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.

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 115: Neuro. Dev. and Cog. Change
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 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, Adds., & Ment. Disord.
PSYC 181: Drugs and Behavior
PSYC 182: Illusions and the Brain

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

Biology-Animal Physiology and Neuroscience

BIPN 100: Human Physiology I
BIPN 105: Animal Physiology Lab

Psychology

PSYC 100: Clinical Psychology
PSYC 116: Lab in Clinical Psychology Research
PSYC 120: Learning and Motivation
PSYC 124: Clinical 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

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 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

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

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

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

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 120N: Adv. Media Production: News Media Workshop
COMM 124A: Critical Design: Advanced Studio
COMM 124B: Critical Design: Topic Studio
COMM 151: The Information Age: Fact & Fiction
COMM 172: Adv. Studies in Mediation and Interaction
COMM 173: Interaction with Technology

Computer Science

CSE 100: Advanced Data Structures
CSE 101: Design and Analysis of Algorithms
CSE 110: Software Engineering
CSE 118: Ubiquitous Computing
CSE 130: Programming Lang: Principles and Paradigms
CSE 132A: Database System Principles
CSE 132B: Database Systems Applications
CSE 134B: Web Client Languages
CSE 135: Online Database Analytics Applications
CSE 152: Intro Computer Vision
CSE 165: 3D User Interaction
CSE 167: Computer Graphics
CSE 170: Interaction Design
CSE 176A: Maker Topics: Health Care Robotics

Design

DSGN 100: Prototyping
DSGN 118: Design for Future Creativity & Productivity
DSGN 160: Special Topics in 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

Education Studies

EDS 114: Cog. Development/Interactive Computing Env.
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 Invention
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 LEARNING AND NEURALCOMPUTATION 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 180: Decision Making in the Brain
COGS 181: Neur. Net. Models of Cognition
COGS 182: Introduction to Reinforcement Learning
COGS 185: Adv. Machine Learning Methods
COGS 186: Genetic Algorithms
COGS 188: Artificial Intelligence Algorithms
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 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
CSE 160: Intro to Parallel Computation

Electrical and Computer Engineering

ECE 175B: Elements of Machine Intelligence: Prob. Reasoning & Graphical Models
ECE 176: Introduction to Deep Learning & Applications

Linguistics

LIGN 167: Deep Learning for Nat. Lang. Understanding

Math

MATH 170A: Intro to Numerical Analysis: Linear Algebra
MATH 170B: Intro to Numerical Analysis: Approx./ Non Lin. Eq.
MATH 170C: Intro to Numerical Analysis: Ordinary. Diff. Eq.
MATH 180A: Introduction to Probability
MATH 180B: Intro. to Stochastic Processes I
MATH 180C: Intro. to Stochastic Processes II
MATH 189: Exploratory 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)
Visit crossenroll.universityofcalifornia.edu to enroll

** 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.*