

COGNITIVE AND BEHAVIORAL NEUROSCIENCE (BS)

The B.S. in Cognitive/Behavioral Neuroscience focuses on the neural substrates of cognitive processes and behavior, utilizing methods from cognitive psychology, behavioral analysis, psychobiology, and computer science to account for empirical data about the brain.

Our neuroscience majors are designed to provide both breadth and depth to the neuroscience knowledge base of our students, and afford ample opportunities for developing creative and critical thinking skills needed to advance neuroscience (or any other life science field).

Curriculum

Code	Title	Hours
Basic Science and Math Foundations		
PSYC 101	General Psychology	3
BIOL 101	General Biology I	3
BIOL 111	General Biology I Lab	1
BIOL 102	General Biology II	3
BIOL 112	General Biology II Lab	1
Select one of the following three sets of classes:		4
CHEM 101 & CHEM 111	General Chemistry A Lecture/Discussion and General Chemistry Lab A	
CHEM 160 & CHEM 161	Chemical Structure and Properties and Chemical Structure and Properties Laboratory	
CHEM 105	Chemical Principles	
Select one of the following three sets of classes:		4
CHEM 102 & CHEM 112	General Chemistry B Lecture/Discussion and General Chemistry Lab B	
CHEM 180 & CHEM 181	Chemical Reactivity I and Chemical Reactivity I Lab	
CHEM 106	Basic Inorganic Chemistry	
BIOL 251	Cell Biology	3
BIOL 282	Genetics	3
BIOL 252	Cell Biology Laboratory	1
or BIOL 283	Genetics Laboratory	
MATH 131	Applied Calculus I	3
or MATH 161	Calculus I	
Select one of the following two sets of classes:		4
PHYS 111 & 111L	College Physics I Lec / Dis and College Physics Laboratory I	
PHYS 125 & 125L	General Physics I Lec/Dis and General Physics Laboratory I	
Select one of the following three sets of classes:		4
PHYS 112 & 112L	College Physics II Lec/Dis and College Physics Lab II	
PHYS 122 & PHYS 112L	College Physics II Lec/Dis and College Physics Lab II	
PHYS 126 & 126L & 126F	General Physics II Lec/Dis and General Physics Laboratory II and Freshman Projects	
BIOL 335 / STAT 335	Intro to Biostatistics	3

or PSYC 304	Statistics	
Neuroscience Foundations Courses		
NEUR 101	Introduction to Neuroscience	3
BIOL 362	Neurobiology	3
PSYC 382 / BIOL 284	Behavioral and Cognitive Neuroscience	3
Cognitive/Behavioral Neuroscience Track		
Cognitive/Behavioral Neuroscience Specialty Areas Courses		
PSYC 306	Research Methods in Psychology	3
Select one of the following Computer Science options:		3
COMP 150	Introduction to Computing	
COMP 170	Introduction to Object-Oriented Programming	
COMP 180	Computing and Data Analysis for the Sciences	
DSCI 101	Fundamentals of Modern Data Science with R	
NEUR 300 / BIOL 303	Seminar in Neuroscience	1
Cognitive/Behavioral Neuroscience Lecture Electives		
Select three of the following:		9
BIOL 320	Animal Behavior	
BIOL 351	Sleep/Circadian Rhythms	
BIOL 352	Neurobiology of Feeding in Health and Disease	
BIOL 357	Neural Disease, Degeneration, and Regeneration	
BIOL 395	Special Topics in Biology (if topics is Cellular and Gross Functional Neuroanatomy)	
COMP 386	Computational Neuroscience	
PSYC 240 / BIOL 240	Psychology-Biology of Perception	
PSYC 251	Learning and Memory	
PSYC 332	Affective Neuroscience	
PSYC 350	Developmental Cognitive Neuroscience	
PSYC 352	Neuropsychology	
PSYC 355 / PHIL 355	Neuroethics	
PSYC 378	Drugs and Behavior	
Cognitive/Behavioral Neuroscience Lab Electives		
Select two of the following:		5-7
NEUR 301 / BIOL 373 / PSYC 388	Laboratory in Neuroscience I	
PSYC 311 / BIOL 313	Lab in Psychobiology	
PSYC 312	Lab in Cognitive Neuroscience	
PSYC 313	Lab in Behavioral Neuroscience	
PSYC 314	Lab in Experimental Psychology: Cognition	
PSYC 316	Lab in Experimental Psychology: Sense & Perception	
BIOL 395L	Special Topics Laboratory (if topics is neuroanatomy)	
May include one of the following independent research options:		
PSYC 397	Independent Research (with a Cognitive/Behavioral focus)	
PSYC 369 / PSYC 370	Psychology Honors Readings (with a Cognitive/Behavioral focus)	
BIOL 396	Research (with a Cognitive/Behavioral focus)	

Cognitive/Behavioral Neuroscience Capstone		
PSYC 387	Seminar in Behavioral and Cognitive Neurosciences	3
Total Hours		73-75

Undergraduate Research

Neuroscience students have numerous opportunities to conduct scientific research in the labs of our neuroscience-affiliated faculty at Loyola's Lake Shore Campus (<https://www.luc.edu/neuroscience/aboutus/facultydirectoryandresearch/#den422313>), in the labs of other faculty on any of Loyola's campuses, or at other institutions in the Chicago area. Depending on the applicability of the research project to the student's Neuroscience Major or Minor, independent research may be able to qualify for course credit as one of the required specialty labs (see below).

