NEUROSCIENCE MAJOR (CMNS)

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 (formerly BSCI105) and BSCI160 AND BSCI161 (formerly BSCI106) 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 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
MATH140 Calculus I 4
MATH136 Calculus for Life Sciences 4
MATH141 Calculus II 4

STATISTICS
BIOM301, EPIB315, PSYC200, STAT400, STAT464, or DATA400 3

BSCI170 Principles of Molecular & Cellular Biology 4
BSCI171 Principles of Molecular & Cellular Biology Laboratory 4
BSCI160 Principles of Ecology and Evolution 4
BSCI161 Principles of Ecology and Evolution Lab 4
CHEM131 Chemistry I - Fundamentals of General Chemistry 4
CHEM132 General Chemistry and Energetics 4
CHEM231 Organic Chemistry I 4
CHEM232 Organic Chemistry Laboratory I 4
CHEM241 Organic Chemistry II 4
CHEM242 Organic Chemistry Laboratory II 4
CHEM271 General Bioanalytical Chemistry Laboratory 4
CHEM272 General Bioanalytical Chemistry Laboratory 4

PHYS131 Fundamentals of Physics for Life Sciences I 4
PHYS141 Principles of Physics 4
PHYS161 General Physics: Mechanics and Particle Dynamics 4
PHYS132 Fundamentals of Physics for Life Sciences II 4
PHYS142 Principles of Physics 4
PHYS260 General Physics: Electricity, Magnetism and Thermodynamics 4

PSYC100 Introduction to Psychology 3
UNIV100 The Student in the University (or equivalent) 1

Track Courses 2,3

MOLECULAR, CELLULAR, AND PHYSIOLOGICAL TRACK 4
BCHM463 Biochemistry of Physiology 4
BSCI222 Principles of Genetics 4
BSCI330 Cell Biology and Physiology 4
BSCI343 Cellular Mechanisms of Aging and Disease 4
BSCI357 Neurobiology of Chemosensory Systems 4

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 4
BSCI222 Principles of Genetics 4
BSCI330 Cell Biology and Physiology 4
BSCI343 Cellular Mechanisms of Aging and Disease 4
BSCI357 Neurobiology of Chemosensory Systems 4
BSCI381  Molecular Neuroethology  
BSCI402  
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  Neural Systems  
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: PSYC489 or BSCI339 when specifically approved. Check with your advisor.  

Total Credits  75-79

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

Click here (https://cmns.umd.edu/undergraduate/advising-academic-planning/academic-planning/four-year-plans/four-year-plans-gened/) for roadmaps for graduation plans in the College of Computer, Mathematical, and Natural Sciences.

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 a mandatory advising appointment every semester. Mandatory advising appointments serve as consistent touch points throughout a student’s undergraduate experience. Our advising office takes a holistic advising approach. Though our 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 Student (https://neur.umd.edu/advising/advising-prospective-internal-transfer-students/). This site provides necessary
requirements and directions for how to request a prospective major advising appointment.

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/).