## Neuroscience and Behavior Major

### Admission to the Major

One or more of the foundation courses in biology (Biol181, Biol182) are
prerequisites for the advanced NS&B courses offered by the Biology Department.
Although not legislated as prerequisites, NS&B213 and NS&B laboratory courses
provide important conceptual and practical background for independent
research in the junior and senior years. The ideal course sequence would include
Biol181 and Biol182 along with chemistry in the first year. In the sophomore
year, one would take NS&B213. The other required courses and research
tutorials would be spread out over the last two years. For information on the
pathway through the major, please visit wesleyan.edu/nxb/pathways.html
(http://www.wesleyan.edu/nxb/pathways.html) for further information.

To be admitted to the major during March of the sophomore year, a student
must have completed, with grades of C- or better, at least two of the full-credit
courses listed in foundation and core courses that follow. At least one of these
credits must be either NS&B213 or Biol181.

### Foundation Requirements

#### Foundation Courses

- **Biol181** Principles of Biology I
- **Biol191** Principles of Biology I-Laboratory
- **Biol182** Principles of Biology II
- **Biol192** Principles of Biology II-Laboratory
- **Chem141/CheM142** Introductory Chemistry I/II or Chem143/CheM144 Principles of Chemistry I/II
- **Chem251/CheM252** Principles of Organic Chemistry I/II
- Two additional courses from the following (beginning with the graduating
class of 2016):
  - Physics (Phys111 or Phys112 or Phys113 or Phys116)
  - Psychology (Psyc105)
  - Mathematics (Math117 or higher); and/or
  - Computer science (Comp112 or higher)

#### Core Course

- **NS&B213** Behavioral Neurobiology

### Advanced Courses

Five advanced courses from the following list are required for students; two
must be cross-listed with biology; two cross-listed with psychology; and one, a
research tutorial or methodological course. Some courses appear in both Biology
and Psychology lists but may be counted only once, in either category.

#### Cross-listed with biology

- **NS&B224** Hormones, Brain, and Behavior
- **NS&B239** Functional Anatomy of the Human Brain*
- **NS&B245** Cellular Neurophysiology

- **NS&B252** Cell Biology of the Neuron
- **NS&B254** Comparative Animal Behavior
- **NS&B299** Waves, Brains, and Music
- **NS&B303** Receptors, Channels, and Pumps: Advanced Topics in Membrane
  Protein Structure and Function
- **NS&B317** Neuroethics
- **Chem323/NS&B323** Biochemistry of Neurodegenerative Disease
- **NS&B325** Stem Cells: Basic Biology to Clinical Application
- **NS&B328** Chemical Senses
- **NS&B343** Muscle and Nerve Development
- **NS&B345** Developmental Neurobiology
- **NS&B347** Mammalian Cortical Circuits
- **NS&B351** Neurobiology of Learning and Memory
- **NS&B357** (https://owaprod-pub.wesleyan.edu/reg/!wesmaps_page.html?
  studid= &facid=NONE &crse=015539 &term=1199) Sex and Gender: From
  Synapse to Society
- **NS&B353** Neurobiology of Neurological Disorders*
- **NS&B356** Neurodevelopmental Disorders*
- **NS&B360** Neuroplasticity: How Experience Changes the Brain

#### Cross-listed with psychology

- **NS&B220** Cognitive Psychology
- **NS&B221** Human Memory
- **NS&B222** Sensation and Perception
- **NS&B225** Cognitive Neuroscience
- **NS&B227** Motivation and Reward
- **NS&B228** Clinical Neuropsychology
- **NS&B239** Functional Anatomy of the Human Brain*
- **NS&B316** Schizophrenia and Its Treatment: Neuroscientific, Historical, and
  Phenomenological Perspectives
- **NS&B317** Neuroethics
- **NS&B329** Neural Costs of War
- **NS&B341** Psychology of Learning and Memory
- **NS&B342** Music Perception and Cognition
- **NS&B348** Origins of Knowledge
- **NS&B353** Neurobiology of Neurological Disorders*
- **NS&B356** Neurodevelopmental Disorders*

