSYC 115: Lab in Clinical Psychology Research
- PSYC 120: Learning and Motivation
- PSYC 125: Clinical Neuropsychology Assessment
- PSYC 124: Introduction to Clinical Psychology
- PSYC 134: Eating Disorders
- PSYC 140: Lab/Human Behavior
- PSYC 154: Behavior Modification
- PSYC 155: Social Psychology and Medicine
- PSYC 168: Psych, Disorders of Childhood
- PSYC 169: Brain Damage and Mental Functions
- PSYC 170: Cognitive Neuropsychology
- PSYC 179: Drugs, Addiction, Mental Disorders
- PSYC 181: Drugs and Behavior
- PSYC 188: Impulse Control Disorders

### DESIGN AND INTERACTION SPECIALIZATION  
**Major Code: CG33**

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 HCl 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 122: Interaction Design Startup
- COGS 123: Social Computing
- COGS 124: HCI Technical Systems Research
- COGS 125: Advanced Interaction Design
- COGS 126: Human-Computer Interaction
- COGS 160: Sem Special Topics (if topic applies)
- 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

Plus any COGS 102 not used for core sequence

#### 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 105G: Computer Games Studies
- COMM 106i: Internet Industry
- COMM 110T: LLC: Language, Thought & Media
- COMM 112M: Communication and Social Machines
- COMM 120N: Advanced Media Production: News Media Workshop
- COMM 124A: Critical Design: Advanced Studio
- COMM 124B: Critical Design: Topic Studio
- COMM 151: The Information Age: In Fact and Fiction
- COMM 173: Interaction with Technology

### 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 110: Software Engineering
- CSE 111: Object Oriented Software Design
- CSE 118: Ubiquitous Computing
- CSE 130: Programming Lang: 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 165: 3D User Interaction
- CSE 167: Computer Graphics
- CSE 171: User Interface Design
- CSE 176A: Maker Topics: Health Care Robotics
- CSE 180A: Documentary Evidence and the Construction of Authenticity in Current Media Practices
- 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 Evidence and the Construction of Authenticity in Current Media Practices
- VIS 180B: Fiction and Allegory in Current Media Practices
- VIS 182: Advanced Editing
- VIS 186: Advanced Filmmaking Strategies

**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 Evidence and the Construction of Authenticity in Current Media Practices
- VIS 180B: Fiction and Allegory in Current Media Practices
- VIS 182: Advanced Editing
- VIS 186: Advanced Filmmaking Strategies

**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 Evidence and the Construction of Authenticity in Current Media Practices
- VIS 180B: Fiction and Allegory in Current Media Practices
- VIS 182: Advanced Editing
- VIS 186: Advanced Filmmaking Strategies

#### Design
- DSGN 100: Prototyping

#### 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

#### Education Studies
- EDS 124AR: Teaching Comp. in a Digital World
- EDS 124BR: Teaching Comp. Thinking for Everyone

#### Engineering
- ENG 100D: Design for Development

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