

Cognitive Science

Concentration Requirements

Cognitive science is the interdisciplinary study of the mind. Research in Cognitive Science uses behavioral experimentation, computational modeling, and brain imaging to study mental representations and processes. The study of Cognitive Science involves integrating certain areas of focus within Psychology with methods and topics from other disciplines, such as Computer Science, Neuroscience, Linguistics, Philosophy, Anthropology, and Sociology. The goal of the Cognitive Science concentration is to provide students with the foundational background in those areas of psychological science that are fundamental to the field, as well as exposure to the other disciplines that involve the study of the mind. Students can choose to focus on behavioral experimentation or computational modeling with their choice of core classes, and can focus on a particular avenue of study with their electives.

These are the new requirements approved by CCC effective Fall 2024. For existing concentrators graduating in 2024-25, the prior requirements can be found by selecting the Bulletin archive <https://bulletin.brown.edu/archive/2023-24/>

Common Core

Careers in Cognitive Science and related fields require familiarity with statistics. Therefore, the Psychology concentration requires a course in Quantitative Methods (CPSY 0900 (<https://bulletin.brown.edu/search/?P=CPSY%200900>)). CPSY 0900 (<https://bulletin.brown.edu/search/?P=CPSY%200900>) is a prerequisite for research methods and laboratory courses, so concentrators should plan to take this course by their fourth semester. Students may substitute CPSY 0900 (<https://bulletin.brown.edu/search/?P=CPSY%200900>) with a comparable statistics course taught in another department with the approval of a Cognitive Science concentration advisor. Consult with a concentration advisor for details. The department does not grant concentration credit for AP Statistics, regardless of score. We strongly recommend fulfilling the statistics requirement as a sophomore.

Another element in the Cognitive Science concentration is a course on research methods. This course could focus on behavioral research methods or computational methods. One of Research Methods and Design (CPSY 1900 (<https://bulletin.brown.edu/search/?P=CPSY%201900>)) or Research Methods (CPSY 1901 (<https://bulletin.brown.edu/search/?P=CPSY%201901>)) is the preferred way of fulfilling this requirement if students are interested in behavioral methods. One of the laboratory courses in computation (CPSY 1291 or CPSY 1492) is the preferred course for fulfilling this requirement if students are more interested in computational methods. These courses expose students to a variety of topics and methods in Cognitive Science. Other laboratory courses can be used to fulfill the research methods requirement; consult with a Cognitive Science advisor for lists of approved courses. The research methods requirement should be fulfilled before senior year.

Foundation

The goal of the foundation courses is to provide students with a background in the relevant areas of psychological science related to Cognitive Science, as well as provide students with exposure to computational training and foundational knowledge in at least one other discipline related to the study of the mind.

(A) Three of these foundational courses will be in the CPSY department, specifically providing students with foundations in the psychological sciences related to Cognitive Science. The goal of the foundational courses in the psychological sciences is to provide students with the background in areas of psychology relevant to the study of the mind. This includes cognition, perception, psycholinguistics, and cognitive neuroscience as well as the possibility to study developmental cognitive science or social cognitive science. No student in cognitive science is expected to know all of these topics; rather, the expectation is that students have exposure to a subset of these fields.

Note however, that we do not accept both CPSY 0610 and CPSY 0700 for the Cognitive Science concentration; students interested in both of these courses are recommended to concentrate in Psychology. Moreover, given the emphasis that some of these courses place on cognitive neuropsychology, one further restriction to these requirements is that students cannot specifically take CPSY 0010, CPSY 0200, and CPSY 0450 to satisfy this foundation requirement. All other combinations are acceptable.

(B) One foundation course must be outside of the CPSY department. The goal of this requirement is to provide students with exposure to fields related to the study of the mind, not in psychology. These courses contribute to a more interdisciplinary approach to the study of the mind.

