Cognitive Science

Bachelor of Arts (BA)

Cognitive Science is the cross-disciplinary study of the structure and processes of human cognition and their computational simulation or modeling. This interdisciplinary program is designed to give students an understanding of questions dealing with human cognition, such as concept formation, visual perception, the acquisition and processing of natural language, and human reasoning and problem-solving.

The program draws on relevant courses found within the fields of anthropology, biology, computer science, education, linguistics, philosophy, and psychology, as well as specially designed lower and upper division courses in cognitive science.

Declaring the Major

For prerequisites required before declaring the major, please see the Major Requirements tab. Once prerequisites are completed, students may submit the Cognitive Science declaration submission form (https://cogsci.berkeley.edu/major-program/how-declare/). Students interested in the major should consult the Cognitive Science website (http://cogsci.berkeley.edu/). If students have questions or would like to speak to someone about the major or other academic issue, they should schedule an appointment with the student academic advisor (http://cogsci.berkeley.edu/contact-information/). The Cognitive Science office is located in 140 Stephens Hall.

Honors Program (https://cogsci.berkeley.edu/major-program/honors-program/)

Students who meet certain requirements apply for admission to the honors program in their senior year. Honors Program Requirements differ based on the term you first attended UC Berkeley after admission.

Honors requirements for students admitted to Cal as first years in Spring 2020 or earlier. (https://cogsci.berkeley.edu/node/107/)

Honors requirements for students admitted to Cal as first years Fall 2020 or later. (https://cogsci.berkeley.edu/node/108/)

Honors requirements for students admitted to Cal as transfer students Spring 2020 and earlier (https://cogsci.berkeley.edu/node/109/).

Honors requirements for students admitted to Cal as transfer students Fall 2020 or later (https://cogsci.berkeley.edu/node/110/).

The awarding of honors is contingent upon submission of a thesis of high quality, based upon independent study with a member of the Cognitive Science faculty (https://cogsci.berkeley.edu/people/cogsci-affiliated-faculty/) and marked by satisfactory completion of the required research and writing. Evaluation of the thesis is the responsibility of, first, the faculty supervisor and then of the second reader, both secured by the student. It is the responsibility of the supervisor and the second reader to decide (1) whether the thesis is of honors quality and (2) if of honors quality, which level of honors is to be assigned: Honors, High Honors, or Highest Honors. Please see the Cognitive Science program’s Honors page for additional details. (http://cogsci.berkeley.edu/honors/)

In addition to the University, campus, and college requirements listed on the College Requirements tab, students must fulfill the following requirements specific to their major program.

General Guidelines

1. All courses taken to fulfill major requirements must be taken for a letter grade.
2. A lower division requirement may be repeated one time only with the repeated grade being final. For all other groups, students may repeat courses one time only with the repeated grade being final.
3. All students must complete at least 26 upper division units.
4. A minimum grade point average (GPA) of 2.0 must be maintained in all upper division courses used by the major.
5. No more than two upper division courses may be used to simultaneously fulfill requirements in a double major. No more than one upper division course may be used to simultaneously fulfill requirements for a student's minor program, with the exception of minors offered outside of the College of Letters & Science.
6. Please note that COG SCI 197, COG SCI 199, COG SCI H195A, and COG SCI H195B may not be used to fulfill upper division requirements.

For information regarding all requirements outside the major, including breadth requirements, residence requirements and unit requirements, please see the College Requirements tab.

Students admitted to Berkeley Spring 2015 and earlier should review requirements in the Berkeley Academic Guide archive (http://guide.berkeley.edu/archive/).

Summary of Major Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower division prerequisites: three courses</td>
<td>10-12</td>
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<td>Additional lower division requirements: three courses</td>
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<td>Upper division distribution requirements: six courses</td>
<td>18-24</td>
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<td>Upper division electives: three courses</td>
<td>9-12</td>
</tr>
<tr>
<td><strong>Total Units</strong></td>
<td><strong>47-59</strong></td>
</tr>
</tbody>
</table>

Lower Division Prerequisites

<table>
<thead>
<tr>
<th>Course</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 1A</td>
<td>Calculus (preferred)</td>
</tr>
<tr>
<td>or MATH 10A</td>
<td>Methods of Mathematics: Calculus, Statistics, and Combinatorics</td>
</tr>
<tr>
<td>or MATH 16A</td>
<td>Analytic Geometry and Calculus</td>
</tr>
<tr>
<td>COMPS/STAT C8</td>
<td>Foundations of Data Science</td>
</tr>
<tr>
<td>COMPS/STAT 61A</td>
<td>The Structure and Interpretation of Computer Programs</td>
</tr>
<tr>
<td>or ENGIN 7</td>
<td>Introduction to Computer Programming for Scientists and Engineers</td>
</tr>
</tbody>
</table>

Lower Division Requirements

<table>
<thead>
<tr>
<th>Course</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>COG SCI 1</td>
<td>Introduction to Cognitive Science</td>
</tr>
<tr>
<td>MCELLBI C61</td>
<td>Brain, Mind, and Behavior (Psych 110 can also fulfill this requirement)</td>
</tr>
<tr>
<td>or MCELLBI C62</td>
<td>Exploring the Brain: Introduction to Neuroscience</td>
</tr>
<tr>
<td>MATH 55</td>
<td>Discrete Mathematics</td>
</tr>
<tr>
<td>or COMPSCI 70</td>
<td>Discrete Mathematics and Probability Theory</td>
</tr>
</tbody>
</table>
Upper Division Distribution Requirements

Select one course from each of the following six areas. Courses that are listed within more than one area of concentration can be counted toward only one requirement.

