

# BRAIN & COGNITIVE SCIENCE, BSLAS

*for the degree of Bachelor of Science in Liberal Arts & Sciences in Brain & Cognitive Science*

The **Brain and Cognitive Science major** introduces the student to a simple question: How do intelligent systems work? Our world provides two examples of complex intelligent systems—human beings (and possibly some other animals) and intelligent computer systems. Brain and Cognitive Science majors investigate the brain and behavior of intelligent biological systems (e.g. people) from the perspective that the brain is a kind of computer. Consequently, students must learn about how brains and computers work, and how these can explain what we know about mental functions including perception, learning, memory, and language. Brain and Cognitive Science majors make use of discoveries from a number of different disciplines, including psychology, neuroscience, computer science, linguistics, philosophy, and anthropology, and has applications to the development of technology in education, health, language sciences, and design.

The Brain and Cognitive Science major provides fundamental training in psychology, neuroscience, and computation, and it allows a great deal of flexibility with regard to more advanced courses. The major requires training in statistics, a laboratory course, and the capstone course. Students should contact our Undergraduate Advising Office for help in creating a plan of study and research that best meets their goals and interests.

## Academic Advising

The Psychology Undergraduate Advising Office is open to help students choose patterns of courses relevant to their interests, as well as to help students explore graduate school, professional school, and career options. Advising is done by an award-winning staff of academic professionals along with mentoring by faculty for students with research interests. Peer registration assistants are also available to help with the registration process.

## Undergraduate Degree Programs in Psychology

- BSLAS in Brain & Cognitive Science (p. 1)
- BSLAS in Psychology (<http://catalog.illinois.edu/undergraduate/las/psychology-bslas/#majortext>) with the following concentrations:
  - Behavioral Neuroscience (<http://catalog.illinois.edu/undergraduate/las/psychology-bslas/behavioral-neuroscience/>)
  - Clinical/Community Psychology (<http://catalog.illinois.edu/undergraduate/las/psychology-bslas/clinical-community-psychology/>)
  - Cognitive Neuroscience (<http://catalog.illinois.edu/undergraduate/las/psychology-bslas/cognitive-neuroscience/>)
  - Cognitive Psychology (<http://catalog.illinois.edu/undergraduate/las/psychology-bslas/cognitive-psychology/>)

- Developmental Psychology (<http://catalog.illinois.edu/undergraduate/las/psychology-bslas/developmental-psychology/>)
- Diversity Science (<http://catalog.illinois.edu/undergraduate/las/psychology-bslas/diversity-science/>)
- Intradisciplinary Psychology (<http://catalog.illinois.edu/undergraduate/las/psychology-bslas/intradisciplinary-psychology/>)
- Organizational Psychology (<http://catalog.illinois.edu/undergraduate/las/psychology-bslas/organizational-psychology/>)
- Personality Psychology (<http://catalog.illinois.edu/undergraduate/las/psychology-bslas/personality-psychology/>)
- Social Psychology (<http://catalog.illinois.edu/undergraduate/las/psychology-bslas/social-psychology/>)

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A Major Plan of Study Form must be completed and submitted to the LAS Student Academic Affairs Office before the end of the fifth semester (60-75 hours).

**Departmental distinction:** To be eligible for graduation with Distinction in Psychology, a student must complete a two-semester research sequence in PSYC 494, submit a Senior Thesis that must be approved by the department, and maintain an overall 3.0 GPA at the time of submission. A student can also enroll in PSYC 492 to facilitate the preparation of a Bachelor's thesis.

To be eligible for High or Highest Distinction, a student must first be admitted to the Honors Program (requirements: junior standing, 3.5 GPA in Psychology overall, and completion of the statistics and laboratory requirements). The student then has to complete the three semester Honors sequence (PSYC 398, PSYC 498, PSYC 499), submit a Senior Thesis that must be approved by the department, and maintain an overall GPA of at least 3.0 to be awarded High Distinction or a GPA of 3.5 for Highest Distinction.

### Graduation Requirements

Minimum hours required for graduation: 120 hours.

Minimum hours required major and supporting course work: normally equates to 42 hours. Twelve hours of 300- and 400-level courses in the major must be taken on this campus.

### University Requirements

Minimum of 40 hours of upper-division coursework, generally at the 300- or 400-level. These hours can be drawn from all elements of the degree. Students should consult their academic advisor for additional guidance in fulfilling this requirement.

