

NEUROSCIENCE, BSLAS

for the degree of Bachelor of Science in Liberal Arts and Sciences in Neuroscience

The School of MCB's neuroscience curriculum combines the study of molecular and cellular biology with neuroscience, neurophysiology, neurochemistry, and neuro-pathology. Students will gain an understanding of brain function at multiple levels, from behavior and information processing to systems and integrative physiology. We use model organisms like fruit flies, fish, and mice, and we will explore cells at all levels, from the dish to cells functioning in animals. We seek to understand the causes of a variety of disorders, from neurodevelopmental to neurodegenerative disorders, from brain cancer to epilepsy, and to develop biomedical treatments for them. As a neuroscience major, you'll take a variety of cutting-edge courses and develop critically-important laboratory skills. Students conduct research alongside faculty who lead pioneering programs in sensory processing, neuroendocrinology, physiology of neurons and glia, regeneration, and cell signaling with advanced techniques, such as optogenetics and neuroimaging.

Undergraduate degree programs in Molecular & Cellular Biology

- Biochemistry, BS (<http://catalog.illinois.edu/undergraduate/las/biochemistry-bs/>)
- Molecular & Cellular Biology, BSLAS (<http://catalog.illinois.edu/undergraduate/las/molecular-cellular-biology-bslas/>)
- Molecular & Cellular Biology Honors Concentration, BSLAS (<http://catalog.illinois.edu/undergraduate/las/molecular-cellular-biology-bslas/honors/>)
- Molecular & Cellular Biology + Data Science, BSLAS (<http://catalog.illinois.edu/undergraduate/las/molecular-cellular-biology-data-science-bslas/>)
- Neuroscience, BSLAS (p. 1)

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Minimum Required Courses: 83-84 hours including 29 hours of 300- or 400-level courses. 12 hours of advanced level courses in the major must be taken on the Urbana-Champaign campus.

In addition, undergraduate research (MCB 290) in an MCB Neuroscience-designated lab is strongly recommended for students planning to go to graduate school. No more than 10 hours of MCB 290 credit may be counted towards the 120 hours required for a degree in Neuroscience.

Students earning a degree in Neuroscience may not also earn a second degree in the Specialized Curriculum in Biochemistry.

Students earning a degree in Neuroscience may not double major in Molecular and Cellular Biology.

Distinction

Students in Neuroscience can qualify for Distinction via one of the following:

Distinction for Excellence in Research:

To be eligible for graduation with Distinction a student must:

Complete 3 semesters of MCB 290 for 2 credit hours or more each semester. Maintain a minimum cumulative GPA of 3.25 at the end of penultimate semester. Give at least one poster presentation at the Undergraduate Research symposium or other approved venue. Obtain a letter of support from their Principal Investigator.

To be eligible for graduation with High Distinction a student must:

Complete at least 2 semesters of MCB 290, in an MCB Neuroscience-designated lab, for 2 credit hours or more each semester. Complete 1 semester of MCB 492, in the same Neuroscience-designated lab, for 3 credit hours or more in their final semester. Maintain a minimum cumulative GPA of 3.25 at the end of penultimate semester. Give at least one presentation at the Undergraduate Research Symposium or other approved venue. Submit a written thesis that is approved by the Distinction Committee. Obtain a letter of support from their Principal Investigator.

To be eligible for graduation with Highest Distinction a student must:

Complete at least 2 semesters of MCB 290, in an MCB Neuroscience-designated lab, for 2 credit hours or more each semester. Complete 1 semester of MCB 492, in the same Neuroscience-designated lab, for 3 credit hours or more in their final semester. Maintain a minimum cumulative GPA of 3.90 at the end of penultimate semester. Give at least one presentation at the Undergraduate Research Symposium or other approved venue. Submit a written thesis that is approved by the Distinction Committee. Obtain a letter of support from their Principal Investigator.

Distinction for Excellence in Academics:

To be eligible for graduation with Academic Distinction a student must:

- Maintain a major GPA of 3.90 or higher in the Neuroscience major (MCB/Neuroscience, Chemistry, Physics and Math courses for the Neuroscience major) at the end of their penultimate semester.
- General education: Students must complete the Campus General Education requirements, including the campus general education language requirement.
- Minimum required major and supporting course work: 83-84 hours, including 29 credit hours of 300- or 400-level courses; 12 hours of 300- and 400-level courses in the major must be taken on this campus.
- Minimum Hours required for graduation: 120 hours.

Graduation Requirements

Minimum hours required for graduation: 120 hours.

Minimum hours required major and supporting course work: 83-84, including 29 hours of 300-/400- level courses. Twelve hours of 300- and 400-level courses in the major must be taken on this campus.