(C) Because the study of cognitive science has a fundamental relation with computational modeling and understanding the computational model of the mind, it is critical that all cognitive science students be familiar with computation and programming. The goal of this last foundation requirement is to provide students with this knowledge base. Note that if students use CPSY1291 or CPSY1492 to satisfy this requirement, they must use a different course to satisfy the research methods requirement listed above.

Electives

The goal of the elective requirement is to construct a curriculum that provides a deeper understanding of Cognitive Science. Students should take four classes in CPSY, PHIL, NEUR, SOC, ANTH, LING, or CSCI with at least one of these classes coming from the CPSY department at the 1000-level and at least two others at the 1000-level. Permission of concentration advisor required to approve electives. No more than two 1970/1980 credits can count towards electives (or requirements to the concentration in general).

Requirements for the A.B. degree

CPSY 0900	Statistical Methods	1
CPSY 1900	Research Methods And Design	1
or CPSY 1901	Research Methods	
Three Foundation Courses within CPSY:		3
CPSY 0010	Mind, Brain and Behavior: An Interdisciplinary Approach	
CPSY 0200	Human Cognition	
or CPSY 0220	Making Decisions	
CPSY 0400	Cognitive Neuroscience	
or CPSY 0450	Brain Damage and the Mind	
CPSY 0500	Perception and Mind	
or CPSY 0550	Science of Consciousness	
CPSY 0610	Children's Thinking: The Nature of Cognitive Development	
or CPSY 0700	Social Psychology	
CPSY 0800	Language and the Mind	
One Foundation Course Outside of CPSY:		1
LING 0100	Introduction to Linguistics	
NEUR 0010	The Brain: An Introduction to Neuroscience	
SOC 0010	Social Forces: An Introduction to Sociology	
Or choose from a set of approved courses in PHIL, ANTH, or SOC		
One Foundation Course in Computation:		1
CPSY 0950	Introduction to programming	
CPSY 1291	Computational Methods for Mind, Brain and Behavior	
CPSY 1492	Computational Cognitive Neuroscience	
CPSY 1950	Deep Learning in Brains, Minds and Machines	
Or any introductory CSCI course with a programming component such as:		

CSCI 0111	Computing Foundations: Data	
or CSCI 0150	Introduction to Object-Oriented Programming and Computer Science	
or CSCI 0170	Computer Science: An Integrated Introduction	
or CSCI 0190	Accelerated Introduction to Computer Science	
Four Approved Electives related to Cognitive Science, such as:		4
Students should take four courses from CPSY, PHIL, NEUR, SOC, ANTH, LING, or CSCI with at least one of these classes coming from CPSY at 1the 1000-level and at least two others at the 1000-level.		
Capstone: Independent Study (CPSY 1970, CPSY 1980) or approved seminar		1
Total Credits		12

Honors Requirement

The Honors Program in Cognitive Science gives undergraduates a special opportunity to carry out a research project under the direction of a faculty member. The program also provides the opportunity for outstanding senior concentrators to receive their undergraduate degree with Honors. Participation in the program allows students to develop an understanding of research and acquire research skills and background.

Candidates for Honors in Cognitive Science must meet all of the requirements of the concentration as described above. Candidates submit their application for the program in semester 7. We encourage students to seek out a potential faculty mentor prior to semester 7. Candidates for Honors must have completed the Statistics and Research Methods requirements before semester 7. Please refer to the CPSY Honors Program page for detailed information about the specific requirements for the Honors program in Cognitive Science.

Requirements for the Sc.B. degree

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(B) One foundation course must be outside of the CPSY department. The goal of this requirement is to provide students with exposure to fields related to the study of the mind, not in psychology. These courses contribute to a more interdisciplinary approach to the study of the mind.

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Electives

The goal of the elective requirement is to construct a curriculum that provides a deeper understanding of Cognitive Science. Students should take four classes in CPSY, PHIL, NEUR, SOC, ANTH, LING, or CSCI with at least one of these classes coming from the CPSY department at the 1000-level and at least two others at the 1000-level. Permission of concentration advisor required to approve electives. No more than two 1970/1980 credits can count towards electives (or requirements to the concentration in general).

