

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 Pathways

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 pre-management students.

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

Major Advisor

Staff advisors are located in the Blue Ridge Office Building. For information about how to contact a major advisor, see Major Advising (<https://yellowcluster.ucdavis.edu/advising/undergraduate/major-advising/>).

The major requirements below are in addition to meeting University Degree Requirements (<https://catalog.ucdavis.edu/undergraduate-education/university-degree-requirements/>) & College Degree Requirements (<https://catalog.ucdavis.edu/undergraduate-education/college-degree-requirements/>); unless otherwise noted. The minimum total units required for both the Computational and Neuroscience emphases are 107.

Computational Emphasis

| Code | Title | Units |
|---|-----------------------------------|-------|
| Preparatory Subject Matter | | |
| <i>Cognitive Science:</i> | | |
| CGS 001/PHI 010 | Introduction to Cognitive Science | 4 |
| <i>Introduction to Mathematical Abstraction</i> | | |

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| ECS 020 | Discrete Mathematics For Computer Science | 4 |
| <i>Programming</i> | | |
| Choose a series: | | 12 |
| ECS 032A or ECS 032AV | Introduction to Programming Introduction to Programming | |
| AND | | |
| ECS 032B | Introduction to Data Structures | |
| AND | | |
| ECS 034 | Software Development in UNIX & C++ (prerequisite is ECS 032C) | |
| OR | | |
| 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 Introduction to Linguistics | 4 |
| <i>Calculus</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 019A & MAT 019B & MAT 019C | Calculus for Data-Driven Applications and Calculus for Data-Driven Applications and Calculus for Data-Driven Applications | |
| OR | | |
| MAT 021A & MAT 021B & MAT 021C | Calculus and Calculus and Calculus | |
| <i>Linear Algebra & MATLAB</i> | | |
| MAT 022A & 022AL | Linear Algebra and Linear Algebra Computer Laboratory | 4 |
| OR | | |
| MAT/BIS 027A | Linear Algebra with Applications to Biology | |
| <i>Philosophy</i> | | |
| PHI 012 | Introduction to Symbolic Logic | 4 |
| PHI 013G | Minds, Brains, & Computers with Discussion (Discontinued for winter 2026) ** | 4 |
| <i>Psychology</i> | | |
| PSC 001 or PSC 001V or PSC 001Y | General Psychology General Psychology General Psychology | 4 |
| <i>Research Methods</i> | | |
| PSC 041 or PSC 041V | Research Methods in Psychology Research Methods in Psychology | 4 |
| <i>Statistics</i> | | |
| STA 013 or STA 013Y or STA 100 | Elementary Statistics Elementary Statistics Applied Statistics for Biological Sciences | 4 |

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| Preparatory Subject Matter Subtotal | 60 | PSC 131 | Perception |
| Depth Subject Matter² | | PSC 135 | Cognitive Neuroscience: The Biological Foundations of the Mind ² |
| <i>Important: Each class may only be used to satisfy one Cognitive Science major requirement. The same course cannot be used for multiple groups.</i> | | PSC 136 | Psychology of Music |
| <i>Take each of the courses below:</i> | 8 | PSC 137 | Neurobiology of Learning & Memory |
| PSC 100 Introduction to Cognitive Psychology or PSC 100Y Introduction to Cognitive Psychology | | PSC 140 | Developmental Psychology or PSC 140V Developmental Psychology or PSC 140Y Developmental Psychology |
| PHI 112 Intermediate Symbolic Logic | | PSC 141 | Cognitive Development |
| Group A: Cognitive Science Topical Courses | 4 | Depth Subject Matter Subtotal | |
| CGS Topical Course: choose one upper division course from this list. (https://ucdavis.box.com/s/qvabknkd06tuazt836bq3uyctznjzc/) ¹ | | Total Units | |
| Group B: Computation | | 47-50 | |
| Choose three from Group B: | 12 | 1 | |
| ECS 120 Theory of Computation | | For a list of approved CGS <i>Topical Courses</i> , please see the major worksheet (https://ucdavis.app.box.com/file/458212968122? s=iu3cby5n5aimx4xvh5vkn26scb1bcqq4). | |
| ECS 170 Introduction to Artificial Intelligence | | 2 | |
| ECS 171 Machine Learning | | Important: Each class may only be used to satisfy one Cognitive Science major requirement. The same course cannot be used for multiple groups. | |
| LIN 177 Computational Linguistics | | ** | |
| PHI 133 Logic, Probability, & Artificial Intelligence | | Course(s) discontinued; see your advisor for course options. | |
| Group C: Neuroscience | | Neuroscience Emphasis | |
| Choose one from Group C: | 4 | Code | |
| CGS 107/ Neuroeconomics/Reinforcement Learning | | Title | |
| PSC 133/ECN 107 & Decision Making | | Units | |
| LIN 175 Biological Basis of Language | | Preparatory Subject Matter | |
| PSC 101 Introduction to Biological Psychology ² | | <i>Cognitive Science</i> | |
| PSC 135 Cognitive Neuroscience: The Biological Foundations of the Mind ² | | CGS 001/PHI 010 | Introduction to Cognitive Science |
| PSC 139 Advanced Cognitive Neuroscience | | BIS 002B | Introduction to Biology: Principles of Ecology & Evolution |
| PSC 145 Developmental Cognitive Neuroscience | | BIS 002C | Introduction to Biology: Biodiversity & the Tree of Life |
| Choose one from Group D or E: | 4 | BIS 002A | Introduction to Biology: Essentials of Life on Earth (recommended to take after BIS 002B and BIS 002C) |
| Group D: Philosophy | | Linguistics | |
| PHI 103 Philosophy on Mind | | LIN 001 | Introduction to Linguistics |
| PHI 104 The Evolution of Mind | | or LIN 001Y | Introduction to Linguistics |
| PHI 129 Knowledge & the A Priori | | Mathematics | |
| PHI 136 Formal Epistemology | | Choose a series: | 12 |
| Group E: Linguistics | | MAT 017A & MAT 017B & MAT 017C | Calculus for Biology & Medicine and Calculus for Biology & Medicine and Calculus for Biology & Medicine |
| LIN 103A Linguistic Analysis I: Phonetics, Phonology, Morphology | | OR | |
| or LIN 103AV Linguistic Analysis I: Phonetics, Phonology, & Morphology | | MAT 019A & MAT 019B & MAT 019C | Calculus for Data-Driven Applications and Calculus for Data-Driven Applications and Calculus for Data-Driven Applications |
| LIN 103B Linguistic Analysis II: Morphology, Syntax, Semantics | | OR | |
| LIN 150 Languages of the World | | MAT 021A & MAT 021B & MAT 021C | Calculus and Calculus and Calculus |
| LIN 182 Multilingualism | | Philosophy | |
| Group F: Psychology | | PHI 013G | Minds, Brains, & Computers with Discussion (Discontinued for winter 2026) |
| Choose four from Group F: | 15-18 | ** | 4 |
| 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 | | | |