Cognitive/Behavioral Neuroscience Majors Research Credit

Cognitive/Behavioral Neuroscience (NRCB) majors can earn specialty lab credit for conducting **independent research that has a neuroscience or cognitive/behavioral focus** in labs within the psychology or biology departments. Your research project must be approved by the NRCB Director for NRCB credit through one of the 3-credit courses below:

- PSYC 397 Independent Research (relevant research with faculty in Psychology)
- PSYC 369 Psychology Honors Readings/PSYC 370 Psychology Honors Research (relevant research with faculty in Psychology for NRCB credit; additionally must use neuroscientific technique if desire NRCB Honors)
- BIOL 396 Research (relevant research with faculty in Biology)

Please contact the NRCB Director for questions about earning credit from cognitive/behavioral or neuroscience-related research in other departments (e.g., computer science, engineering, chemistry) or at other institutions.

Course Objectives

Because the nervous system is the organ for behavior, neuroscience cuts across traditional fields in the biological and behavioral sciences. Owing to this breadth, we have designed two major tracks for students who wish to focus on neuroscience in their course of study at LUC. Completing either of these options will prepare students well for a variety of careers, including but not limited to medicine and life sciences research, particularly in neuroscience-related fields. Both options require at least two semesters of courses in biology, chemistry, and physics.

Lecture Course Objectives

Both of the majors require three courses in neuroscience fundamentals: NEUR 101 (<https://catalog.luc.edu/search/?P=NEUR%20101>) Introduction to Neuroscience, BIOL 362 (<https://catalog.luc.edu/search/?P=BIOL%20362>) Neurobiology (which stresses cellular and electrophysiological mechanisms of neural function), and PSYC 382 (<https://catalog.luc.edu/search/?P=PSYC%20382>)/BIOL 284 (<https://catalog.luc.edu/search/?P=BIOL%20284>) Behavioral and Cognitive Neuroscience (which stresses the neural substrates underlying mental processing and behavior). After completing this sequence, majors can design their own course of study within cognitive/behavioral or molecular/cellular neuroscience. There is some overlap in the list of lecture courses from which students may choose to complete their

elective requirements, but there is also great diversity in the topics that are available in each major track.

Lab Course Objectives

Aside from first-year labs in chemistry and biology, and organic chemistry lab for molecular/cellular neuroscience majors, neuroscience majors choose their own lab experiences. Because the nervous system is cellular, computational, and a control center, the range of techniques that are useful is extremely broad, from cellular/molecular to behavioral, and the student can decide which techniques will be most helpful in answering the questions they want to address. Students who are interested in conducting independent neuroscience research have several neuroscience labs from which to choose, and may also seek permission to carry out a neuroscience-relevant project in a lab that is not focused on neuroscience. Independent research is the best preparation for doctoral programs, and is also regarded highly by medical, dental and other life science professional schools. For this reason, getting an independent research position in a lab is competitive.

Seminar Courses

There are three seminar style courses available to neuroscience undergraduates. In these courses, students tackle the primary literature and react to seminars given by neuroscientists on their research. Cognitive/Behavioral Neuroscience majors are required to take the 1-credit hour NEUR 300 (<https://catalog.luc.edu/search/?P=NEUR%20300>) Seminar in Neuroscience course, providing basic exposure to the primary literature and a wide range of research talks. Both major tracks culminate with a required capstone seminar class, which immerses the students in the primary literature and encourages development of critical thinking and presentation skills.

College of Arts and Sciences Graduation Requirements

All Undergraduate students in the College of Arts and Sciences are required to take two Writing Intensive courses (6 credit hours) as well as complete a foreign language requirement at 102-level or higher (3 credit hours) or a language competency test. More information can be found here (<https://www.luc.edu/cas/college-requirements/>).

Additional Undergraduate Graduation Requirements

All Undergraduate students are required to complete the University Core, at least one Engaged Learning course, and UNIV 101. SCPS students are not required to take UNIV 101. Nursing students in the Accelerated BSN program are not required to take core or UNIV 101. You can find more information in the University Requirements (<https://catalog.luc.edu/undergraduate/university-requirements/>) area.