NEUROSCIENCE - BACHELOR OF ARTS (BA)

Our neuroscience major provides a fundamental understanding of brain function that emerges from knowledge of the interplay of the molecular, cellular and systems–level operation of the nervous system. Our distinguished faculty also teach excellent upper division courses in areas of expertise that include, but are not limited to, learning and memory, addiction, mental illness, stress, neuroendocrinology, neurogenetics and neurocircuits of motivated behavior.

Requirements

Prerequisites

It is policy to enforce the course prerequisites listed in the course descriptions. If a student has not either taken and passed (C- or better) the prerequisites for a course, or obtained permission from the instructor or a departmental advisor to take the course based on equivalent preparatory coursework or experience here or elsewhere, the student may be administratively dropped from the course.

Degree Requirements

The neuroscience major requires a minimum of 37 credit hours in neuroscience coursework, including a minimum of 21 upper-division credit hours, and additional ancillary foundation coursework in biology and chemistry. The ancillary courses provide an important foundation for the overall curriculum and should be started early in the major. The ancillary biology lecture requirement must be completed (with a grade of C- or better) to begin any NRSC coursework.

The department recommends taking the ancillary biology and genetics requirements in the first year. The department also recommends completing the ancillary general chemistry sequence, NRSC 2125, NRSC 2150 and NRSC 2200, and statistics requirements within the first 2.5 years (5 semesters) of study.

Students must complete the general requirements of the College of Arts and Sciences (General Education, graduation, and credit requirements) and the requirements listed below. Students must fulfill all the following requirements with a grade of C- or better. None of the courses taken to fill these requirements may be taken pass/fail; courses must be taken for a letter grade. The cumulative GPA in courses that can count toward the major must be at least 2.000.

Required Major Courses

Code	Title	Credit Hours
Required Major Courses		
NRSC 2125	Introduction to Neuroscience I: Foundations	4
NRSC 2150	Introduction to Neuroscience II: Systems	4
NRSC 2200	Laboratory Techniques in Neuroscience	2
Select one of the following genetics courses: [1]		3-4
MCDB 2150	Principles of Genetics (preferred)	
EBIO 2070	Genetics: Molecules to Populations	
Select one of the following statistics/computation courses:		3-4
PSYC 2111	Psychological Science I: Statistics (preferred)	
EBIO 1010	Introduction to Statistics and Quantitative Thinking for Biologists	
ECON 3818	Introduction to Statistics with Computer Applications	
IPHY 3280	Intro to Data Science and Biostatistics	
MATH 2510	Introduction to Statistics	
BCOR 1025	Statistical Analysis in Business	
CSCI 3022	Introduction to Data Science with Probability and Statistics	
SOCY 2061	Introduction to Social Statistics	
Upper-division Neuroscience Requirements		
MCDB 3135	Molecular Biology (one will count as an UD elective if both are taken)	3
or MCDB 3145	Cell Biology	
Select at least four of the following Neuroscience courses:		12
NRSC 4032	Neurobiology of Learning and Memory	
NRSC 4062	The Neurobiology of Stress	
NRSC 4545	Neurobiology of Addiction	
NRSC 4572	Developmental Neurobiology	
NRSC 4072	Clinical Neuroscience: A Clinical and Pathological Perspective	
NRSC 4082	Neural Circuits of Learning and Decision Making	
NRSC 4092	Behavioral Neuroendocrinology	
NRSC 4132	Neuropharmacology	
NRSC/MCDB 4420	Genetics of Brain and Behavior	
Upper-division major electives		
Select 6 credit hours of upper-division elective coursework by taking additional courses from the upper-division requirements above or from the following neuroscience and general science electives. [1]		6
BCHM 3300	Genetic Engineering: Science, Technology, and Society	
BCHM 3450	Principles of Pharmacology and Toxicology	
BCHM 4312	Quantitative Optical Imaging	
BCHM 4720	Metabolic Pathways and Human Disease	
BCHM 4611	Principles of Biochemistry	
BCHM 4631	Computational Genomics Lab	
EBIO 3240	Animal Behavior	
EBIO 4420	Computational Biology	
IPHY 3410	Human Anatomy	
IPHY 3430	Human Physiology	
IPHY 3590	Health and Function over the Adult Lifespan	
IPHY 4200	Physiological Genetics and Genomics	
IPHY 4580	Sleep Physiology	
IPHY 4720	Neurophysiology	
IPHY 4780	Sleep, Circadian Rhythms, and Health	
IPHY 4880	Advanced Data Analysis in Biomedical Research	
MCDB 3450	Biological Data Science	
MCDB 4312 or BCHM 4312	Quantitative Optical Imaging Quantitative Optical Imaging	

MCDB 4426	Cell Signaling and Developmental Regulation	
MCDB 4444	Cellular Basis of Disease	
MCDB 4680	Mechanisms of Aging	
MCDB 4777	Molecular Neurobiology	
NRSC 4011	Senior Thesis	
NRSC 4015	Affective Neuroscience	
NRSC 4042	Systems Neuroscience	
NRSC/PSYC 4155	Cognitive Neuroscience/ Neuropsychology	
NRSC 4561	Special Topics in Neuroscience	
PSYC 4152	Research Methods in Behavioral Genetics	
PSYC 4165	Psychology of Perception	
PSYC 4526	Social Neuroscience	
PSYC 4543	Clinical Neuropsychological Disorders	
SLHS 4576	Communication Neuroscience	
Total Credit Hours		**37-39**

