NEUROSCIENCE MAJOR (CMNS)

Program Director: Hilary Bierman, Ph.D.

The Neuroscience major is jointly offered by the Departments of 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

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>NEUR200</td>
<td>Introduction to Neuroscience</td>
<td>3</td>
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<tr>
<td>NEUR305</td>
<td>Neural Systems and Circuits</td>
<td>3</td>
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<td>NEUR306</td>
<td>Cellular and Molecular Neuroscience</td>
<td>3</td>
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<td>NEUR405</td>
<td>Neuroscience Laboratory</td>
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<tr>
<td>MATH135</td>
<td>Discrete Mathematics for Life Sciences</td>
<td>4</td>
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<tr>
<td>or MATH140</td>
<td>Calculus I</td>
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<tr>
<td>MATH136</td>
<td>Calculus for Life Sciences</td>
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<tr>
<td>or MATH141</td>
<td>Calculus II</td>
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<tr>
<td>STATISTICS</td>
<td>BIOM301, EPIB315, PSYC220, STAT400, or STAT464</td>
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<tr>
<td>BSCI170 &amp; BSCI171</td>
<td>Principles of Molecular &amp; Cellular Biology and Principles of Molecular &amp; Cellular Biology Laboratory</td>
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<tr>
<td>BSCI160 &amp; BSCI161</td>
<td>Principles of Ecology and Evolution Lab</td>
<td>4</td>
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<td>CHEM131 &amp; CHEM132</td>
<td>Chemistry I - Fundamentals of General Chemistry and General Chemistry I Laboratory</td>
<td>4</td>
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<td>CHEM231</td>
<td>Organic Chemistry I</td>
<td>4</td>
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<tr>
<td>&amp; CHEM232</td>
<td>and Organic Chemistry Laboratory I</td>
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<tr>
<td>CHEM241</td>
<td>Organic Chemistry II</td>
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<tr>
<td>&amp; CHEM242</td>
<td>and Organic Chemistry Laboratory II</td>
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<tr>
<td>CHEM271</td>
<td>General Chemistry and Energetics</td>
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<tr>
<td>&amp; CHEM272</td>
<td>and General Bioanalytical Chemistry Laboratory</td>
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<tr>
<td>PHYS131</td>
<td>Fundamentals of Physics for Life Sciences I</td>
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<tr>
<td>or PHYS141</td>
<td>Principles of Physics</td>
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<tr>
<td>or PHYS161</td>
<td>General Physics: Mechanics and Particle Dynamics</td>
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<tr>
<td>PHYS132</td>
<td>Fundamentals of Physics for Life Sciences II</td>
<td>4</td>
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<tr>
<td>or PHYS142</td>
<td>Principles of Physics</td>
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<tr>
<td>or PHYS260</td>
<td>General Physics: Vibration, Waves, Heat, Electricity and Magnetism</td>
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<tr>
<td>PSYC100</td>
<td>Introduction to Psychology</td>
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<tr>
<td>UNIV100</td>
<td>The Student in the University (or equivalent)</td>
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Track Courses

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

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

BSCI402  Genomics of Sensory Systems
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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: BSCI338 or BSCI339 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
PSYC341  Introduction to Memory and Cognition
PSYC403  Animal Behavior
PSYC404  Introduction to Behavioral Pharmacology
PSYC406  Neuroethology
PSYC407  Behavioral Neurobioblogy Laboratory
PSYC411  Introduction to Functional Magnetic Resonance Imaging
PSYC414  Science of Sleep and Biological Rhythms
PSYC417  Data Science for Psychology and Neuroscience Majors
PSYC442  Psychology of Language
PSYC489  Advanced Special Topics in Psychology
PSYC455  Cognitive Development
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.

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.

FOUR-YEAR PLAN

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

Additional information on developing a four-year academic 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