University Requirements

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
	fulfilled by MCB 150, CHEM 102, CHEM 104, PHYS 101, PHYS 102	
	Social & Behavioral Sciences (6 hours)	6
	fulfilled by PSYC 100 and any other course approved as Social & Behavioral Science	
	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 Quantitative Reasoning I)	6-10
	fulfilled by MATH 220 or MATH 221 & MATH 231 or STAT 212	
	Language Requirement (Completion of the fourth semester or equivalent of a language other than English is required)	0-20

Major Requirements

Code	Title	Hours
Supporting Courses		30-31
MATH 220 or MATH 221	Calculus	
MATH 231 or STAT 212	Calculus II Biostatistics	
CHEM 102 & CHEM 103 & CHEM 104 & CHEM 105	General Chemistry I and General Chemistry Lab I and General Chemistry II and General Chemistry Lab II	
CHEM 232	Elementary Organic Chemistry I	
CHEM 233	Elementary Organic Chem Lab I	
PHYS 101 & PHYS 102	College Physics: Mech & Heat and College Physics: E&M & Modern	
Neuroscience Introductory Courses		11
MCB 150	Molecular & Cellular Basis of Life	
MCB 170	Society and the Brain	
PSYC 100	Intro Psych	
Neuroscience Core Courses		13
MCB 250	Molecular Genetics	
MCB 251	Exp Techniqs in Molecular Biol	
MCB 252	Cells, Tissues & Development	
MCB 253	Exp Techniqs in Cellular Biol	
PSYC 210	Behavioral Neuroscience	

or PSYC 224 Cognitive Psych

Advanced Neuroscience Courses		14
MCB 314	Introduction to Neurobiology	
MCB 354	Biochem & Phys Basis of Life	
MCB 460	Neuroanatomy Laboratory	
MCB 461	Cell & Molecular Neuroscience	
MCB 462	Integrative Neuroscience	
Advanced Neuroscience Elective Courses		
Five additional three- or four-credit hour courses (minimum of 15 hours) at the 300- to 400-level from the Approved Advanced Elective Courses List are also required. ¹		15
Total Hours		83-84

¹ The Approved Advanced Elective Course List will be available on the MCB website (<https://mcb.illinois.edu/undergrad/>) and will be updated each semester to most accurately reflect the courses to be offered each academic year.

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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. See the corresponding section on the Degree and General Education Requirements page (<http://catalog.illinois.edu/general-information/degree-general-education-requirements/>).

First Semester

Requirements	Hours
Free Elective course	1
MCB 170 - Society and the Brain	3
CHEM 102 - General Chemistry I	3
CHEM 103 - General Chemistry Lab I	1
Composition I or MATH 220 or MATH 221	4
General Education course	3
Semester Hours	15

Second Semester

Requirements	Hours
MCB 150 - Molecular & Cellular Basis of Life	4
PSYC 100 - Intro Psych	4
CHEM 104 - General Chemistry II	3
CHEM 105 - General Chemistry Lab II	1

MATH 220 - Calculus or MATH 221 - Calculus I (or Composition I) 5

Semester Hours 17

First Semester

Requirements Hours

MCB 250 - Molecular Genetics 3

MCB 251 - Exp Techniqs in Molecular Biol 2

CHEM 232 - Elementary Organic Chemistry I 4

STAT 212 - Biostatistics or

MATH 231 - Calculus II 3

Language Other Than English (3rd level) 4

Semester Hours 16

Second Semester

Requirements Hours

MCB 252 - Cells, Tissues & Development 3

MCB 253 - Exp Techniqs in Cellular Biol 2

CHEM 233 - Elementary Organic Chem Lab I 2

PSYC 210 - Behavioral Neuroscience or PSYC 224 - Cognitive Psych 3

Language Other Than English (4th level) 4

Semester Hours 14

First Semester

Requirements Hours

MCB 314 - Introduction to Neurobiology 3

MCB 354 - Biochem & Phys Basis of Life 3

PHYS 101 - College Physics: Mech & Heat 5

General Education course 3

Semester Hours 14

Second Semester

Requirements Hours

MCB 460 - Neuroanatomy Laboratory 2

Advanced Neuroscience elective 3

PHYS 102 - College Physics: E&M & Modern 5

General Education course 3

Free Elective course 1

Semester Hours 14

First Semester

Requirements Hours

MCB 461 - Cell & Molecular Neuroscience 3

Advanced Neuroscience elective 3

Advanced Neuroscience elective 3

General Education course 3

General Education course 3

Semester Hours 15

Second Semester

Requirements Hours

MCB 462 - Integrative Neuroscience 3

Advanced Neuroscience elective 3

Advanced Neuroscience elective 3

General Education course 3

General Education course 3

Semester Hours 15

Total Hours: 120

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Upon successful completion of the Neuroscience undergraduate curriculum, students will be able to:

1. Understand and appreciate the diversity of life as it evolved over time by processes of mutation, selection and genetic change.
2. Illustrate that fundamental structural units define the function of all living things.
3. Explain that the growth, development, and behavior of organisms are activated through the expression of genetic information in context.
4. Summarize that living systems grow and change by processes based upon chemical transformation pathways and are governed by the laws of physics.
5. Illustrate that living systems are interconnected and interacting across scales of space and time.
6. Design a scientific process and employ the scientific method, demonstrating that neuroscience is evidence based and grounded in the formal practices of observation, experimentation, and hypothesis testing.
7. Execute quantitative analysis to interpret data.
8. Construct and utilize predictive models to study and describe complex systems.
9. Apply concepts from other sciences in order to interpret molecular and neural phenomena.
10. Communicate concepts of neuroscience to members of a diverse scientific community as well as to the general public.

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School of Molecular & Cellular Biology (<https://mcb.illinois.edu/undergrad/>)

School Faculty (<https://mcb.illinois.edu/people/>)
undergrad@mcb.illinois.edu

MCB advising (<https://mcb.illinois.edu/academics/undergraduate-programs/school-mcb-center-advising/>)
advising@mcb.illinois.edu

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

Overview of College Admissions & Requirements: Liberal Arts & Sciences
(<http://catalog.illinois.edu/schools/las/academic-units/>)