Specialization Electives

2024-2025

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.

- At least 3 of your 6 total electives must be taken within the Cognitive Science Department (COGS courses).

- A COGS 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.

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 165: Neuroimaging of Cognition
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

Electives

Plus COGS 107 not used for core sequence

LINGUISTICS

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 112: Humor
COGS 143: Animal Cognition
COGS 144: Social Cognition
COGS 150: Large Language Models and CogSci
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

Linguistics

LING 148: Psycholinguistics of Sign Language
LING 155: Evolution of Language
LING 170: Psycholinguistics
LING 171: Child Lang Acquisition
LING 174: Gender and Language in Society *
LING 175: Sociolinguistics
LING 180: Language Representation in the Brain
LING 181: Language Processing in the Brain

Psychology

PSYC 110: Clinical Psychology
PSYC 116: Lab in Clinical Psychology Research
PSYC 120: Learning and Motivation
PSYC 124: Assessment and Treatment
PSYC 125: Clinical Neuropsychology
PSYC 134: Eating Disorders
PSYC 140: Human Behavior Lab.
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

Cross-Campus Online

PSY BEH 102C: Abnormal Psychology (UC Irvine)

Visit crossenroll.universityofcalifornia.edu to enroll

SOCIETY AND CULTURE SPECIALIZATION

Major Code: CG31

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 116: Developmental Cognitive Neuroscience
COGS 118C: Neural Signal Processing
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 165: Neuroimaging of Cognition
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: Decision Making in the Brain
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: Human Physiology I
BIPN 105: Animal Physiology Lab
BIPN 144: Developmental Neurobiology
BIPN 146: Computational Neurobiology
BIPN 148: Cellular Basis of Learning and Memory

Bioengineering

BENG 140A: Bioengineering Physiology

Chemistry

CHEM 114A: Biochemical Structure and Function
CHEM 114B: Biochemical Energetics and Metabolism
CHEM 143B: Organic Chemistry Laboratory
CHEM 143C: Organic Chemistry Laboratory

Linguistics

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

Psychology

PSYC 120: Learning and Motivation
PSYC 124: Assessment and Treatment
PSYC 125: Clinical Neuropsychology
PSYC 134: Eating Disorders
PSYC 140: Human Behavior Lab.
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

Cross-Campus Online

PSY BEH 102C: Abnormal Psychology (UC Irvine)

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Updated: 02-21-24
### 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 HCI students since many of these majors are very impacted and priority is given to students in those majors.

#### Cognitive Science
- COGS 102A: Cognitive Perspectives
- COGS 102B: Cognitive Ethnography
- COGS 102C: Cognitive Design
- COGS 119: Programming/Experimental Res.
- COGS 120: Interaction Design
- COGS 121: HCI Portfolio Design Studio
- COGS 122: Interaction Design Startup
- COGS 123: Social Computing
- COGS 124: HCI Technical Systems Research
- COGS 125: Advanced Interaction Design
- COGS 126: Thinking with Computers
- COGS 127: Data-Driven UX/Product Design
- COGS 128: Information Visualization
- COGS 160: Sem Special Topics (if topic applies)
- COGS 187A: Usability & Info. Architecture
- COGS 187B: Practicum in Pro Web Design
- COGS 188: Artificial Intelligence Algorithm
- COGS 189: Brain Computer Interfaces

#### 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
- ENG 100DR: Design for Development

#### Mechanical and Aerospace Engineering
- MAE 154: Product Design and Entrepreneurship

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

#### Psychology
- PSYC 161: Engineering Psychology

#### Visual Arts
- VIS 135: Design Research Methods
- VIS 143: Virtual Environments
- VIS 145A: Time- and Process-Based Digital Media I
- 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 161: Systems and Networks at Scale
- VIS 162: Speculative Science and Design Innovation
- VIS 163: Design Research and Criticism
- VIS 176: 16mm Filmmaking
- VIS 177: Scripting Strategies
- VIS 180A: Doc. Evidence & the Construction of Auth. in Current Media Practices
- VIS 180B: Fiction and Allegory in Current Media Practices
- VIS 182: Advanced Editing

**Cross-Campus Online**
- CMN 152V: Social Science w/ Online Data (UC Davis)
- CMN 170V: The Digital Revolution & Social Change (UC Davis)
- CMN 176V: Video Game (UC Davis)

Visit crossenroll.universityofcalifornia.edu to enroll

### MACHINE 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 109: Modeling and Data Analysis
- COGS 118A: Supervised Machine Learning Algorithms *
- COGS 118B: Introduction to Machine Learning II *
- COGS 118C: Neural Signal Processing *
- COGS 118D: Stats/Behavioral Data Analysis *
- COGS 137: Practical Data Science in R
- COGS 138: Neural Data Science
- COGS 150: Large Language Models & CogSci
- COGS 160: Sem Special Topics (if topic applies)
- COGS 162: Introduction to Reinforcement Learning
- COGS 186: Genetic Algorithms
- COGS 188: Artificial Intelligence Algorithms
- COGS 189: Brain Computer Interfaces

**Biological and Computational 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 130: Program Lang: Prin. and Paradigms
- CSE 131: Compiler Construction
- CSE 150A: Intro to AI: Prob. Reasoning & Decision-Making
- CSE 150B: Intro to AI: Search & Reasoning
- CSE 151A: Intro to Machine Learning
- CSE 151B: Deep Learning
- CSE 152A: Introduction to Computer Vision I
- CSE 152B: Introduction to Computer Vision II
- CSE 156: Statistical Natural Language Processing

**Electrical and Computer Engineering**
- ECE 175A: Elements of Machine Intelligence: Prob. Reasoning & Graphical Models

**Linguistics**

**Math**
- MATH 170A: Intro to Numerical Analysis: Linear Algebra
- MATH 170B: Intro to Numerical Analysis: Approx./Non Lin. Eq.
- MATH 180A: Introduction to Probability
- MATH 180B: Intro. to Stochastic Processes I
- MATH 180C: Intro. to Stochastic Processes II
- MATH 189: Explanatory Data Analysis and Inference

**Management**
- MGT 153: Business Analytics

**Cross-Campus Online**
- CMN 150V: Computational Social Science (UC Davis)
- CMPE 107: Prob/Stats for Engineers (UC Santa Cruz)

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* Students specializing in Machine Learning and Neural Computation must choose 2 electives from: COGS 118A-B-C-D. These courses require MATH 20C-E, 18, 180A, and COGS 18 or CSE 11 as prerequisites.

** We cannot guarantee these courses for CogSci majors as many CSE courses are very impacted.