The university and residency requirements can be found in the Student Code (<https://studentcode.illinois.edu/article3/part8/3-801/>) (§ 3-801) and in the Academic Catalog (<http://catalog.illinois.edu/general-information/degree-general-education-requirements/>).

### General Education Requirements

Follows the campus General Education (Gen Ed) requirements (<https://courses.illinois.edu/gened/DEFAULT/DEFAULT/>). Some Gen Ed

requirements may be met by courses required and/or electives in the program.

Code	Title	Hours
Composition I		4-6
Advanced Composition		3
Humanities & the Arts (6 hours)		6
Natural Sciences & Technology (6 hours)		6
Social & Behavioral Sciences (6 hours)		6
Cultural Studies: Non-Western Cultures (1 course)		3
Cultural Studies: US Minority Cultures (1 course)		3
Cultural Studies: Western/Comparative Cultures (1 course)		3
Quantitative Reasoning (2 courses, at least one course must be fulfilled by PSYC 235 and any other approved as Quantitative Reasoning)		6-10
Language Requirement (Completion of the fourth semester or equivalent of a language other than English, or completion of the third semester in two different languages other than English is required)		0-20

#### Major Requirements

Code	Title	Hours
BCOG 100	Introduction to the Brain and Cognitive Science	3
BCOG 200	Introduction to Programming for the Brain and Cognitive Sciences	4
Statistics Course		4
PSYC 235	Intro to Statistics (or equivalent)	
<b>Multi-disciplinary Breadth Courses</b>	<b>Select two of the following:</b>	<b>6-7</b>
ANTH 101 or ANTH 102 or ANTH 104 or ANTH 143	Introduction to Anthropology Human Origins and Culture Talking Culture Biology of Human Behavior	
INFO 102 or CS 125	Little Bits to Big Ideas Introduction to Computer Science	
LING 100	Intro to Language Science	
MCB 170	Society and the Brain	
PHIL 100 or PHIL 101	Intro to Philosophy-ACP Introduction to Philosophy	
PHIL 102 or PHIL 103	Logic and Reasoning Logic and Reasoning QR II	
PSYC 100	Intro Psych	
<b>Intermediate Required Courses</b>	<b>Select one of the following:</b>	<b>3</b>
PSYC 220	Images of Mind	
PSYC 204	Intro to Brain and Cognition	
PSYC 210	Behavioral Neuroscience	
<b>Intermediate Elective Courses</b>	<b>Select one of the following:</b>	<b>3</b>
ANTH 240	Biological Anthropology	
ANTH 243	Sociality of the Great Apes	
ANTH 270	Language in Culture	

CS 173 or MATH 213	Discrete Structures Basic Discrete Mathematics	
CS 225	Data Structures	
PSYC 216	Child Psych	
PSYC 224	Cognitive Psych	
PSYC 230	Perception & Sensory Processes	
PSYC 248	Learning and Memory	
LING 225	Language, Mind, and Brain	
LING 270	Language, Technology & Society	
PHIL 202	Symbolic Logic	
PHIL 250	Conceptions of Human Nature	
PHIL 270	Philosophy of Science	
BCOG 458	Advances in Brain and Cognitive Science	3
<b>Required Lab</b>	<b>Select one of the following:</b>	<b>4</b>
PSYC 311	Behavioral Neuroscience Lab	
PSYC 331	Cognitive Psych Lab	
PSYC 334	Perception Lab	
PSYC 363	Developmental Child Psych Lab	
PSYC 445	Cognitive Neuroscience Lab	
PSYC 489	Neural Network Modeling Lab	
<b>Advanced Electives</b>	<b>Select four of the following:</b>	<b>12</b>
ANTH 372	Topics in Lang & Culture	
BCOG 492	Capstone Undergraduate Research (Cognitive Science Capstone)	
CS 361	Probability & Statistics for Computer Science	
CS 440	Artificial Intelligence	
IB 329	Animal Behavior	
IB 432	Genes and Behavior	
IE 340	Human Factors	
LING 301	Elements of Syntax	
LING 302	Elements of Phonology	
LING 304	Elements of Morphology	
LING 307	Elmnts Semantics & Pragmatics	
LING 425	Intro to Psycholinguistics	
MCB 419	Brain, Behavior & Info Process	
MCB 462	Integrative Neuroscience	
PHIL 351	Thinking and Reasoning	
PHIL 407	Logic and Linguistic Analysis	
PHIL 425	Philosophy of Mind	
PHIL 430	Theory of Knowledge	
PHIL 443	Phenomenology	
PHIL 453	Formal Logic and Philosophy	
PHIL 454	Advanced Symbolic Logic	
PHIL 471	Contemporary Phil of Science	
PHIL 477	Philosophy of Psychology	
PSYC 302	Applied Neuroscience	
PSYC 361	The Psychology of Aging	
PSYC 402	Intro Clin Neuropsych	
PSYC 403	Memory and Amnesia	
PSYC 404	Cognitive Neuroscience	
PSYC 408	Human Behavior Genetics	

