NEUROSCIENCE MAJOR (BSOS)

Program Director: Hilary Bierman, Ph.D.

The Neuroscience major is jointly offered by the Departments of Biology (https://academiccatalog.umd.edu/undergraduate/colleges-schools/computer-mathematical-natural-sciences/biology/) in the College of Computer, Mathematical, and Natural Sciences and Psychology (https://academiccatalog.umd.edu/undergraduate/colleges-schools/behavioral-social-sciences/psychology/) in the College of Behavioral and Social Sciences.

The Neuroscience major offers rigorous training in the interdisciplinary study of brain and behavior. Students complete a required set of NEUR courses as well as a supporting sequence of coursework in mathematics, biology, chemistry, physics, and psychology. Students then choose an upper-level specialization and coursework in (1) cellular, molecular, and physiological neuroscience or (2) behavioral and cognitive neuroscience. The Neuroscience major prepares students for a broad range of career paths including: scientific research, medicine, clinical psychology, allied health professions, or science-related government, nonprofit, or private sector employment.

Admission to the Major

The Neuroscience major is a Limited Enrollment Program. Information on limited enrollment programs can be found at: http://lep.umd.edu.

Transfer Admission Requirements
Students beyond their first semester and those off campus wishing to transfer are required to meet the following gateway criteria:

- Completion of MATH130, MATH135 or MATH140 with a minimum grade of C-
- Completion of BSCI170 AND BSCI171 and BSCI160 AND BSCI161 with a minimum grade of C-
- Completion of CHEM131 AND CHEM132 and CHEM231 AND CHEM232 with a minimum grade of C-

A minimum grade point average of 2.7 in all courses taken at the University of Maryland and all other institutions is required for internal and external transfer students.

Program Learning Outcomes

1. Demonstrate a knowledge base in the field of neuroscience and supporting disciplines.
2. Describe the current techniques and strategies in neuroscience research.
3. Demonstrate competence in scientific reasoning and critical thinking.
4. Demonstrate effective effective professional scientific communication skills.
5. Describe the role of neuroscience in social and cultural contexts as well as the influences of social and cultural context on neuroscience: understand the influences, current and potential, of neuroscience on other fields such as medicine, education, the arts, and the social sciences, recognize the relationships between scientific research and the culture(s) in which it is embedded, and understand and follow ethical practices in academic study, scientific research, and professional life. Students will be able to demonstrate how neuroscience research has been used to oppress and marginalize groups through history and how it might be used to mitigate disparities.
6. Demonstrate an appreciation of possible career paths available to students proficient in neuroscience.

REQUIREMENTS

Course	Title	Credits
NEUR Required Courses		
NEUR200	Introduction to Neuroscience	3
NEUR305	Neural Systems and Circuits	3
NEUR306	Cellular and Molecular Neuroscience	3
NEUR405	Neuroscience Laboratory	3
Required Supporting Courses		
MATH135	Discrete Mathematics for Life Sciences	4
or MATH140	Calculus I	
MATH136	Calculus for Life Sciences	4
or MATH141	Calculus II	
STATISTICS	BIOM301, EPIB315, PSYC200, STAT400, STAT464, or DATA400	3
BSCI170 & BSCI171	Principles of Molecular & Cellular Biology and Principles of Molecular & Cellular Biology Laboratory	4
BSCI160 & BSCI161	Principles of Ecology and Evolution and Principles of Ecology and Evolution Lab	4
CHEM131 & CHEM132	Chemistry I - Fundamentals of General Chemistry and General Chemistry I Laboratory	4
CHEM231 & CHEM232	Organic Chemistry I and Organic Chemistry Laboratory I	4
CHEM241 & CHEM242	Organic Chemistry II and Organic Chemistry Laboratory II	4
CHEM271 & CHEM272	General Chemistry and Energetics and General Bioanalytical Chemistry Laboratory	4
PHYS131	Fundamentals of Physics for Life Sciences I	4
or PHYS141	Principles of Physics	
or PHYS161	General Physics: Mechanics and Particle Dynamics	
PHYS132	Fundamentals of Physics for Life Sciences II [1]	4
or PHYS142	Principles of Physics	
or PHYS260	General Physics: Electricity, Magnetism and Thermodynamics	
PSYC100	Introduction to Psychology	3
Track Courses [2,3]		**16-20**
Complete at least 5 courses, including at least 3 courses from within one track and at least 1 lab course		
MOLECULAR, CELLULAR, AND PHYSIOLOGICAL TRACK [4]		
BCHM463	Biochemistry of Physiology	
or BCHM461	Biochemistry I	
BSCI222	Principles of Genetics	
or HLSC322	Principles of Genetics and Genomics	
BSCI330	Cell Biology and Physiology	
BSCI343	Cellular Mechanisms of Aging and Disease	
BSCI357	Neurobiology of Chemosensory Systems	
BSCI381	Molecular Neuroethology	
BSCI403	Biology of Vision	