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| Physics | | |
| Choose a series: | 12-15 | |
| PHY 007A & PHY 007B & PHY 007C | General Physics and General Physics and General Physics | |
| OR | | |
| PHY 009A & PHY 009B & PHY 009C | Classical Physics and Classical Physics and Classical Physics | |
| Psychology | | |
| PSC 001 or PSC 001V or PSC 001Y | General Psychology | 4 |
| | General Psychology | |
| | General Psychology | |
| Research Methods | | |
| PSC 041 or PSC 041V | Research Methods in Psychology | 4 |
| | Research Methods in Psychology | |
| Statistics | | |
| STA 013 or STA 013Y or STA 100 | Elementary Statistics | 4 |
| | Elementary Statistics | |
| | Applied Statistics for Biological Sciences | |
| Preparatory Subject Matter Subtotal | 63-66 | |
| Depth Subject Matter² | | |
| <i>Important: Each class may only be used to satisfy one Cognitive Science major requirement. The same course cannot be used for multiple groups.</i> | | |
| <i>Take each of these courses below:</i> | 9 | |
| NPB 100 | Neurobiology | |
| PSC 103A | Statistical Analysis of Psychological Data | |
| Group A: Cognitive Science Topical Courses | 4 | |
| CGS Topical Course: choose one upper division course from this list. (https://ucdavis.box.com/s/qvabknkd06tuazt836bq3uyccznzjjc/) ¹ | | |
| Group B: Computation | | |
| Choose one from Group B: | 4-5 | |
| LIN 177 | Computational Linguistics | |
| NPB 167 | Computational Neuroscience (offered very irregularly) | |
| Group C: Neuroscience | | |
| 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; Discontinued for winter 2026) ^{**} | |
| NPB 162 | Neural Mechanisms of Behavior (3 units) | |
| NPB 163 | Systems Neuroscience | |
| NPB 164 | Mammalian Vision (Discontinued for winter 2026) ^{**} | |
| NPB 165 | Neurobiology of Speech Perception (3 units) | |
| PSC 101 | Introduction to Biological Psychology ² | |
| PSC 121 | Physiological Psychology ² | |
| PSC 123/NPB 152 | 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: | | |
| Group D: Philosophy | | |
| PHI 103 | Philosophy on Mind | |
| PHI 104 | The Evolution of Mind | |
| PHI 129 | Knowledge & the A Priori | |
| PHI 136 | Formal Epistemology | |
| Group E: Linguistics | | |
| LIN 103A | Linguistic Analysis I: Phonetics, Phonology, Morphology | |
| or LIN 103AV | Linguistic Analysis I: Phonetics, Phonology, & Morphology | |
| LIN 103B | Linguistic Analysis II: Morphology, Syntax, Semantics | |
| LIN 150 | Languages of the World | |
| LIN 182 | Multilingualism | |
| Group F: Psychology | | |
| Choose two from Group F: | | |
| 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 or PSC 140V or PSC 140Y | 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). | | |
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| Important: Each class may only be used to satisfy one Cognitive Science major requirement. The same course cannot be used for multiple groups. | | |
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| Course(s) discontinued; see your advisor for course options. | | |