PSYC 413	Advanced Neuropsychopharmacology
PSYC 414	Brain, Learning, and Memory
PSYC 421	Principles of Psychophysiology
PSYC 423	Language Acquisition
PSYC 433	Evolutionary Neuroscience
PSYC 450	Cognitive Psychophysiology
PSYC 451	Neurobio of Aging
PSYC 453	Cog Neuroscience of Vision
SHS 301	General Speech Science
SHS 427	Language and the Brain
<b>Total Hours</b>	<b>42-43</b>

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## Sample Sequence

This sample sequence is intended to be used only as a guide for degree completion. All students should work individually with their academic advisors to decide the actual course selection and sequence that works best for them based on their academic preparation and goals. Enrichment programming such as study abroad, minors, internships, and so on may impact the structure of this four-year plan. Course availability is not guaranteed during the semester indicated in the sample sequence.

Students must fulfill their Language Other Than English requirement by successfully completing a fourth level of a language other than English. For more information, see the corresponding section on the Degree and General Education Requirements page (<http://catalog.illinois.edu/general-information/degree-general-education-requirements/>).

First Year	
First Semester	Hours
Free Elective course	1
BCOG 100	3
General Education course	3
Language Other Than English (3rd level)	4
Composition I or General Education course	4
<b>Total Hours</b>	<b>15</b>

First Year	
Second Semester	Hours
BCOG 200	4
PSYC 235	3
Language Other Than English (4th level)	4
General Education course or Composition I	3
<b>Total Hours</b>	<b>14</b>

**Total Hours 14**

Second Year	
First Semester	Hours
Multi-disciplinary Breadth course	3
PSYC Intermediate Required course	3
General Education course	3
General Education course	3
Free Elective course	3
<b>Total Hours</b>	<b>15</b>

Second Year	
Second Semester	Hours
Multi-disciplinary Breadth course	3
Intermediate Elective course	3
General Education course	3
Free Elective course	3
Free Elective course	3
<b>Total Hours</b>	<b>15</b>

Third Year	
First Semester	Hours
PSYC Required Lab	4
Advanced Elective course	3
General Education course	3
General Education course	3
Free Elective course	3
<b>Total Hours</b>	<b>16</b>

Third Year	
Second Semester	Hours
Advanced Elective course	3
General Education course	3
General Education course	3
Free Elective course	3
Free Elective course	3
<b>Total Hours</b>	<b>15</b>

Fourth Year	
First Semester	Hours
BCOG 458	3
Advanced Elective course	3
General Education course	3
Free Elective course	3
Free Elective course	3
<b>Total Hours</b>	<b>15</b>

**Total Hours 15**

**Fourth Year**

<b>Second Semester</b>	<b>Hours</b>
Advanced Elective course	3
General Education course	3
Free Elective course	3
Free Elective course	3
Free Elective course	3
	<b>15</b>

**Total Hours 15****Total Hours: 120**

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1. Students will be able to explain how intelligent systems function by integrating foundational concepts from psychology, neuroscience, and computation, including how perception, learning, memory, and language emerge from biological and artificial processes.
2. Students will apply interdisciplinary methods—drawing from fields such as computer science, linguistics, philosophy, and anthropology—to analyze and model brain–behavior relationships and evaluate theories of biological and artificial intelligence.
3. Students will demonstrate competency in statistics, programming, and laboratory techniques to design, conduct, and interpret empirical or computational studies, culminating in a capstone seminar that synthesizes their learning across the major.

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## **Department of Psychology (<http://www.psychology.illinois.edu/undergrad/>)**

**department faculty:** Psychology Faculty (<https://psychology.illinois.edu/directory/faculty/>)

**advising:** Psychology advising (<https://psychology.illinois.edu/academics/undergraduate-program/advising-services/>)

## **College of Liberal Arts & Sciences (<https://las.illinois.edu/>)**

**overview of college admissions & requirements:** Liberal Arts & Sciences (<http://catalog.illinois.edu/schools/las/academic-units/>)