NEUROSCIENCE & BEHAVIOR

415P Milbank
212-851-9943
Program Administrator, Michele Miozzo

Mission

The Neuroscience and Behavior major provides a strong background in the neural underpinnings of behavior and cognition. It is intended for students who plan to pursue a research career in neuroscience or a related discipline. Students electing this major are exposed to basic courses in biology, psychology and statistics, and to advanced courses in neuroscience and behavior.

All majors engage in two semesters of independent research during the senior year while taking the Senior Research Seminar. In the junior year, majors must begin developing a plan for the senior research project.

Student Learning Goals

Students graduating with a major in Neuroscience and Behavior should be able to attain the following outcomes:

- acquire a strong intellectual foundation in neuroscience
- develop competence in the interpretation and evaluation of neuroscience research
- understand the role of experimentation in neuroscience
- learn basic methods of experimental design and hypothesis testing
- acquire effective oral presentation skills
- demonstrate a capability to write a scientific paper
- understand statistical approaches to data analysis.

Student Learning Outcomes

Upon successfully completing the major, students should have the ability to

- discuss neuroscience phenomena from many different levels of organization (e.g., explain how the destruction of myelin in people with multiple sclerosis leads to cognitive and motor deficits);
- describe the basic features of nervous system development, organization, signaling, integration, and higher-level processing;
- explain the neural basis of sensory-motor integration, learning and the generation of complex behaviors;
- conceive of, implement, and present an original research project;
- generate a testable hypothesis and develop a controlled experimental design;
- perform modern scientific measurement techniques;
- write an original research paper.

As an alternative to the Neuroscience and Behavior major, students may pursue an interdisciplinary program by majoring in either Biology or Psychology and taking a minor in the other discipline.

Core Faculty: Rae Silver (Chair), Kara Pham (Departmental Representative), Peter Balsam, Elizabeth Bauer, Maria de la Paz Fernandez, John Glendinning, Russell Romeo, Alex White

The Barnard Neuroscience and Behavior (NSBV) Department, founded in July 2019, offers a "new curriculum" to all **students** who entered in **Fall 2019 and thereafter**. Students who **entered in Fall 2018** had options that were determined individually by the courses they have taken and their interests. Students who entered **in Fall 2017 or earlier** follow the "old curriculum" established under the rubric of the Neuroscience Program.

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The New Curriculum

The new NSBV curriculum requires the completion of a minimum of 13 courses (5 core neuroscience courses; 3 introductory courses from cognate disciplines; 3 elective courses; a year-long research seminar counting as 2 courses) and a senior thesis. All NSBV majors must take 5 core neuroscience courses that provide foundational knowledge and laboratory training. No more than 2/5 core neuroscience courses can be taken outside the NSBV Department, including Columbia University or other institutions. For many courses, NSBV majors have multiple options. Reflecting the interdisciplinary nature of our discipline, students can select introductory and elective courses offered in other departments either at Barnard or Columbia. Furthermore, students have the option of selecting elective courses in one suggested track – cognitive/behavioral, computational, or molecular.

Five Core Neuroscience Courses	
NSBV BC1001	INTRODUCTION TO NEUROSCIENCE
NSBV BC2001	Laboratory in Neuroscience
NSBV BC3001	SYSTEMS AND BEHAVIORAL NEUROSCIENCE
BIOL BC3362	MOLECULAR # CELLULAR NEUROSCIENCE
NSBV BC2002	Statistics and Experimental Design
Three Introductory Courses from Other Disciplines	
One course must be Introduction to Cellular and Molecular Biology (BIOL BC1502 + lab BIOL BC1503); the other courses (1lect; 1lect+lab) from cognate disciplines (Biology, Chemistry, Computer Science, Physics, or Psychology)	
Senior Research Seminar	
NSBV BC3593	Senior Research Seminar: Neuroscience and Behavior
NSBV BC3594	Senior Research Seminar: Neuroscience and Behavior
Three Elective Courses	

Approved electives are listed on the department webpage. One elective course must be a 3000-level seminar.

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The Old Curriculum

To elect the NSBV major under the old curriculum, a student must have earned:

- an average grade of B- or better in BIOL BC1500+1501 & 1502+1503
- an average grade of B- or better in CHEM BC2001 & 3230+3328
- B- or better in PSYC BC1001

NSBV majors are required to complete a **senior thesis** and the courses listed below.

(a) **Molecular & Cellular Neuroscience** (BIOL BC3362) and **Systems & Behavioral Neuroscience** (PSYC BC2119) (one with lab)

(b) **one statistics course** (e.g., Statics, PSYCH BC BC1101)

(c) **two elective courses** (approved electives are listed on the department webpage)

(d) **Senior Research Seminar: Neuroscience and Behavior** (NSBV BC3593 and NSBV BC3594)

Majors must choose one of two areas of concentration: **Behavioral or Cellular**. The Behavioral concentration places greater emphasis on behavioral and systems neuroscience. The Cellular concentration places greater emphasis on cellular and molecular neuroscience. Students who chose the Behavioral concentration must take (a) Psychology of Learning (Lec+lab, PSYCH BC2106 & 2107) and (b) Animal Behavior (BIOL BC2280). Required courses for the Cellular concentration are: (a) Mendelian & Molecular Genetics (BIOL BC2100), (b) Cell Biology (BIOL BC3310), and (c) one lab (see list on the department page).

Fall 2021

NSBV BC1001	INTRODUCTION TO NEUROSCIENCE
NSBV BC2001	Laboratory in Neuroscience
NSBV BC3376	Psychobiology of Infant Development
NSBV BC3381	Visual Neuroscience: From the Eyeball to the Mind's Eye
NSBV BC3387	Topics in Neuroethics
NSBV BC3593	Senior Research Seminar: Neuroscience and Behavior
NSBV BC3099	INDEPENDENT STUDY

Spring 2022

NSBV BC1001	INTRODUCTION TO NEUROSCIENCE
NSBV BC2001	Laboratory in Neuroscience
NSBV BC3594	Senior Research Seminar: Neuroscience and Behavior
NSBV BC2154	Hormones and Behavior
NSBV BC2002	Statistics and Experimental Design
NSBV BC3398	Psychobiology of Sleep
NSBV BC3099	INDEPENDENT STUDY

Past Courses

(Courses not offered in 2021-2022 academic year)

NSBV BC3367	Transformative Landmarks in Neuroscience
NSBV BC3383	Neuropharmacology and Behavior
NSBV BC3394	Neurobiology of Social Behaviors
NSBV BC3377	Adolescent Neurobehavioral Development
NSBV BC3392	Psychobiology of Stress