Required Ancillary Foundation Courses

Code	Title	Credit Hours
Ancillary Introductory Biology and Laboratory Requirement		**4-5**
Select one of the two following:		
MCDB 1150	Introduction to Cellular and Molecular Biology (with 2 credit lab MCDB 1161, MCDB 1171, MCDB 1181/IPHY 1181, MCDB 2161, MCDB 2171)	
EBIO 1210 & EBIO 1230	General Biology 1 and General Biology Laboratory 1	
Ancillary General Chemistry Sequence Requirement		**10**
Select one of the following options:		
Option 1:		
CHEM 1113 & CHEM 1114	General Chemistry 1 and Laboratory in General Chemistry 1	
CHEM 1133 & CHEM 1134	General Chemistry 2 and Laboratory in General Chemistry 2	
Option 2:		
Biochemistry/Chemistry double majors and Engineering double degree students: Please check with your NRSC advisor for approved alternative options, including the "for-majors" CHEM courses.		
Total Credit Hours		**14-15**

1 Please check all prerequisites and corequisites before enrolling in courses.

2 Students planning graduate/medical school or work in the biotechnology industry should also take CHEM 3311 and CHEM 3331. Students should verify program requirements for any additional chemistry prerequisites.

Graduating in Four Years

Consult the Four-Year Guarantee Requirements for information on eligibility. The concept of "adequate progress" as it is used here only refers to maintaining eligibility for the four-year guarantee; it is not a requirement for the major.

To maintain adequate progress in neuroscience, students should meet the following requirements:

- The neuroscience major ideally should be started in the first semester. Adequate progress is defined as cumulative completion of at least one fourth of the required coursework for the major during each academic year, including the following specific requirements: a) The ancillary introduction to biology requirement and the genetics requirement ideally should be completed during the first year; b) All ancillary requirements and Introduction to Neuroscience I and II ideally should be completed by the end of the second year.
- The neuroscience major requires at least 51 hours of required coursework.
- The four-year guarantee also requires completion of 30 hours of General Education courses by the end of the sophomore year.

Recommended Four-Year Plan of Study

Through the required coursework for the major, students will complete all 12 credits of the Natural Sciences area of the Gen Ed Distribution Requirement, including the lab component, and possibly the QRMS component of the Gen Ed Skills Requirement.

Year One		
Fall Semester		**Credit Hours**
MCDB 1150	Introduction to Cellular and Molecular Biology	3
MCDB 1161 or MCDB 1171	From Dirt to DNA: Phage Genomics Laboratory I or Antibiotics Discovery Through Hands-on Screens I	2
MCDB 1152	Problem Solving Co-Seminar for Introduction to Molecular and Cellular Biology	1
NRSC 1020	Exploring the Neuroscience Major (OPTIONAL)	1
General Education Requirement (example: Lower-division Written Communication)		3
General Education Requirement (example: Arts & Humanities, Social Science)		3
Elective		3
	Credit Hours	**16**
Spring Semester		
Genetics (MCDB 2150 or EBIO 2070)		3-4
MCDB 2152	Problem Solving Co-Seminars for Genetics	1
CHEM 1021	Introductory Chemistry	4
General Education Requirement (example: Arts & Humanities, Social Science)		3
General Education Requirement (example: Arts & Humanities, Social Science)		3
	Credit Hours	**14-15**

Year Two		
Fall Semester		
CHEM 1113 & CHEM 1114	General Chemistry 1 and Laboratory in General Chemistry 1	5
NRSC 2125	Introduction to Neuroscience I: Foundations	4
General Education Requirement (example: Arts & Humanities, Social Science)		3
General Education Requirement (example: Diversity)		3
	Credit Hours	**15**
Spring Semester		
CHEM 1133 & CHEM 1134	General Chemistry 2 and Laboratory in General Chemistry 2	5
NRSC 2150	Introduction to Neuroscience II: Systems	4
General Education Requirement (example: Diversity)		3
General Education Requirement (example: Arts & Humanities, Social Science)		3
	Credit Hours	**15**
Year Three		
Fall Semester		
NRSC 2200	Laboratory Techniques in Neuroscience	2
MATH 2510	Introduction to Statistics	3
MCDB 3135 or MCDB 3145	Molecular Biology or Cell Biology	3
Upper-division Elective		3
Upper-division Elective		3
Elective (lower-division or upper-division)		1-3
	Credit Hours	**15-17**
Spring Semester		
Upper-division NRSC Core course		3
Upper-division NRSC Core course		3
General Education Requirement (example: Upper-division Written Communication)		3
Upper-division Elective		3
Upper-division Elective		3
	Credit Hours	**15**
Year Four		
Fall Semester		
Upper-division NRSC Core course		3
Upper-division NRSC Core course		3
Upper-division Elective		3
Upper division Elective		3
General Education Requirement (example: Arts & Humanities, Social Science)		3
	Credit Hours	**15**
Spring Semester		
Upper-division NRSC Elective		3
Upper-division NRSC Elective		3
Upper-division Elective		3
Elective (lower-division or upper-division)		3
	Credit Hours	**15**
	Total Credit Hours	**120-123**

Learning Outcomes

By the completion of the program, students will be able to:

- Demonstrate knowledge of the structural organization and functional components of the nervous system, including intracellular and intercellular signaling.
- Demonstrate understanding of the systems and circuits of the brain and nervous system that control specific functions.
- Demonstrate understanding of the important mechanistic relationship between nervous system function and health (physiological, neurological and psychological health).
- Read, evaluate and interpret primary literature in the neuroscience field.
- Design experiments, critically evaluate experimental design and analyze experimental data related to the neuroscience field.
- Effectively communicate information in the neuroscience field.