

COGNITIVE SCIENCE, BACHELOR OF SCIENCE

College of Letters & Science

The Major Programs

The Cognitive Science major is designed to provide a broad interdisciplinary approach to the study of mind that includes courses from different departments and attracts students with a variety of interests. It emphasizes a multifaceted approach to the study of mind that integrates concepts and techniques from psychology, artificial intelligence, linguistics, neurology, philosophy and other relevant fields.

For students interested in the liberal arts the Cognitive Science major can be pursued as a Bachelor of Arts (A.B.) program. Alternatively, it can be pursued as a Bachelor of Science (B.S.) program for students with a stronger interest in the mathematical, neurological and computational foundations of the discipline. The main objective of both programs is to give the student a broad grounding in the integrated sciences of the mind and to connect approaches from different fields. Students must complete a number of core courses for the degree, as well as a number of specialty courses on such wide-ranging topics as logic for artificial intelligence, computational linguistics, cognitive neuroscience, animal cognition and the psychology of music.

Career Alternatives

A degree in Cognitive Science provides broad intellectual foundations useful for careers in a variety of areas, including teaching, business, social work/counseling and the information technology industry. Undergraduate education in cognitive science also prepares the student for graduate study in appropriate subfields of psychology, linguistics, philosophy and informatics. It is also suitable training for pre-medicine, pre-law, and premanagement students.

Bachelor of Science (B.S.) program students select to pursue either the Computational Emphasis (Emphasis 1) or the Neuroscience Emphasis (Emphasis 2).

Major Advisors

Staff advisors are located in Young Hall; cogsciadvising@ucdavis.edu; 530 752 5104. For more information on how to make an appointment or join Drop-In Advising, see Yellow Cluster Undergraduate Advising Center (<https://yellowcluster.ucdavis.edu/advising/undergraduate/>).

Computational Emphasis

Code	Title	Units
Preparatory Subject Matter		
<i>Cognitive Science:</i>		
CGS 001/PHI 010	Introduction to Cognitive Science	4
<i>Computer Science Engineering</i>		
ECS 020	Discrete Mathematics For Computer Science	4
Choose a series:		12
ECS 032A & ECS 032B & ECS 034	Introduction to Programming and Introduction to Data Structures and Software Development in UNIX & C++ (pre-req is ECS 032C)	

ECS 036A & ECS 036B & ECS 036C	Programming & Problem Solving and Software Development & Object-Oriented Programming in C++ and Data Structures, Algorithms, & Programming	
<i>Linguistics</i>		
LIN 001 or LIN 001Y	Introduction to Linguistics	4
<i>Mathematics</i>		
Choose a series:		12
MAT 017A & MAT 017B & MAT 017C	Calculus for Biology & Medicine and Calculus for Biology & Medicine and Calculus for Biology & Medicine	
OR		
MAT 021A & MAT 021B & MAT 021C	Calculus and Calculus and Calculus	
MAT 022A & 022AL or MAT/BIS 027A	Linear Algebra and Linear Algebra Computer Laboratory Linear Algebra with Applications to Biology	4
<i>Philosophy</i>		
PHI 012	Introduction to Symbolic Logic	4
PHI 013G	Minds, Brains, & Computers with Discussion	4
<i>Psychology</i>		
PSC 001 or PSC 001Y	General Psychology	4
<i>Research Methods</i>		
PSC 041	Research Methods in Psychology	4
<i>Statistics</i>		
STA 013 or STA 100	Elementary Statistics Applied Statistics for Biological Sciences	4
Preparatory Subject Matter Subtotal		60
Depth Subject Matter		
<i>Group A: Core</i>		
All courses from Group A:		12
PSC 100 or PSC 100Y	Introduction to Cognitive Psychology	
PHI 112	Intermediate Symbolic Logic	
CGS Topical Course: one upper division CGS course ¹		
<i>Group B: Computation</i>		
Choose three from Group B:		12
ECS 120	Theory of Computation	
ECS 170	Introduction to Artificial Intelligence	
ECS 171	Machine Learning	
LIN 177	Computational Linguistics	
PHI 133	Logic, Probability, & Artificial Intelligence	
<i>Group C: Neuroscience</i>		
Choose one from Group C:		4
CGS 107/ PSC 133/ECN 107	Neuroeconomics/Reinforcement Learning & Decision Making	
LIN 175	Biological Basis of Language	
PSC 101	Introduction to Biological Psychology ²	

PSC 135	Cognitive Neuroscience: The Biological Foundations of the Mind ²	
PSC 139	Advanced Cognitive Neuroscience	
PSC 145	Developmental Cognitive Neuroscience	
Choose one from Group D or E:		4
<i>Group D: Philosophy</i>		
PHI 103	Philosophy on Mind	
PHI 104	The Evolution of Mind	
PHI 129	Knowledge & the A Priori	
PHI 136	Formal Epistemology	
<i>Group E: Linguistics</i>		
LIN 103A	Linguistic Analysis I: Phonetics, Phonology, Morphology	
LIN 103B	Linguistic Analysis II: Morphology, Syntax, Semantics	
LIN 150	Languages of the World	
LIN 182	Multilingualism	
<i>Group F: Psychology</i>		
Choose four from Group F (which do not overlap with the Group C course):		15-18
PSC 101	Introduction to Biological Psychology ²	
PSC 103A	Statistical Analysis of Psychological Data	
PSC 103B	Statistical Analysis of Psychological Data	
PSC 113	Developmental Psychobiology	
PSC 121	Physiological Psychology	
PSC/NPB 124	Comparative Neuroanatomy	
PSC 130	Human Learning & Memory	
PSC 131	Perception	
PSC 135	Cognitive Neuroscience: The Biological Foundations of the Mind ²	
PSC 136	Psychology of Music	
PSC 137	Neurobiology of Learning & Memory	
PSC 140	Developmental Psychology	
PSC 141	Cognitive Development	
Depth Subject Matter Subtotal		47-50
Total Units		107-110

¹ For a list of approved *CGS Topical Courses*, please see the major worksheet (<https://ucdavis.app.box.com/file/458212968122/?s=iu3cby5n5aimx4xvh5vkn26scb1bcqq4>).