Cognitive Neuroscience
- ANTHRO 107 Evolution of the Human Brain
- COG SCI/PSYCH C127 Cognitive Neuroscience
- PSYCH 117 Human Neuropsychology
- PSYCH 133 Psychology of Sleep
- PSYCH 114 Biology of Learning
- COG SCI 170 Brain Damage
- COG SCI 171 Genetic Factors in Neuropsychology
- COG SCI 172 Clinical Applications in Cognitive Neuroscience

Cognitive Psychology
- COG SCI C100/PSYCH C120 Basic Issues in Cognition
- COG SCI C102/PSYCH C129 Scientific Approaches to Consciousness
- COG SCI/PSYCH C126 Perception
- COG SCI 181 The Cognitive Unconscious
- COG SCI 182 The Cognitive Psychology of Concept and Idea Formation
- LINGUIS C146/PSYCH C143 Language Acquisition
- PSYCH 164 Social Cognition
- PSYCH 140 Developmental Psychology
- PSYCH 147 Methods in Cognitive Development

Computational Modeling
- COG SCI 131 Computational Models of Cognition
- COMPSCI 188 Introduction to Artificial Intelligence

Linguistics
- COG SCI C101/LINGUIS C105 Cognitive Linguistics
- COG SCI/LINGUIS C142 Language and Thought
- LINGUIS 100 Introduction to Linguistic Science
- LINGUIS 108 Psycholinguistics

Philosophy
- PHILOS 3 The Nature of Mind
- PHILOS 12A Introduction to Logic
- PHILOS 25A Ancient Philosophy
- PHILOS 25B Modern Philosophy
- CLASSIC 36 Course Not Available
- PHILOS 122 Theory of Knowledge
- PHILOS 132 Philosophy of Mind
- PHILOS 133 Philosophy of Language
- PHILOS 135 Theory of Meaning
- PHILOS 136 Philosophy of Perception
- COG SCI 180 Mind, Brain, and Identity

Society, Culture, and Cognition
- ANTHRO 166 Language, Culture, and Society

Upper Division Electives

In addition to completing the six distribution groups, students must complete at least three additional elective courses. Please submit an elective petition form if you want to ask for a course not listed below to count as an elective for the major. The course must have an explicit connection to the study of the mind.

Select three courses from the following list:

- ANTHRO 149 Psychological Anthropology
- ANTHRO 160AC Forms of Folklore
- COG SCI C140/LINGUIS C160 Quantitative Methods in Linguistics
- COMPSCI 160 User Interface Design and Development
- COMPSCI 170 Efficient Algorithms and Intractable Problems
- COMPSCI 186 Introduction to Database Systems
- COMPSCI/VIS SCI C280 Computer Vision
- COMPSCI 287 Advanced Robotics
- COMPSCI 288 Natural Language Processing
- EDUC 224A Mathematical Thinking and Problem Solving
- EDUC C229A/PSYCH C223 Proseminar: Problem Solving and Understanding
- LINGUIS 106 Metaphor
- LINGUIS 110 Phonetics
- LINGUIS 115 Morphology
- LINGUIS 120 Syntax
- LINGUIS 121 Formal Semantics
- LINGUIS 123 Pragmatics
- LINGUIS 125 Gesture, Cognition, and Culture
- LINGUIS 130 Comparative and Historical Linguistics
- LINGUIS/SLAVIC C139 Language Spread
- LINGUIS 151 Language and Gender
- LINGUIS 158 Computational Methods
- LINGUIS 170 History, Structure, and Sociolinguistics of a Particular Language
- LINGUIS 181 Lexical Semantics
- MCELLBI 160 Cellular and Molecular Neurobiology
- MCELLBI 160L Neurobiology Laboratory
- MCELLBI 161 Circuit, Systems and Behavioral Neuroscience
- MCELLBI 165 Neurobiology of Disease
- MCELLBI 166 Biophysical Neurobiology

INFO 103 History of Information
ECON 119 Psychology and Economics
EDUC 140AC/ W140/W140A The Art of Making Meaning: Educational Perspectives on Literacy and Learning in a Global World
LINGUIS 150 Sociolinguistics
PSYCH 160 Social Psychology
PSYCH 164 Social Cognition
PSYCH 166AC Cultural Psychology
SOCIOL 150 Social Psychology
COG SCI 181 The Cognitive Unconscious
should have an understanding of the history and governmental institutions of the United States.

**Berkeley Campus Requirement**

American Cultures (http://americancultures.berkeley.edu/students/courses/)

All undergraduate students at Cal need to take and pass this course in order to graduate. The requirement offers an exciting intellectual environment centered on the study of race, ethnicity and culture of the United States. AC courses offer students opportunities to be part of research-led, highly accomplished teaching environments, grappling with the complexity of American Culture.

**College of Letters & Science Essential Skills Requirements**

Quantitative Reasoning (http://guide.berkeley.edu/undergraduate/colleges-schools/letters-science/quantitative-reasoning-requirement/)

The Quantitative Reasoning requirement is designed to ensure that students graduate with basic understanding and competency in math, statistics, or computer science. The requirement may be satisfied by exam or by taking an approved course.

Foreign Language (http://guide.berkeley.edu/undergraduate/colleges-schools/letters-science/foreign-language-requirement/)

The Foreign Language requirement may be satisfied by demonstrating proficiency in reading comprehension, writing, and conversation in a foreign language equivalent to the second semester college level, either by passing an exam or by completing approved course work.

Reading and Composition (http://guide.berkeley.edu/undergraduate/colleges-schools/letters-science/readincomposition-requirement/)

In order to provide a solid foundation in reading, writing, and critical thinking the College requires two semesters of lower division work in composition in sequence. Students must complete parts A & B reading and composition courses by the end of their second semester and a second-level course by the end of their fourth semester.

**College of Letters & Science 7 Course Breadth Requirements**

Breadth Requirements (http://guide.berkeley.edu/undergraduate/colleges-schools/letters-science/#breadthrequirementstext)

The undergraduate breadth requirements provide Berkeley students with a rich and varied educational experience outside of their major program. As the foundation of a liberal arts education, breadth courses give students a view into the intellectual life of the University while introducing them to a multitude of perspectives and approaches to research and scholarship. Engaging students in new disciplines and with peers from other majors, the breadth experience strengthens interdisciplinary connections and context that prepares Berkeley graduates to understand and solve the complex issues of their day.

