### 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.
- At least 3 of your 6 total electives must be taken within the Cognitive Science Department (COGS courses).
- 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 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 179: 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.

#### 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 118A: Intro to Machine Learning
- 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 188: AI Algorithm and Social Language
- 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 102: Storage System Architectures
- CSE 105: Theory of Computability
- 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: Nonlinear 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

* Students specializing in Machine Learning and Neural Computation must choose 2 electives from this group: Cogs 118A, 118B, 118C, and 118D. These courses require MATH 20C, 20E, MATH 18, & MATH 180A as pre-requisites.

**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, Add., & Ment. Disord.
- PSYC 181: Drugs and Behavior
- PSYC 182: Illusions and the Brain

**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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**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 146: Computational Neurobiology
- BIPN 148: Cellular Basis of Learning and Memory

**CHEMISTRY**

- 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

**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, Add., & Ment. Disord.**

**PSYC 181: Drugs and Behavior**

**PSYC 182: Illusions and the Brain**

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**Linguistics**

- LIGN 155: Evolution of Language
- LIGN 170: Psycholinguistics
- LIGN 171: Child Lang Acquisition
- LIGN 179: 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 Inanfy

**Sociology**

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

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UCSD Cognitive Science

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