#### Research Methods and Practica

- **Biol320** Quantitative Methods for the Biological and Environmental Sciences
- **Math132** Elementary Statistics
- **NS&B210** Research Methods in Cognition
- **NS&B215** Research Methods: Behavioral Methods in Animal Research
- **NS&B243** Neurohistology
- **NS&B247** Laboratory in Neurophysiology
- **NS&B250** Laboratory in Cellular and Behavioral Neurobiology
- **NS&B260** Applied Data Analysis
- **NS&B363** Advanced Research in Auditory Cognitive Neuroscience
- **NS&B390** Lab in Gambling, Drugs, and Junk Food
**STUDENT LEARNING GOALS**

Our program offers a curriculum that encourages fluency across multiple disciplines in the field of neuroscience and behavior. Immersion in this field requires thinking across multiple levels of analysis and an appreciation for how complex and broad questions can be made amenable to scientific inquiry. In terms of goals, we have three areas of knowledge that we expect all students to acquire by the time they have completed the NS&B major:

- **Structure:** The parts and how they connect. Structural knowledge includes neural development, neuroanatomy, neurotransmitters, and the cell and molecular biology of the neuron.
- **Function:** How the parts come together to produce systems. Such systems include various sensory, motor, and neuroendocrine systems. Knowledge concerning function is gained by studies of structures and studies of perception, learning and memory, behavior, and cognition.
- **Theory:** Governing principles that can be proposed from all the above. Examples of theories include those that address the relationships between brain and behavior, articulate how brain structure and function changes over time, and explain cognitive and perceptual processes.

In addition, it is our goal that all students can skillfully apply and analyze knowledge gained from their studies. Statistics courses, lab-based methods courses, and/or direct experience in research projects serve this goal.

**ADVANCED PLACEMENT**

AP credit may be used to place out of any of the foundation courses, subject to the guidelines of the department hosting these courses.

**PRIZES**

George H. Acheson and Grass Foundation Prize in Neuroscience: Established in 1992 by a gift from the Grass Foundation, this prize is awarded to an outstanding undergraduate in the Neuroscience and Behavior Program who demonstrates excellence in the program and who also shows promise for future contributions in the field of neuroscience.

**BA/MA PROGRAM**

This program provides an attractive option for science majors to enrich their course and research background. Students are advised to begin research by their junior year if they intend to pursue the BA/MA. Admission is competitive and based on GPA, faculty recommendations, and research experience. For more information, please visit [https://catalog.wesleyan.edu/departments/nsb/index.html](https://catalog.wesleyan.edu/departments/nsb/index.html) and the Graduate Studies page: [http://wesleyan.edu/grad/degree-programs/bama.html](http://wesleyan.edu/grad/degree-programs/bama.html).

**ADDITIONAL INFORMATION**

- **Teaching apprenticeships.** Students may be appointed teaching apprentices with the approval of the participating faculty member and the Office of Academic Affairs. The apprenticeship position involves assisting a faculty member in the teaching of a course. Concurrently, the apprentice enrolls in an apprenticeship tutorial (NS&B491/NS&B492) that is usually a one-credit course and operates in either the graded or credit/no credit mode.
- **Petitioning for exemptions.** A student may request a variance from the requirements of the major or for honors by submitting a written petition to the chair of the program. The petition should indicate why the requirement cannot be met and the educational justification for the alternative. The petition will be considered by the NS&B faculty, and the student will receive a statement of the decision by letter.
- **Seminars.** The program periodically invites neuroscientists from outside Wesleyan to come here and describe their research. These seminars frequently complement course material and give students the opportunity to interact with noted researchers. The talks are usually scheduled for noon on Thursdays. Students are encouraged to attend.

**HONORS**

To be considered for honors, a student must be an NS&B major and have a B average (grade average 85) in the courses credited to the major. The student
must submit a laboratory research thesis that was supervised by a member of the NS&B faculty and be recommended for honors by the NS&B faculty.