**Unit Requirements**

- 120 total units
- Of the 120 units, 36 must be upper division units
• Of the 36 upper division units, 6 must be taken in courses offered outside your major department

Residence Requirements
For units to be considered in “residence,” you must be registered in courses on the Berkeley campus as a student in the College of Letters & Science. Most students automatically fulfill the residence requirement by attending classes here for four years. In general, there is no need to be concerned about this requirement, unless you go abroad for a semester or year or want to take courses at another institution or through UC Extension during your senior year. In these cases, you should make an appointment to meet an adviser to determine how you can meet the Senior Residence Requirement.

Note: Courses taken through UC Extension do not count toward residence.

Senior Residence Requirement
After you become a senior (with 90 semester units earned toward your BA degree), you must complete at least 24 of the remaining 30 units in residence in at least two semesters. To count as residence, a semester must consist of at least 6 passed units. Intercampus Visitor, EAP, and UC Berkeley-Washington Program (UCDC) units are excluded.

You may use a Berkeley Summer Session to satisfy one semester of the Senior Residence requirement, provided that you successfully complete 6 units of course work in the Summer Session and that you have been enrolled previously in the college.

Modified Senior Residence Requirement
Participants in the UC Education Abroad Program (EAP), Berkeley Summer Abroad, or the UC Berkeley Washington Program (UCDC) may meet a Modified Senior Residence requirement by completing 24 (excluding EAP) of their final 60 semester units in residence. At least 12 of these 24 units must be completed after you have completed 90 units.

Upper Division Residence Requirement
You must complete in residence a minimum of 18 units of upper division courses (excluding UCEAP units), 12 of which must satisfy the requirements for your major.

Mission
Cognitive Science is an interdisciplinary field of inquiry that is concerned with the acquisition, representation, and use of knowledge by individual minds, brains, and machines, as well as groups, institutions, and other social entities. Because the fundamental purpose of the University, as a social institution, is the preservation, generation, and transmission of knowledge, cognitive science speaks to the heart of the University’s mission. By engaging faculty from psychology, philosophy, linguistics, computer science, neuroscience, and anthropology, sociology, and other social sciences in common purpose, cognitive science constitutes a microcosm of the University as a whole. Berkeley’s Cognitive Science Program is almost unique in terms of the scope of our approach to the field.

Cognitive Science major students are expected to approach problems of knowledge using the tools of several different disciplines: philosophy, psychology, linguistics, computer science, neuroscience, and various social sciences. This expectation is reflected in a demanding curriculum that moves from a broad introductory survey course (COG SCI 1), to a six-course distribution requirement covering the philosophy of mind, cognitive psychology, linguistics, computational modeling and artificial intelligence, neuroscience, and various social sciences. After fulfilling their distribution requirement, students have the opportunity to concentrate further study in one of these six fields, and to complete an honors thesis.

Learning Goals for the Major
By the end of their undergraduate careers, cognitive science majors are expected to understand and critically evaluate:

1. Research and theory in cognitive psychology, including perception, attention, learning, memory, reasoning, problem-solving, judgment, and decision-making.
2. Research and theory in linguistics, with special attention to the relation between language and thought.
3. Various approaches to artificial intelligence, and the computational modeling of cognitive processes.
4. The biological bases of cognitive functions, as uncovered by cognitive neuroscience.
5. Classic and contemporary work on the philosophy of mind, including the mind-body problem, mental causation, freedom of the will, and the nature of consciousness.
6. The sociocultural context of individual cognition, including the social construction and organization of knowledge, cultural differences in cognition, the history of information, etc.

Skills
We also expect that students will have acquired the following skills for lifelong learning and effective citizenship:

1. Formulating a well-organized argument supported by evidence.
2. Effectively written, spoken, and graphical communication.
4. Applying critical thinking skills in new and complex situations.
5. Using probability and statistics in reasoning.
6. Understanding the social implications of theory and research in cognitive science for responsible professional, civic, and ethical behavior.

Major Maps help undergraduate students discover academic, co-curricular, and discovery opportunities at UC Berkeley based on intended major or field of interest. Developed by the Division of Undergraduate Education in collaboration with academic departments, these experience maps will help you:

• Explore your major and gain a better understanding of your field of study
• Connect with people and programs that inspire and sustain your creativity, drive, curiosity and success
• Discover opportunities for independent inquiry, enterprise, and creative expression
• Engage locally and globally to broaden your perspectives and change the world
• Reflect on your academic career and prepare for life after Berkeley

Use the major map below as a guide to planning your undergraduate journey and designing your own unique Berkeley experience.
View the Cognitive Science Major Map PDF. (https://vcue.berkeley.edu/sites/default/files/cognitive_science.pdf)

**Graduate Study**

Cognitive Science does not have a graduate program at UC Berkeley. The cognitive science research community at Berkeley is centered around the Institute of Cognitive and Brain Sciences (http://icbs.berkeley.edu/). Students interested in cognitive science graduate study can receive graduate training in programs in affiliated disciplines, e.g., psychology (http://psychology.berkeley.edu/), linguistics (http://linguistics.berkeley.edu/), neuroscience (http://neuroscience.berkeley.edu/). There is presently no separate graduate program specifically for cognitive science. We are exploring the possibility of starting a cognitive science graduate program in the near future.

**Honors**

Students who meet the grade point thresholds overall and in the upper division major courses may apply for admission to the honors program in their senior year. The awarding of honors is contingent upon submission of a thesis of high quality, based upon independent study with a member of the Cognitive Science faculty (https://cogsci.berkeley.edu/people/cogsci-affiliated-faculty/) and marked by satisfactory completion of the required research and writing. Evaluation of the thesis is the responsibility of, first, the faculty supervisor and then of the second reader, both secured by the student. It is the responsibility of the supervisor and the second reader to decide (1) whether the thesis is of honors quality and (2) if of honors quality, which level of honors is to be assigned: Honors, High Honors, or Highest Honors. Please see the Cognitive Science program’s Honors page for additional details. (http://cogsci.berkeley.edu/honors/)

