

NEUROSCIENCE MAJOR (CMNS)

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: lep.umd.edu (<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 BSCI 105) and BSCI160 AND BSCI161 (formerly BSCI 106) 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. Develop a knowledge base in the field of neuroscience and supporting disciplines: understand the fundamental principles of neuroscience across all levels of analysis – molecular/cellular, circuits, systems, and behavior, understand the principles of evolution, especially as they apply to the nervous system and behavior, develop additional expertise and depth of knowledge in at least one area of neuroscience (molecular/cellular, circuits, systems, and behavior), and be able to address a question in neuroscience by integrating information from multiple levels of analysis
2. Understand the current techniques and strategies in neuroscience research: understand the theory and practice of important current neuroscience research techniques, along with their strengths and limitations, acquire laboratory experience through neuroscience courses or research, develop skills in data analysis using relevant quantitative and programming methods, and obtain training to work comfortably and successfully within a research team or equivalent experience
3. Develop competence in scientific reasoning and critical thinking: be able to critically evaluate scientific literature, including assessment of the problems addressed, methodology used (including statistical analyses), and conclusions drawn, demonstrate skill in innovative and integrative thinking and problem-solving, and demonstrate skill in experimental design and interpretation
4. Develop effective professional communication skills: demonstrate proficiency in clear, concise, and graceful writing, demonstrate proficiency with oral communication in a range of professional situations, and demonstrate proficiency in graphical presentation of information integrated into both written and oral presentations
5. Understand 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
6. Develop an appreciation of possible career paths available to students proficient in neuroscience: understand the activities, opportunities, and responsibilities of the individual scientist within the scientific community, recognize the range of career opportunities outside academia, and develop and, as far as possible, implement plans for career development

Requirements

Course	Title	Credits
NEUR Required Courses		
NEUR200	Introduction to Neuroscience ((GenEd: NS) Introduction to Neuroscience)	3
NEUR305	(Neuroscience Fundamentals I)	3
NEUR306	(Neuroscience Fundamentals II)	3
NEUR405	(Neurobiology Lab)	4
Required Supporting Courses		
MATH135 or MATH140	Discrete Mathematics for Life Sciences Calculus I	4
MATH136 or MATH141	Calculus for Life Sciences Calculus II	4
STATISTICS	BIOM301, EPIB300, PSYC200, STAT400, or STAT464	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 or PHYS141	Fundamentals of Physics for Life Sciences I Principles of Physics	4
PHYS132	Fundamentals of Physics for Life Sciences II	4

or PHYS142	Principles of Physics	
PSYC100	Introduction to Psychology	3
UNIV100	The Student in the University (or equivalent)	1
Concentration Courses ^{1,2}		16-20

Complete at least 5 courses, including at least 3 courses from within one concentration and at least 1 lab course

MOLECULAR, CELLULAR, AND PHYSIOLOGICAL CONCENTRATION ³

BCHM463	Biochemistry of Physiology
BSCI222	Principles of Genetics ⁴
BSCI330	Cell Biology and Physiology
BSCI339	Selected Topics in Biology (BSCI339D: Biology of Chemosensory Systems)
BSCI339	Selected Topics in Biology (BSCI339F: Neurophysiology of Cells and Circuits)
BSCI402	Genomics of Sensory Systems
BSCI403	Biology of Vision
BSCI410	Molecular Genetics
BSCI415	Molecular Genetics Laboratory
BSCI430	Developmental Biology
BSCI440 & BSCI441	Mammalian Physiology and Mammalian Physiology Laboratory
BSCI446	Neural Systems
BSCI452	Diseases of the Nervous System
KNES370	Motor Development
KNES462	Neural Basis of Human Movement
NEUR379	(Neuroscience Research: Molecular and Cellular)
NEUR479	(Neuroscience Research Lab; BSCI399(H, L) may be substituted with permission)
PSYC404	Introduction to Behavioral Pharmacology
SPECIAL TOPICS	BSCI338 or BSCI339 when specifically approved. Check with your advisor.

BEHAVIORAL AND COGNITIVE CONCENTRATION ³

BSCI222	Principles of Genetics ⁴
BSCI330	Cell Biology and Physiology
BSCI360	Principles of Animal Behavior
BSCI401	Animal Communication
BSCI446	Neural Systems
KNES385	Motor Control and Learning
KNES445	Exercise and Brain Health
NEUR379	(Neuroscience Research: Behavioral and Cognitive)
NEUR479	(Neuroscience Research Lab; BSCI399(H, L) may be substituted with permission)
PHIL202	Know Thyself: Wisdom Through Cognitive Science
PHIL366	Philosophy of Mind
PSYC302	Fundamentals of Learning and Behavior
PSYC341	Introduction to Memory and Cognition
PSYC402	Neural Systems and Behavior
PSYC403	Animal Behavior
PSYC404	Introduction to Behavioral Pharmacology
PSYC406	Neuroethology
PSYC407	Behavioral Neurobiology Laboratory
PSYC413	

PSYC414	Science of Sleep and Biological Rhythms
PSYC442	Psychology of Language
PSYC455	Cognitive Development
PSYC489	Advanced Special Topics in Psychology (PSYC489G: Hormones & Behavior)
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Total Credits	76-80

- ¹ Up to 3 pre-approved Neuroscience Research credits can be applied to the major.
- ² 4 pre-approved NEUR479 credits in the same faculty research laboratory can satisfy the lab requirement.
- ³ Courses may be occasionally added or removed from this list. Not all courses may be available each semester.
- ⁴ Students may not use both ANSC327 and BSCI222 toward filling Neuroscience concentration requirements.

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:

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