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.

**CogSci**
- 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: Neuropsycho/Social/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: Electrophysics of Cognition
- COGS 180: Decision Making in the Brain
- COGS 184: Modeling the Evolution of Cognition

**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

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

**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

**Cross-Campus Online**
CMNS 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 116A-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.

**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.

**CogSci**
- 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: Math. Stat. for Behavioral Data Analysis *
- COGS 160: Sem Special Topics (if topic applies)
- COGS 180: Decision Making in the Brain
- COGS 182: Introduction to Reinforcement Learning
- COGS 188: Artificial Intelligence Algorithms
- COGS 189: Brain Computer Interfaces

**Biochemistry**
BIBC 100: Structural Biochemistry
BIBC 102: Metabolic Biochemistry

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

**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: Sociolinguistics
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.

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The Department of Cognitive Science offers 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.

- 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.
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<td>VIS 145A</td>
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<td>CMN 170</td>
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<td>Cross-Campus Online</td>
<td>Crossenroll.universityofcalifornia.edu to enroll</td>
</tr>
</tbody>
</table>

**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: Minor 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 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

**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 Programming Studio
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 127: Designing Human-Data Interactions
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: Advanced Media Production: News Media Workshop
COMM 124A: Critical Design: Advanced Studio
COMM 124B: Critical Design: Topic Studio
COMM 151: The Information Age: Fact and Fiction
COMM 172: Adv. Studies in Mediation and Interaction
COMM 173: Interaction with Technology

**Computing and the Arts**

VIS 143: Virtual Environments

**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 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 176A: Maker Topics: Health Care Robotics

**Design**

DSGN 100: Prototyping
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

**Education Studies**

EDS 114: Cog. Dev/Interactive Computing Env.
EDS 124AR: Teaching Comp. in a Digital World
EDS 124BR: Teaching Comp. Thinking for Everyone

**Engineering**

ENG 100D: Design for Development

**Mechanical and Aerospace Engineering**

MAE 154: Product Design and Entrepreneurship

**Philosophy**

PHIL 164: Technology and Human Values

Updated: 7/6/20