**Student Association**

The Cognitive Science Student Association (CSSA) is a great resource for students interested in Cognitive Science. About the CSSA, from their website: The CSSA regularly coordinates academic events such as guest lectures and information sessions; plans social events like professor-student dinners and cog sci themed gatherings; and works with cognitive science faculty and university officials to provide assistance for students. Additionally, the CSSA teaches its own decal on research methodology, has an academic outreach program, and organizes the annual California Cognitive Science Conference. Click here to visit the CSSA website. (http://cssa.berkeley.edu/)

**Cognitive Science**

Expand all course descriptions [+]Collapse all course descriptions [-]
COG SCI N1 Introduction to Cognitive Science 3 Units
Terms offered: Summer 2021 First 6 Week Session, Summer 2020 First 6 Week Session, Summer 2019 Second 6 Week Session
This course introduces the interdisciplinary field of cognitive science. Lectures and readings will survey research in such fields as artificial intelligence, psychology, linguistics, philosophy, and neuroscience, and will cover topics such as the nature of knowledge, thinking, remembering, vision, imagery, language, and consciousness. Sections will demonstrate some of the major methodologies. This course is a core prerequisite for the Cognitive Science major and therefore must be taken for a letter grade.

Introduction to Cognitive Science: Read More [+]

Rules & Requirements
Credit Restrictions: Students will receive no credit for N1 after taking Cognitive Science 1 or Cognitive Science C1/Education C1.

Hours & Format
Summer: 6 weeks - 7.5 hours of lecture per week

Additional Details
Subject/Course Level: Cognitive Science/Undergraduate
Grading/Final exam status: Letter grade. Alternative to final exam.
Formerly known as: C1

COG SCI 88 Data Science and the Mind 2 Units
Terms offered: Fall 2020, Spring 2019, Spring 2018
How does the human mind work? We explore this question by analyzing a range of data concerning such topics as human rationality and irrationality, human memory, how objects and events are represented in the mind, and the relation of language and cognition. This class provides students with critical thinking and computing skills that will allow them to work with data in cognitive science and related disciplines.

Data Science and the Mind: Read More [+]

Rules & Requirements
Prerequisites: This course is meant to be taken concurrently with Computer Science C8/Statistics C8/Information C8. Students may take more than one 88 (data science connector) course if they wish, ideally concurrent with or after having taken the C8 course

Hours & Format
Fall and/or spring: 15 weeks - 1 hour of laboratory, 0.5 hours of discussion, and 0.5 hours of lecture per week

Additional Details
Subject/Course Level: Cognitive Science/Undergraduate
Grading/Final exam status: Letter grade. Final exam required.

COG SCI 98 Directed Group Study 1 - 4 Units
Terms offered: Fall 2021, Spring 2016, Spring 2015
Seminar for the group study of selected topics. Topics may be initiated by students subject to the approval of the major advisor.

Directed Group Study: Read More [+]

Rules & Requirements
Credit Restrictions: Enrollment is restricted; see the Introduction to Courses and Curricula section of this catalog.
Repeat rules: Course may be repeated for credit without restriction.

Hours & Format
Fall and/or spring: 15 weeks - 1-4 hours of directed group study per week

Additional Details
Subject/Course Level: Cognitive Science/Undergraduate
Grading/Final exam status: Offered for pass/not pass grade only. Final exam not required.

COG SCI 99 Supervised Independent Study and Research 1 - 4 Units
Terms offered: Spring 2011, Fall 2010
Independent study and research by arrangement with faculty.

Supervised Independent Study and Research: Read More [+]

Rules & Requirements
Prerequisites: Restricted to freshmen and sophomores; consent of instructor
Repeat rules: Course may be repeated for credit without restriction.

Hours & Format
Fall and/or spring: 15 weeks - 3-12 hours of independent study per week

Additional Details
Subject/Course Level: Cognitive Science/Undergraduate
Grading/Final exam status: Offered for pass/not pass grade only. Final exam not required.
Supervised Independent Study and Research: Read Less [-]
COG SCI C100 Basic Issues in Cognition 3 Units
Terms offered: Fall 2021, Spring 2021, Fall 2020, Fall 2019, Fall 2016
Theoretical foundations and current controversies in cognitive science will be discussed. Basic issues in cognition—including perception, imagery, memory, categorization, thinking, judgment, and development—will be considered from the perspectives of philosophy, psychology, computer science, and physiology. Particular emphasis will be placed on the nature, implications, and limitations of the computational model of mind.

Basic Issues in Cognition: Read More [+]

Rules & Requirements
Credit Restrictions: Students will receive no credit for Psychology C120 after passing PSYCH N120. A deficient grade in PSYCH N120 may be removed by taking PSYCH C120.

Hours & Format
Fall and/or spring: 15 weeks - 2-4 hours of lecture and 2-0 hours of discussion per week
Summer: 6 weeks - 5-7.5 hours of lecture and 2.5-0 hours of discussion per week
8 weeks - 3.5-5.5 hours of lecture and 2-0 hours of discussion per week

Additional Details
Subject/Course Level: Cognitive Science/Undergraduate
Grading/Final exam status: Letter grade. Final exam required.
Also listed as: PSYCH C120

Basic Issues in Cognition: Read Less [-]

COG SCI C101 Cognitive Linguistics 4 Units
Terms offered: Spring 2021, Summer 2019 8 Week Session, Spring 2019
Conceptual systems and language from the perspective of cognitive science. How language gives insight into conceptual structure, reasoning, category-formation, metaphorical understanding, and the framing of experience. Cognitive versus formal linguistics. Implications from and for philosophy, anthropology, literature, artificial intelligence, and politics.

Cognitive Linguistics: Read More [+]

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture and 1 hour of discussion per week
Summer: 8 weeks - 6 hours of lecture and 1.5 hours of discussion per week

Additional Details
Subject/Course Level: Cognitive Science/Undergraduate
Grading/Final exam status: Letter grade. Final exam not required.
Instructors: G. Lakoff, E. Sweetser
Formerly known as: 105
Also listed as: LINGUIS C105

Cognitive Linguistics: Read Less [-]

COG SCI C102 Scientific Approaches to Consciousness 3 Units
Terms offered: Fall 2014, Spring 2013, Spring 2011
This course will examine the nature of human consciousness from the interdisciplinary perspective of cognitive science. It will cover topics from the philosophy of mind, cognitive linguistics, neuroscience, psychology, and computational models.