Research Methods and Capstone

Another element in the Cognitive Science concentration is a research methods course that builds on the introductory statistics course (which will be a prerequisite) but exposes students to a variety of topics in research of the mind: to empirical methods (e.g., surveys, chronometry, eye tracking, brain imaging), to common designs (e.g., factorial experimental, correlational, longitudinal), to research ethics, and to best practices of literature review. Concentrators will additionally take either a seminar course or an independent research course to serve as their capstone experience.

ScB Requirements in Cognitive Science

To satisfy an ScB. in the Cognitive Science concentration, one must satisfy all the AB requirements as well as take five (5) additional classes in STEM fields related to the concentration. The goal of this requirement is to provide students with a broader background in both the study of psychology and STEM fields in general. At least two (2) of those five classes must be in the CPSY Department. These two courses must be at the 1000-level. We strongly recommend that one of these courses be an advanced laboratory course (Described above).

The other three classes can be from the following departments: APMA, BIOL, CSCI, CHEM, CPSY, MATH, NEUR, or PHYS. Courses from other fields might be eligible with permission of the concentration advisor, but such courses must be related to a student's other courses, such as their electives. Courses from CPSY must be at the 1000-level to be considered for the Sc.B requirements. All courses must also be acceptable for the concentration requirements of a concentration administered by that department. For example, if a PHYS course is used to satisfy one of these requirements, it must be acceptable for a concentration in the PHYS department.

CPSY 0900	Statistical Methods	1
CPSY 1900 or CPSY 1901	Research Methods And Design Research Methods	1
Three Foundation Courses within CPSY:		3
CPSY 0010	Mind, Brain and Behavior: An Interdisciplinary Approach	
CPSY 0200 or CPSY 0220	Human Cognition Making Decisions	
CPSY 0400 or CPSY 0450	Cognitive Neuroscience Brain Damage and the Mind	
CPSY 0500 or CPSY 0550	Perception and Mind Science of Consciousness	
CPSY 0610 or CPSY 0700	Children's Thinking: The Nature of Cognitive Development Social Psychology	
CPSY 0800	Language and the Mind	
One Foundation Course Outside of CPSY:		1
LING 0100	Introduction to Linguistics	
NEUR 0010	The Brain: An Introduction to Neuroscience	
SOC 0010	Social Forces: An Introduction to Sociology	
Or choose from a set of approved courses in PHIL, ANTH, or SOC		
One Foundation Course in Computation:		1
CPSY 0950	Introduction to programming	
CPSY 1291	Computational Methods for Mind, Brain and Behavior	
CPSY 1492	Computational Cognitive Neuroscience	
CPSY 1950	Deep Learning in Brains, Minds and Machines	
Or any introductory CSCI course with a programming component such as:		
CSCI 0111 or CSCI 0150	Computing Foundations: Data Introduction to Object-Oriented Programming and Computer Science	
or CSCI 0170 or CSCI 0190	Computer Science: An Integrated Introduction Accelerated Introduction to Computer Science	
Four Approved Electives related to Cognitive Science		4
Students should take four courses from CPSY, PHIL, NEUR, SOC, ANTH, LING, or CSCI with at least one of these classes coming from CPSY at 1the 1000-level and at least two others at the 1000-level.		

Five Additional STEM Courses, of which at least two (2) must be PCSY courses at the 1000-level (a lab course is strongly recommended). Courses in APMA, BIOL, CSCI, CHEM, CPSY, MATH, NEUR, or PHYS will be considered and must be applicable to a concentration in that departmen	5
Capstone: Independent Study (CPSY 1970, CPSY 1980) or approved seminar	1

Total Credits **17**

Honors Requirement

The Honors Program in Cognitive Science gives undergraduates a special opportunity to carry out a research project under the direction of a faculty member. The program also provides the opportunity for outstanding senior concentrators to receive their undergraduate degree with Honors. Participation in the program allows students to develop an understanding of research and acquire research skills and background.

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