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-. Note that BSCI180 may substitute for BSCI171 or BSCI161.
- 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. Apply foundational knowledge of neuroscience to ask scientific questions.
2. Apply techniques and strategies in neuroscience research.
3. Explain complex neuroscience concepts and research to identified audiences in oral, written, and graphical formats.
4. Describe the role of neuroscience in social and cultural contexts as well as the influences of social and cultural context on 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	4
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
BSCI160	Principles of Ecology and Evolution	3
BSCI170	Principles of Molecular & Cellular Biology	3
BSCI180	Principles Biology Laboratory (BSCI161 and BSCI171 can count for BSCI180)	1
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 [5]	4
or MATH243	Introduction to Linear Algebra and Differential Equations	
CHEM271 & CHEM272	General Chemistry and Energetics and General Bioanalytical Chemistry Laboratory [5]	4
or MATH243	Introduction to Linear Algebra and Differential Equations	
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 a minimum of 15 credits, including at least 9 credits within your declared track, and at least one lab course. A maximum of 4 credits may be earned through approved electives below the 300-level. The track elective lab requirement must be met with a 300 or 400-level lab course.

MOLECULAR, CELLULAR, AND PHYSIOLOGICAL TRACK [4]		
BCHM463	Biochemistry of Physiology	
or BCHM461	Biochemistry I	
BSCI222	Principles of Genetics [6]	
or HLSC322	Principles of Genetics and Genomics	
BSCI331 & BSCI332	Cell Biology and Physiology and Cell Biology and Physiology Laboratory	
BSCI338	Special Topics in Biology (only specific versions)	
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
BSCI439	Undergraduate Advanced Selected Topics in Biology (only specific versions (letters))
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
BSCI453	Biology of Hearing
BSCI456	Advanced Cellular Neuroscience
KNES370	Motor Development
KNES462	Neural Basis of Human Movement
NEUR379	Special Topics: Research in Neuroscience (Three credits for NEUR379, 379H, 479, or 479 can count toward Track coursework. BSCI399(H, L) or PSYC489(H) may be substituted with permission.)
NEUR479	Advanced Research in Neuroscience (Three credits for NEUR379, 379H, 479, or 479 can count toward Track coursework. BSCI399(H, L) or PSYC489(H) 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
DATA110	Applications of R for Data Science [6]
DATA120	Python Programming for Data Science [6]
KNES385	Motor Control and Learning
KNES445	Exercise and Brain Health
MATH206	Introduction to Matlab [6]
MATH243	Introduction to Linear Algebra and Differential Equations (Can count as Track Course OR Required Supporting Course) [5]
PHIL202	Know Thyself: Wisdom Through Cognitive Science [6]
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
PSYC330	Child Psychopathology
PSYC341	Introduction to Memory and Cognition
PSYC353	Adult Psychopathology
PSYC355	Developmental Psychology
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, BSCI439 when specifically approved. Check with your advisor.	
Total Credits	**74-78**

1 PHYS260 must be taken with PHYS261 to earn 4 credits

2 A maximum of three pre-approved Neuroscience Research credits can be applied to the major. NEUR379(H) and NEUR479(H) credits do not count toward a specific track.

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.

5 MATH243 can be used either as a Track Course OR as a Required Supporting Course, in place of four 200-level CHEM credits.

6 A maximum of 4 credits of 100 or 200-level coursework can count toward Track coursework.

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/***).***