Recommended Courses: Psych C120/CogSci C100 OR Psych/CogSci C127

Scientific Approaches to Consciousness: Read More [+]

Rules & Requirements
Prerequisites: Required courses: Psych 1, Psych W1, Psych 2, OR CogSci 1

Hours & Format
Fall and/or spring: 15 weeks - 2 hours of lecture and 1 hour of discussion per week

Additional Details
Subject/Course Level: Cognitive Science/Undergraduate
Grading/Final exam status: Letter grade. Final exam required.
Also listed as: PSYCH C129

Scientific Approaches to Consciousness: Read Less [-]

COG SCI N100 Basic Issues in Cognition 3 Units
Terms offered: Summer 2019 Second 6 Week Session, Summer 2018 Second 6 Week Session, Summer 2017 Second 6 Week Session
Theoretical foundations and current controversies in cognitive science will be discussed. Basic issues in cognition—including perception, imagery, memory, categorization, thinking, judgment, and development—will be considered from the perspectives of philosophy, psychology, computer science, and physiology. Particular emphasis will be placed on the nature, implications, and limitations of the computational model of mind.

Basic Issues in Cognition: Read More [+]

Rules & Requirements
Credit Restrictions: Students will receive no credit for Psychology N120 after passing PSYCH C120. A deficient grade in PSYCH C120 may be removed by taking PSYCH N120.

Hours & Format
Summer: 6 weeks - 7.5 hours of lecture per week

Additional Details
Subject/Course Level: Cognitive Science/Undergraduate
Grading/Final exam status: Letter grade. Final exam required.
Also listed as: PSYCH N120

Basic Issues in Cognition: Read Less [-]
COG SCI C126 Perception 3 Units
Terms offered: Spring 2022, Spring 2021, Spring 2020
An introduction to principal theoretical constructs and experimental procedures in visual and auditory perception. Topics will include psychophysics; perception of color, space, shape, and motion; pattern recognition and perceptual attention.
Perception: Read More [+]

Rules & Requirements

Prerequisites: Consent of instructor. 101 recommended

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of lecture and 1 hour of discussion per week

Additional Details

Subject/Course Level: Cognitive Science/Undergraduate

Grading/Final exam status: Letter grade. Final exam required.

Also listed as: PSYCH C126

Perception: Read Less [-]

COG SCI C127 Cognitive Neuroscience 3 Units
Terms offered: Spring 2022, Fall 2021, Spring 2021, Fall 2020
This course will examine research investigating the neurological basis of cognition. Material covered will include the study of brain-injured patients, neurophysiological research in animals, and the study of normal cognitive processes in humans with non-invasive behavioral and physiological techniques such as functional Magnetic Resonance Imaging (fMRI), electroencephalography (EEG), and transcranial magnetic stimulation (TMS). Topics to be covered include perception, attention, memory, language, motor control, executive control, and emotion.
Cognitive Neuroscience: Read More [+]

Rules & Requirements

Prerequisites: Psych/MCB C61 OR Psych 110, or Psych C120/Cog Sci C100, and relevant prerequisites. Courses may be taken simultaneously with Psych C127. Enrollment limited to students who are declared Psych, CogSci, MCB, or IB majors, or by permission of the instructor if the student has declared another major

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of lecture and 1 hour of discussion per week

Additional Details

Subject/Course Level: Cognitive Science/Undergraduate

Grading/Final exam status: Letter grade. Final exam required.

Also listed as: PSYCH C127

Cognitive Neuroscience: Read Less [-]

COG SCI 131 Computational Models of Cognition 4 Units
Terms offered: Spring 2022, Fall 2021, Summer 2021 8 Week Session
This course will provide advanced students in cognitive science and computer science with the skills to develop computational models of human cognition, giving insight into how people solve challenging computational problems, as well as how to bring computers closer to human performance. The course will explore three ways in which researchers have attempted to formalize cognition -- symbolic approaches, neural networks, and probability and statistics -- considering the strengths and weaknesses of each.
Computational Models of Cognition: Read More [+]

Rules & Requirements

Prerequisites: Calculus, discrete mathematics, Cognitive Science 1, Computer Science 61A, or equivalents

Credit Restrictions: Student will receive no credit for Cognitive Science 131 after taking Cognitive Science C131/Psychology C123. A deficient grade in Cognitive C131/Psychology C123 may be removed by taking Cognitive Science 131.

Hours & Format

Fall and/or spring: 15 weeks - 4-3 hours of lecture and 0-1 hours of discussion per week

Summer: 8 weeks - 6-8 hours of lecture and 2-0 hours of discussion per week

Additional Details

Subject/Course Level: Cognitive Science/Undergraduate

Grading/Final exam status: Letter grade. Alternative to final exam.

Computational Models of Cognition: Read Less [-]
COG SCI C131 Computational Models of Cognition 4 Units
Terms offered: Spring 2022, Fall 2020, Spring 2013, Fall 2011
This course will provide advanced students in cognitive science and computer science with the skills to develop computational models of human cognition, giving insight into how people solve challenging computational problems, as well as how to bring computers closer to human performance. The course will explore three ways in which researchers have attempted to formalize cognition -- symbolic approaches, neural networks, and probability and statistics -- considering the strengths and weaknesses of each.

Computational Models of Cognition: Read More [+]

Rules & Requirements

Prerequisites: Calculus, discrete mathematics, CogSci 1/1b/N1, Computer Science 61A, or equivalents

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture and 1 hour of discussion per week

Additional Details

Subject/Course Level: Cognitive Science/Undergraduate

Grading/Final exam status: Letter grade. Alternative to final exam.

Also listed as: PSYCH C123

Computational Models of Cognition: Read Less [-]

COG SCI 132 Rhythms of the Brain: from Neuronal Communication to Function 4 Units
Terms offered: Not yet offered
This course provides advanced students in cognitive science, psychology, computer science, and biology with the skills to develop numerical methods used in the study of neuroscience and cognition. We will study several main areas in neuroscience and cognition: memory and the underlying communication between hippocampus and cortical areas; movement control through the study of the cortico-basal-thalamic loops. Modulation of mesolimbic and nigrostriatal pathways by dopamine. Modulation of cortico-hippocampal circuits by acetylcholine and the role of these circuits in the onset of Alzheimer disease. We will study the coherence of electrical oscillations in different parts of the brain and how that coherence can be disturbed in disease.