² PSC 101 and PSC 135 can be used for either Group C or Group F, but not both.

Neuroscience Emphasis

Code	Title	Units
Preparatory Subject Matter		
<i>Cognitive Science</i>		
CGS 001/PHI 010	Introduction to Cognitive Science	4
<i>Biological Science</i>		
BIS 002B	Introduction to Biology: Principles of Ecology & Evolution	5
BIS 002C	Introduction to Biology: Biodiversity & the Tree of Life	5

BIS 002A	Introduction to Biology: Essentials of Life on Earth (recommended to take after BIS 002B and BIS 002C)	5
<i>Linguistics</i>		
LIN 001	Introduction to Linguistics	4
or LIN 001Y	Introduction to Linguistics	
<i>Mathematics</i>		
Choose a series:		12
MAT 017A & MAT 017B & MAT 017C	Calculus for Biology & Medicine and Calculus for Biology & Medicine and Calculus for Biology & Medicine	
OR		
MAT 021A & MAT 021B & MAT 021C	Calculus and Calculus and Calculus	
<i>Philosophy</i>		
PHI 013G	Minds, Brains, & Computers with Discussion	4
<i>Physics</i>		
Choose a series:		12-15
PHY 007A & PHY 007B & PHY 007C	General Physics and General Physics and General Physics	
PHY 009A & PHY 009B & PHY 009C	Classical Physics and Classical Physics and Classical Physics	
<i>Psychology</i>		
PSC 001	General Psychology	4
or PSC 001Y	General Psychology	
<i>Research Methods</i>		
PSC 041	Research Methods in Psychology	4
<i>Statistics</i>		
STA 013	Elementary Statistics	4
or STA 100	Applied Statistics for Biological Sciences	
Preparatory Subject Matter Subtotal		63-66
Depth Subject Matter		
<i>Group A: Core</i>		
All courses from Group A:		13
NPB 100	Neurobiology	
PSC 103A	Statistical Analysis of Psychological Data	
CGS Topical Course: one upper division CGS course ¹		
<i>Group B: Computation</i>		
Choose one from Group B:		4-5
LIN 177	Computational Linguistics	
NPB 167	Computational Neuroscience (offered very irregularly)	
<i>Group C: Neuroscience</i>		
Choose 12-13 units from Group C:		12-13
CGS 107/ PSC 133/ECN 107	Neuroeconomics/Reinforcement Learning & Decision Making	
LIN 175	Biological Basis of Language	
NPB 161	Developmental Neurobiology (3 units)	
NPB 162	Neural Mechanisms of Behavior (3 units)	
NPB 163	Systems Neuroscience	

NPB 164	Mammalian Vision	
NPB 165	Neurobiology of Speech Perception (3 units)	
PSC 101	Introduction to Biological Psychology ²	
PSC 121	Physiological Psychology ²	
PSC 123	Hormones & Behavior (3 units)	
PSC 135	Cognitive Neuroscience: The Biological Foundations of the Mind ²	
PSC 139	Advanced Cognitive Neuroscience	
PSC 145	Developmental Cognitive Neuroscience	
Choose two from Groups D or E:		8
<i>Group D: Philosophy</i>		
PHI 103	Philosophy on Mind	
PHI 104	The Evolution of Mind	
PHI 129	Knowledge & the A Priori	
PHI 136	Formal Epistemology	
<i>Group E: Linguistics</i>		
LIN 103A	Linguistic Analysis I: Phonetics, Phonology, Morphology	
LIN 103B	Linguistic Analysis II: Morphology, Syntax, Semantics	
LIN 150	Languages of the World	
LIN 182	Multilingualism	
<i>Group F: Psychology</i>		
Choose two from Group F (which do not overlap with courses selected for Group C):		7
PSC 100 or PSC 100Y	Introduction to Cognitive Psychology	
PSC 101	Introduction to Biological Psychology ²	
PSC 113	Developmental Psychobiology	
PSC 121	Physiological Psychology ²	
PSC/NPB 124	Comparative Neuroanatomy	
PSC 130	Human Learning & Memory	
PSC 131	Perception	
PSC 132	Language & Cognition	
PSC 135	Cognitive Neuroscience: The Biological Foundations of the Mind ²	
PSC 136	Psychology of Music	
PSC 137	Neurobiology of Learning & Memory	
PSC 140	Developmental Psychology	
PSC 141	Cognitive Development	
Depth Subject Matter Subtotal		44-46
Total Units		107-112

¹ For a list of approved *CGS Topical Courses*, please see the major worksheet (<https://ucdavis.app.box.com/file/458205152398/?s=7ielx1z8rp4i3qq5ajzxe5hzbmw2wyz3>).

² PSC 101, PSC 121, and PSC 135 can be used for either Group C or Group F, but not both.