BSCI410	Molecular Genetics
BSCI415	Molecular Genetics Laboratory
BSCI430	Developmental Biology
BSCI431	The Origin and Evolution of Nervous Systems
BSCI440	Mammalian Physiology
or BSCI450	Mammalian Systems Physiology
BSCI441	Mammalian Physiology Laboratory
or BSCI451	Mammalian Systems Physiology Laboratory
BSCI446	Advanced Systems Neuroscience
BSCI452	Diseases of the Nervous System
BSCI456	Advanced Cellular Neuroscience
KNES370	Motor Development
KNES462	Neural Basis of Human Movement
NEUR379	Special Topics: Research in Neuroscience
NEUR479	Advanced Research in Neuroscience (Neuroscience Research Lab; BSCI399(H, L) may be substituted with permission)
SPECIAL TOPICS: BSCI338, BSCI339, BSCI438 when specifically approved. Check with your advisor.	
BEHAVIORAL AND COGNITIVE TRACK [4]	
BSCI355	Neurobiology of Extraordinary Senses
BSCI360	Principles of Animal Behavior
BSCI401	Animal Communication
BSCI407	Behavioral Genetics
EDHD310	Your Brain on Education: The Neuroscience of Learning and Development
KNES385	Motor Control and Learning
KNES445	Exercise and Brain Health
PHIL202	Know Thyself: Wisdom Through Cognitive Science
PHIL366	Philosophy of Mind
PSYC300	Research Methods in Psychology Laboratory
PSYC302	Fundamentals of Learning and Behavior
PSYC307	Collective Behavior and Decision Making in Human and Animal Groups
PSYC310	Perception
PSYC341	Introduction to Memory and Cognition
PSYC403	Animal Behavior
PSYC404	Introduction to Behavioral Pharmacology
PSYC406	Neuroethology
PSYC407	Behavioral Neurobiology Laboratory
PSYC411	Introduction to Functional Magnetic Resonance Imaging
PSYC414	Science of Sleep and Biological Rhythms
PSYC417	Data Science for Psychology and Neuroscience Majors
PSYC431	Human and Animal Intelligence
PSYC442	Psychology of Language
PSYC489	Advanced Special Topics in Psychology
NEUR379	Special Topics: Research in Neuroscience
NEUR479	Advanced Research in Neuroscience (Neuroscience Research Lab; BSCI399(H, L) may be substituted with permission)
SPECIAL TOPICS: PSYC489, BSCI338, or BSCI339 when specifically approved. Check with your advisor.	
Total Credits	**74-78**

1 PHYS260 must be taken with PHYS261 to earn 4 credits

2 Three pre-approved Neuroscience Research credits can be applied to the major as one course equivalent. One a single Research course equivalent can be applied to the major.

3 Four pre-approved NEUR479 credits in the same faculty research laboratory can satisfy the lab requirement.

4 Courses may be occasionally added or removed from this list. Not all courses may be available each semester.

GRADUATION PLANS

Additional information on developing a graduation plan can be found on the following pages:

- http://4yearplans.umd.edu
- the Student Academic Success-Degree Completion Policy (https://academiccatalog.umd.edu/undergraduate/registration-academic-requirements-regulations/academic-advising/#success) section of this catalog

ADVISING

Advising for Neuroscience Majors

Students in the Neuroscience major have to complete mandatory advising every semester. Mandatory advising serves as consistent touch points throughout a student's undergraduate experience. Our advising office takes a holistic advising approach. Though our first priority is to guide students to achieve academic success and graduate from our major, advisors are available to discuss research, academic, and career interests, extracurricular involvement, as well as personal successes and challenges.

Students are assigned a Neuroscience Academic Advisor during their first semester in the major.

Student advising appointments are scheduled through TerpEngage (https://amp.umd.edu/terpengage/). For brief matters, majors can also utilize drop-in advising hours.

Additional information regarding advising for current Neuroscience majors can be found here ***(***https://neur.umd.edu/landing/Advising/***).***

Advising for Prospective Neuroscience Majors

Current UMD students that are interested in becoming Neuroscience majors are encouraged to visit our webpage, Advising for Prospective Internal Transfer Students (https://neur.umd.edu/advising/advising-prospective-internal-transfer-students/). We offer workshops to provide prospective students with advising support.

Currently, we are not able to provide advising appointments for external prospective majors (transfer students or incoming freshman). We encourage these students to visit our website (http://neur.umd.edu) and attend open house events (https://cmns.umd.edu/undergraduate/future-students/visit/).

Additional information regarding advising for prospective majors can be found here ***(***https://neur.umd.edu/landing/Advising/***).***