Rhythms of the Brain: from Neuronal Communication to Function: Read More [+]

Rules & Requirements

Prerequisites: Prerequisites are a basic familiarity with programming (as might be obtained from COMPSCI 61A or ENG 7), exposure to cognitive science (e.g., CogSci 1/N1/1B), comfort with basic calculus (e.g., Math 1A), and discrete math (e.g., Math 55 or COMPSCI 70)

Hours & Format

Fall and/or spring: 15 weeks - 4-6 hours of lecture per week

Summer: 8 weeks - 9-6 hours of lecture per week

Additional Details

Subject/Course Level: Cognitive Science/Undergraduate

Grading/Final exam status: Letter grade. Alternative to final exam.

Rhythms of the Brain: from Neuronal Communication to Function: Read Less [-]

COG SCI C140 Quantitative Methods in Linguistics 4 Units
Terms offered: Fall 2021, Spring 2021, Fall 2020, Spring 2020
An introduction to research using quantitative analysis in linguistics and cognitive science. Students will learn how to use the R programming environment for statistical analysis and data visualization.

Quantitative Methods in Linguistics: Read More [+]

Rules & Requirements

Prerequisites: 100 or graduate student standing

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture and 1 hour of discussion per week

Additional Details

Subject/Course Level: Cognitive Science/Undergraduate

Grading/Final exam status: Letter grade. Final exam required.

Instructor: Gahl

Also listed as: LINGUIS C160

Quantitative Methods in Linguistics: Read Less [-]
COG SCI C142 Language and Thought 3 Units
Terms offered: Spring 2022, Spring 2021, Spring 2020
This seminar explores the relation of language and thought. Is language uniquely human, and if so, what does this reveal about the human mind? Does the particular language you speak affect the way you think, or do human languages reflect a universal conceptual repertoire? The goal of this class is to familiarize you with a set of classic arguments on these themes, together with current research that evaluates these arguments, through weekly reading and discussion.

Language and Thought: Read More [+]

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of seminar per week
Summer: 6 weeks - 7.5 hours of seminar per week

Additional Details
Subject/Course Level: Cognitive Science/Undergraduate
Grading/Final exam status: Letter grade. Final exam required.
Instructor: Regier
Also listed as: LINGUIS C142
Language and Thought: Read Less [-]

COG SCI 144 Cognitive Science of Language 3 Units
Terms offered: Spring 2020
This class will explore language and the psychological and neurological processing related to language, language use, and cognition from the multidisciplinary perspective of cognitive science. This psycho-neuro-linguist approach will ask whether language is a unique system within the overall cognitive system, with its own specialized representations and operations, or whether language is more continuous with other cognition.

Cognitive Science of Language: Read More [+]

Objectives & Outcomes
Course Objectives: The objective of this course is to excite interest in and explore language and cognition through the lens of cognitive science. The psychological and neurological processing related to language helps to show the nature of the human mind in comparison to others, the unique variety of cognition that language serves, and the relation of that type of cognition to other types. This not only helps to reveal various forms of cognition but also how those forms relate in human, as well as non-human, minds. To do this we will ask:
1) What is language as a system and behavior of humankind?
2) Where is the knowledge of language from?
3) How is language acquired, processed, and lost in the human brain?
4) What do the empirical results and the history of linguistic studies that we cover reveal about how we think about language and, by implication, human beings themselves.

Rules & Requirements
Prerequisites: Cognitive Science 1/1B/N1 preferred

Hours & Format
Fall and/or spring: 15 weeks - 3-4 hours of lecture per week
Summer: 6 weeks - 7.5-9.5 hours of lecture per week

Additional Details
Subject/Course Level: Cognitive Science/Undergraduate
Grading/Final exam status: Letter grade. Final exam required.
Instructor: Pageler
Cognitive Science of Language: Read Less [-]
COG SCI 150 Sensemaking and Organizing 3 Units
Terms offered: Spring 2022, Spring 2021
When something "makes sense" or "is organized" we are imposing or discovering order in the arrangement of concepts, events, or resources of some kind. Sensemaking and organizing are fundamental human activities that raise many multi- or trans-disciplinary questions about perception, knowledge, decision making, interaction with things and with other people, values and value creation. We will analyze sensemaking and organizing from four interrelated perspectives. The most fundamental one is provided by language and culture, which shapes the perspectives one takes as an individual, in institutional contexts governed by business or legal processes, or in data-intensive or scientific contexts.

Rules & Requirements

Prerequisites: Cognitive Science 1/1B/N1

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture per week
Summer: 6 weeks - 7.5 hours of lecture per week

Additional Details
Subject/Course Level: Cognitive Science/Undergraduate
Grading/Final exam status: Letter grade. Alternative to final exam.
Instructor: Glushko
Sensemaking and Organizing; Read More [+]

COG SCI 170 Brain Damage 3 Units
Terms offered: Summer 2021 First 6 Week Session, Spring 2021, Fall 2020
This course introduces students to the full range of brain damage causes, which are: traumatic brain injury (TBI) - civilian vs. military, chronic traumatic encephalopathy (CTE), stroke, tumors, infections, hypoxia, addiction, neurological, and congenital conditions. We understand how brain damage caused by each condition leads to localized and non-localized deficits in the key functions comprising cognition, emotion, physiology, social skills, behavior, and daily functioning capacity. Key co-occurring disorders are covered that present due to the fundamental brain damage causes.

Brain Damage: Read More [+]

Objectives & Outcomes
Course Objectives: We will explore various methods for measuring and diagnosing specific brain injuries. For example, TBI-induced axonal injury can be measured from structural perspective by diffusion tensor imaging, and from a neuropsychological perspective using the Glasgow Coma Scale. We will conclude by synthesizing all of this information into recommendations for treatment protocols of each specific brain injury, and a look at how the brain compensates for each condition's brain cell loss, which highlights the remarkable neuroplasticity of the brain.

