

NEUROSCIENCE (BS IN NEUROSCIENCE)

The Major

The Neuroscience program brings together scientists from diverse disciplines (biology, chemistry, mathematics, physiology, and psychology) to explore questions at every scale of nervous system organization: how the nervous system forms, develops, and carries out its remarkable range of functions; how the biology of neurons and glia, including ion channels, synapses, signaling cascades, and molecular machinery, supports nervous system activity; and how circuits and brain regions coordinate and change to produce perception, movement, learning, emotion, and complex behavior. The deliberately interdisciplinary curriculum provides a broad foundation in neuroscience, with opportunities to develop depth and specialization through advanced electives and original research with a faculty mentor. Students build the analytical and communication skills to read and critically evaluate primary research literature, design and interpret experiments, and apply ethical reasoning to research involving living systems. Many graduates pursue graduate or professional degrees in medicine, dentistry, pharmacy, or research-focused PhD programs in neuroscience, physiology, or pharmacology. The Neuroscience degree prepares students for careers in clinical or industrial research, and fields such as science writing, policy, consulting, and law. Majors planning on pursuing advanced degrees are strongly recommended to take two additional semesters of chemistry (with the associated laboratories) and biochemistry.

Major Declaration: Prospective majors in Neuroscience should discuss their plans for study with an affiliated faculty listed on the Neuroscience website by the end of the sophomore year.

Additional Eligible Courses for Neuroscience Major

In addition to NSCI courses, Neuroscience majors should consult the catalog for a complete list of courses satisfying Neuroscience major requirements that are offered by the following departments: Applied Science, Biology, Chemistry, Health Sciences, Mathematics, and Psychology. Students may petition and request permission from the Director of Neuroscience to count a particular course not listed if the course's relevance for the NSCI major can be demonstrated.

Minimum Credits Required: 51

The Neuroscience major requires at least 8 Introductory, 5 Core, and 4 Neuroscience Domain courses.

Course Requirements

Introductory Courses (21 credits)

Students who intend to major in neuroscience are encouraged to complete the following courses by the end of their sophomore year. Enrolling in the CHEM laboratories is highly encouraged.

Code	Title	Hours
BIOL 203	Introduction to Molecules, Cells, Development	3
BIOL 203L	Introduction to Molecules, Cells, Development Laboratory	1
BIOL 204	Introduction to Organisms, Ecology, Evolution	3
BIOL 204L	Introduction to Organisms, Ecology, Evolution Laboratory	1

CHEM 103	General Chemistry I	3
CHEM 206	Organic Chemistry I	3
MATH 111	Calculus I	4
or MATH 131	Calculus I for Life Sciences	
PSYC 201	Introduction to Psychology as a Natural Science	3

Core Major Requirements (18-19 credits)

Code	Title	Hours
BIOL 310	Molecular Cell Biology	3
NSCI 305	Exploring Neuroscience: Molecules, Cells, and Synapses	3
NSCI 306	Exploring Neuroscience: Brain Systems & Behavior	3
NSCI 351	Cellular Biophysics and Modeling (or APSC 351)	3

Statistics Requirement

Select one of the following:

PSYC 301	Elementary Statistics	4
HHP 300	Statistical and Data Analysis in Health Sciences	3
MATH 351	Probability and Statistics for Scientists	3
BIOL 327	Intro to Biostatistics	3-4

Major Writing Requirement

Students majoring in Neuroscience fulfill the major writing requirement by working with an individual faculty member, typically in a lecture or research course, and by achieving a C-. Neuroscience courses satisfying the writing requirement include many Neuroscience Domain Requirement courses including (but not limited to): APSC 440 Respiratory Neurobiology, APSC 450 Computational Neurosci, BIOL 460 Advanced Seminar in Biology (Molecular Neuroscience), BIOL 433 Developmental Biology, BIOL 442 Molecular Genetics, CHEM 417 Neurochemistry, HHP 420 Advanced Topics in Physiology (Physiology of Obesity), PSYC 302 Research Methods/Psy, PSYC 413 Research in Physiological Psychology, PSYC 415 Research in Animal Cognition, PSYC 417 Research in Sensation & Perception, NSCI 451 Mechanisms of Neurodegenerative Diseases, NSCI 490 Neuroscience Capstone, and NSCI 496 Honors. Other Courses with writing projects may also satisfy the requirement by enrolling in NSCI 300 Writing in the Neurosciences with Instructor Approval. COLL 400 may be satisfied in Neuroscience by passing any course with that attribute or pairing NSCI 490 Neuroscience Capstone with 3 credits of NSCI 400 taken with a single research mentor.

NSCI 490 may be combined with prior or concurrent NSCI 400 Research in Neuroscience credits.

Domain Requirements (4 Courses)

Neuroscience majors must take one course (and up to three) from Group A: Behavioral/ Cognitive Neuroscience domain and one course (and up to three) from Group B: Cell/Systems Neuroscience domain. The remaining 2 courses may be selected from any domain group (A, B, C or D), but a maximum of one D-group course is permitted. Neuroscience is highly interdisciplinary and courses from outside of the published catalog requirements may satisfy a major requirement domain with petition to and approval by the Director of Neuroscience.

Code	Title	Hours
Group A: Behavioral and Cognitive Neuroscience		
BIOL 410	Animal Behavior	3
NSCI 465	Special Topics in Neuroscience (Topic: Developmental Cognitive Neuroscience)	1-4
PSYC 315	Foundations of Learning and Memory	3

PSYC 317	Sensation and Perception	3
PSYC 441	Neuroscience of Musical Cognition	3
PSYC 445	Psychopharmacology	3
PSYC 447	Cognitive Neuroscience	3
PSYC 457	Plastic Brain	3
Group B: Cell/Systems Neuroscience		
APSC 377	Bioengineering and Synthetic Biology	3
APSC 440	Respiratory Neurobiology	3
APSC 450	Computational Neurosci	3
BIOL 433	Developmental Biology	3
BIOL 460	Advanced Seminar in Biology (Topic: Molecular Neuroscience)	3
CHEM 417	Neurochemistry	3
HHP 411	Cardiovascular Physiology	3
HHP 420	Advanced Topics in Physiology (Topic: Neuromuscular Physiology)	3
HHP 420	Advanced Topics in Physiology (Topic: Physiology of Obesity)	3
HHP 420	Advanced Topics in Physiology (Topic: Physiology of Sleep)	3
NSCI 451	Mechanisms of Neurodegenerative Diseases	3
NSCI 465	Special Topics in Neuroscience (Topic: Neurophysiology)	3
Group C: Research Methods		
NSCI 400	Research in Neuroscience (upon completion of 3 credits of research with the same instructor)	1-3
NSCI 496	Honors	3
PSYC 302	Research Methods/Psy	4
PSYC 411	Cognition and Thinking	4
PSYC 413	Research in Physiological Psychology	4
PSYC 417	Research in Sensation & Perception	4
PSYC 470	Topics in Psychology (Topic: Data Science for Psychology)	3
Group D: Other Neuroscience-Approved Electives		
BIOL 442	Molecular Genetics	3
HHP 411	Cardiovascular Physiology	3
HHP 430	Adv Topics in Nutrition	1-4