

## Neuroscience

PROFESSOR **Burk** (Psychology), Director. PROFESSOR **Griffin** (Biology), Associate Director. PROFESSOR **Porter** (Psychology), Program Administrator

Affiliated Faculty: **Del Negro, Smith** (Applied Science), **Allison, Bradley, Heideman, Saha, Shakes** (Biology), **Coleman** (Chemistry), **Deschenes, Looft-Wilson** (Kinesiology and Health Sciences), **Barnet, Dickter, Forestell, Hunt, Kieffaber, Stevens, Vishton** (Psychology)

### The Major

Our program brings together scientists from diverse disciplines committed to teaching and research aimed at understanding the mind, brain, and functions of the nervous system. Neuroscience encompasses multiple levels of biological organization ranging from molecular mechanisms of cellular physiology to complex behavior and cognitive processing. This comprehensive understanding includes comparative, evolutionary, and computational approaches to the neuroscience of human personality, society, and disease.

Neuroscience is a formalized program within the interdisciplinary studies major. Students wishing to declare their major in Neuroscience should contact Professor Porter in the Psychology Department for advising.

### Program Objectives:

- To provide all of our students with a broad based understanding of the neurosciences, with the opportunity to focus their studies in advanced topics.
- To prepare students for advanced study at the graduate and professional level, including cellular and molecular physiology, cognitive and behavioral neuroscience, and the biomedical fields.
- To promote student engagement in original and independent research.
- To foster interdisciplinary approaches to problem solving through a diverse faculty, the curriculum, symposia, and additional neuroscience-related events.

### For success in the Neuroscience Program a student must:

1. Achieve a high level of performance in introductory coursework in biology, chemistry, mathematics, psychology, and physics.
2. Demonstrate mastery of the concepts in required coursework and their interdisciplinary application to neuroscience.
3. Develop a clear focus in elective coursework and research experience in collaboration with a faculty advisor/mentor.

Students who have successfully completed this program are prepared for graduate study, careers in academic and biomedical research, medicine, and health care related fields.

### Requirements for Major

**Required Credit Hours:** A minimum of 38 (plus 28 credit hours in prerequisites). Alterations in the prescribed curriculum, while not encouraged, may be petitioned to the Committee on Honors and Interdisciplinary Studies. The major writing requirement is satisfied by passing NSCI 300 Writing in the Neurosciences.

### Prerequisite Courses

CREDITS	COURSE
4	BIOL 220/221 Introduction to Organisms, Ecology and Evolution
4	BIOL 225/226 Introduction to Molecules, Cells and Development
3	CHEM 103 General Chemistry I
3	CHEM 206 Organic Chemistry I

4	MATH 111 or 131 Calculus I
4	MATH 112 or 132 Calculus II
3	PSYC 201 Introduction to Psychology as a Natural Science
3	PSYC 301 Elementary Statistics, MATH 106 Elementary Probability and Statistics, or KINE 394 Statistics and Evaluation

### Required Courses

CREDITS	COURSE
3	APSC 351 Cellular Biophysics and Modeling (*Calculus II is a pre- or co-requisite for this course)
3	BIOL 310 Molecular Cell Biology
3	BIOL 345 Neurobiology
3	CHEM 307 or 209 Organic Chemistry II
3	CHEM 308 General Chemistry II, 305 Inorganic Chemistry, or 335 Principles of Inorganic Chemistry
4	PHYS101 or 107 General Physics I
4	PHYS102 or 108 General Physics II
3	PSYC 313 Physiological Psychology

A major must also complete at least four additional courses. At least one course must be chosen from the Behavioral Neuroscience group and at least one course must be chosen from the Cell/ Systems Neuroscience group (see below). One of the remaining two electives may be satisfied with an undergraduate research experience (NSCI 400) for at least 3 credits. Research counting as an elective in the program must be conducted under the supervision of a Neuroscience affiliated faculty member.

### Behavioral Neuroscience Courses

CREDITS	COURSE
3	BIOL 410 Animal Behavior
4	PSYC 302 Experimental Methods
3	PSYC 311 Cognitive Psychology
3	PSYC 315 Foundations of Learning and Memory
3	PSYC 317 Sensation and Perception
3	PSYC 319 Cognitive Science
4	PSYC 413 Research in Physiological Psychology
4	PSYC 415 Research in Animal Cognition
3	PSYC 445 Psychopharmacology
3	PSYC 447 Cognitive Neuroscience

### Cell/Systems Neuroscience Courses

CREDITS	COURSE
3	APSC 431 Applied Cellular Neuroscience
3	APSC 432 Applied Systems Neuroscience
3	BIOL 415 General Endocrinology
4	BIOL 432 Principles of Animal Physiology
3	BIOL 433 Developmental Biology
3	BIOL 442 Molecular Genetics
4	BIOL 447 Neurophysiology
3	CHEM 417 Neurochemistry
3	KINE 450 Cardiovascular Physiology
3	KINE 485 Cellular and Biochemical Effects of Exercise

**300. Writing in the Neurosciences.**

*Fall and Spring (0 credits)*

Students majoring in Neuroscience fulfill the major writing requirement by working with an individual faculty member, typically in a lecture or research course. Lecture courses that offer sections of NSCI 300 are PSYC 302, PSYC 413, PSYC 415, BIOL 433, BIOL 442 and CHEM 417. Declared majors should discuss the writing requirement with a faculty member during the first two weeks of the semester during which they would like to fulfill this requirement. Once accepted by a faculty member, the student will be given permission to enroll in the proper section of NSCI 300 by the faculty member. Students must register for this course during the add/drop period.

**400. Research in Neuroscience.**

*Fall and Spring (1-3, 1-3)*

Students will gain hands-on experience with Neuroscience research by working in a Neuroscience faculty member's laboratory. May be repeated for credit. Neuroscience students attaining a total of 3 credit hours can use this course to fulfill one of their electives. Hours to be arranged.

**495-496. Honors in Neuroscience.**

*Fall, Spring (3,3)*

Neuroscience Honors students complete empirically-based research projects that are conducted under the supervision of a Neuroscience faculty member. Intention to pursue honors must be filed with the Charles Center no later than the first day of classes of the semester in which the student will begin their thesis. This is usually the fall semester of their senior year (two semesters before graduation). In order to graduate with a degree with Honors in Neuroscience a student must (a) complete a written thesis that will be submitted to the honors examination committee at least two weeks before the last day of classes and (b) pass, with satisfactory performance, a comprehensive oral examination. For College provisions governing admission to Honors, see the catalog section titled Honors and Special Programs. For additional requirements see the Neuroscience website.

Please visit the Program website for further information and updates.  
<http://www.wm.edu/as/neuroscience>.