Rules & Requirements
Prerequisites: CogSci 1/N1/1B and MCB C61/C64 or Psych 110 recommended

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture per week
Summer: 6 weeks - 7 hours of lecture per week

Additional Details
Subject/Course Level: Cognitive Science/Undergraduate
Grading/Final exam status: Letter grade. Final exam required.
Instructor: Isaac
Brain Damage: Read Less [-]
COG SCI 171 Genetic Factors in Neuropsychology 3 Units
Terms offered: Spring 2020
This course will explore genetic, environment, systems neuroscience to understand critical pathways that underlie the emergence of common diseases (Dementia), neuropathology of fear (Anxiety Disorders), neurodevelopmental disorders (ADHD, Autism), learning disabilities (e.g. Dyslexia), addiction (e.g. Alcoholism) and psychosis (Schizophrenia, Major Depressive Disorder). Seminal and current research will demonstrate how science and current technologies are transforming our knowledge of the interplay between genes, environment, brain development, and cognitive functioning.

Genetic Factors in Neuropsychology: Read More [+]

Objectives & Outcomes

Course Objectives: Students will gain a deeper understanding of how genetic factors influence cognitive functioning. How do we assess cognitive domains and trace results to brain and genetic predisposition? How does neuropsychology contribute to our understanding of disease onset (pre-morbid functioning), progression (worsening symptoms) or knowing the difference between someone who is depressed with memory deficits and someone with early onset dementia memory deficits (e.g. differential diagnosis of pseudodementia)? We will conclude each lecture with a translational science discussion on how advancements in knowledge about genetic factors in neuropsychology is converting into precision medicine for pharmacological interventions, diagnostic procedures and preventive measures.

Rules & Requirements:

Prerequisites: CogSci 1/N1/1B and MCB C61/C64 or Psych 110 preferred

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture per week
Summer: 6 weeks - 7 hours of lecture per week

Additional Details

Subject/Course Level: Cognitive Science/Undergraduate
Grading/Final exam status: Letter grade. Final exam required.
Instructor: Isaac

COG SCI 172 Clinical Applications in Cognitive Neuroscience 3 Units
Terms offered: Spring 2020
Cognitive Neuroscience has provided a paradigm shift in our understanding of brain structure and function. We have excitingly transitioned from a scientific approach to brain science that relied primarily on overt behavioral observation and making anatomical inferences based on those behaviors to probing the brain in ways that were once considered inconceivable. Scientific and technology (imaging) developments now enable neuroscientists to view, investigate, measure, and influence the brain directly. An understanding of both structure and function then advances our knowledge of the mechanisms involved in cognitive processes underlying neural systems. For instance, what brain structures are involved, connected and work in concert to form new clinical applications in cognitive neuroscience:

Clinical Applications in Cognitive Neuroscience: Read More [+]

Objectives & Outcomes

Course Objectives: Students will also gain an appreciation of the relationship between healthy brain function and its breakdown (pathophysiology) in various disease states. Understanding disease states constitutes an important aspect of this course. Brain disorders change the neural circuits in the brain and cause it to malfunction during basic cognitive processes, such as memory and attention. We will compare how healthy neural circuits are functioning and draw inferences about the biological basis of the impacted cognitive processes.

Rules & Requirements:

Prerequisites: CogSci 1/1B/N1 or MCBC61/C64 or Psych 101 preferred

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture per week
Summer: 6 weeks - 7 hours of lecture per week

Additional Details

Subject/Course Level: Cognitive Science/Undergraduate
Grading/Final exam status: Letter grade. Final exam required.
Instructor: Isaac

Clinical Applications in Cognitive Neuroscience: Read Less [-]
COG SCI 180 Mind, Brain, and Identity 3 Units
Terms offered: Summer 2020 Second 6 Week Session, Spring 2020, Summer 2019 First 6 Week Session
Do you have a self or are you one? How is the self related to brain structure and function? Is the self, for example, identical to some part of the brain or part of the brain’s function? Can you damage the self by damaging the brain? In this course we will look at these questions from conceptual, psychological, and neuroscientific perspectives. We will study both normal and injured brains to help shed light on what is a deeply philosophical and personal issue: What is the human self. We will read various papers pertaining to these issues as well as the books listed under required reading.

Mind, Brain, and Identity:

Read More [+]

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture per week
Summer: 6 weeks - 7 hours of lecture per week

Additional Details
Subject/Course Level: Cognitive Science/Undergraduate
Grading/Final exam status: Letter grade. Alternative to final exam.
Instructor: Pageler

Mind, Brain, and Identity: Read Less [-]

COG SCI 181 The Cognitive Unconscious 3 Units
Terms offered: Summer 2020 Second 6 Week Session
This class is on the cognitive unconsciousness. This is the unconscious mind from a cognitive science point of view rather than one from psychoanalysis (though we will briefly touch on the psychoanalytic notions of the unconscious to clarify the distinction). The basic guide will be asking whether there is explanatory value to explaining human behavior with mental states or events that are not conscious to the person who has them. We say, for example, that a person flinched because they felt pain. Pain is a mental state that can explain the behavior (the flinch) of the person. Are there good reasons to think that some behaviors are explained by unconscious mental states? Cognitive science provides a strong reason to believe we can answer

The Cognitive Unconscious:

Read More [+]

Objectives & Outcomes
Course Objectives: The objective of this course is to explore and understand the conceptual and empirical approaches to the cognitive unconscious from the multidisciplinary perspective of philosophy and cognitive science.
Student Learning Outcomes: Argue for or against theoretical positions in cognitive science. Based on 1) and 2), students will be able to argue for or against theoretical positions in this domain of cognitive science. Evaluate simple behavioral and neuroscientific experiments. Based on 1), students will be able to evaluate philosophical, neuroscientific, and psychological experiments regarding the demarcation of conscious and unconscious states. Explain and apply knowledge of landmark findings and theories in cognitive science. Students will be able to explain a sense of the nature, demarcation, and function of conscious and unconscious mental states (events/ activity)

Rules & Requirements
Prerequisites: Cognitive Science 1/1B/N1 preferred

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture per week
Summer: 6 weeks - 7.5 hours of lecture per week

Additional Details
Subject/Course Level: Cognitive Science/Undergraduate
Grading/Final exam status: Letter grade. Final exam required.
Instructor: Pageler

The Cognitive Unconscious: Read Less [-]
COG SCI 182 The Cognitive Psychology of Concept and Idea Formation 3 Units
Terms offered: Summer 2020 First 6 Week Session, Spring 2020
This class will explore cognitive psychology and some neurological processing related to cognition and the formation and use of “ideas” or “concepts.” We will discuss the modeling of idea and concept formation, the structures of memory, reasoning and problem solving, and metacognition, among others.

Objectives & Outcomes

Course Objectives: The objective of this course is to explore and understand the conceptual and empirical approaches to the cognitive unconscious from the multidisciplinary perspective of philosophy and cognitive science.

Student Learning Outcomes: Argue for or against theoretical positions in cognitive science. Based on 1) and 2), students will be able to argue for or against theoretical positions in this domain of cognitive science. Evaluate simple behavioral and neuroscientific experiments. Based on 1), students will be able to evaluate philosophical, neuroscientific, and psychological experiments regarding the demarcation of conscious and unconscious states. Explain and apply knowledge of landmark findings and theories in cognitive science. Students will be able to explain a sense of the nature, demarcation, and function of conscious and unconscious mental states (events/activity).

Rules & Requirements

Prerequisites: Cognitive Science 1/1B/N1 preferred

Hours & Format

Fall and/or spring: 15 weeks - 3-4 hours of lecture per week
Summer: 6 weeks - 7.5-9.5 hours of lecture per week

Additional Details

Subject/Course Level: Cognitive Science/Undergraduate

Grading/Final exam status: Letter grade. Final exam required.

Instructor: Pageler

COG SCI 190 Special Topics in Cognitive Science 3 Units
Terms offered: Spring 2022, Fall 2021, Spring 2021
Selected topics in the study of Cognitive Science.

Rules & Requirements

Prerequisites: Consent of instructor

Repeat rules: Course may be repeated for credit when topic changes.

Hours & Format

Fall and/or spring: 15 weeks - 2-4 hours of seminar per week
Summer:
6 weeks - 6-8 hours of seminar per week
8 weeks - 4-8 hours of seminar per week

Additional Details

Subject/Course Level: Cognitive Science/Undergraduate

Grading/Final exam status: Letter grade. Alternative to final exam.

Special Topics in Cognitive Science: Read Less [-]

COG SCI H195A Special Study for Honors Candidates 1 - 3 Units
Terms offered: Spring 2013, Spring 2012, Fall 2011
Independent study and preparation of an honors thesis under the supervision of a faculty member.

Rules & Requirements

Prerequisites: Open only to senior cognitive science majors in the honors program

Repeat rules: Course may be repeated for credit up to a total of 6 units.

Hours & Format

Fall and/or spring: 15 weeks - 0 hours of independent study per week

Additional Details

Subject/Course Level: Cognitive Science/Undergraduate

Grading/Final exam status: Letter grade. Final exam not required.

Special Study for Honors Candidates: Read Less [-]
COG SCI 195B Special Study for Honors Candidates 1 - 3 Units
Independent study and preparation of an honors thesis under the supervision of a faculty member.
Special Study for Honors Candidates: Read More [+]
Rules & Requirements
Prerequisites: Open only to senior cognitive science majors in the honors program
Repeat rules: Course may be repeated for credit up to a total of 6 units.
Hours & Format
Fall and/or spring: 15 weeks - 0 hours of independent study per week
Additional Details
Subject/Course Level: Cognitive Science/Undergraduate
Grading/Final exam status: Letter grade. Final exam not required.
Special Study for Honors Candidates: Read Less [-]

COG SCI 197 Academic Internship Credit 1 - 3 Units
Terms offered: Summer 2017 10 Week Session
Academic internship credit for students pursuing an internship related to their studies in the Cognitive Science Program. Limited to Cognitive Science declared majors with at least 60 units, and a 2.0 GPA.
Academic Internship Credit: Read More [+]
Rules & Requirements
Repeat rules: Course may be repeated for credit without restriction.
Hours & Format
Fall and/or spring: 15 weeks - 2-7 hours of independent study per week
Summer: 10 weeks - 4-11 hours of independent study per week
Additional Details
Subject/Course Level: Cognitive Science/Undergraduate
Grading/Final exam status: Offered for pass/not pass grade only. Final exam not required.
Academic Internship Credit: Read Less [-]

COG SCI 198 Directed Group Study 1 - 4 Units
Terms offered: Fall 2021, Spring 2016, Fall 2015
Seminar for the group study of selected topics. Topics may be initiated by students subject to the approval of the major advisor.
Directed Group Study: Read More [+]
Rules & Requirements
Prerequisites: Upper division standing and consent of instructor
Repeat rules: Course may be repeated for credit without restriction.
Hours & Format
Fall and/or spring: 15 weeks - 1-4 hours of directed group study per week
Additional Details
Subject/Course Level: Cognitive Science/Undergraduate
Grading/Final exam status: Offered for pass/not pass grade only. Final exam not required.
Directed Group Study: Read Less [-]

COG SCI 199 Independent Study in Research 1 - 4 Units
Terms offered: Fall 2015, Fall 2014, Spring 2013
Independent study and research by arrangement with faculty.
Independent Study in Research: Read More [+]
Rules & Requirements
Prerequisites: Restricted to juniors and seniors
Repeat rules: Course may be repeated for credit without restriction.
Hours & Format
Fall and/or spring: 15 weeks - 1-4 hours of independent study per week
Summer: 8 weeks - 1.5-7.5 hours of independent study per week
Additional Details
Subject/Course Level: Cognitive Science/Undergraduate
Grading/Final exam status: Offered for pass/not pass grade only. Final exam not required.
Independent Study in Research: Read Less [-]