NEUROSCIENCE AND BEHAVIOR MAJOR (B.S.)

https://cola.unh.edu/psychology/program/bs/neuroscience-behavior-major

Description

The major in neuroscience and behavior (NSB) offers an interdisciplinary approach to human and non-human behavior, focusing on the evolution and adaptiveness of certain behaviors, as well as their underlying neural mechanisms. Students who have always been fascinated by how the brain functions will be well served by this major, as will those who love wild animals and wish to better understand their behavior. The B.S. in neuroscience and behavior is based on a solid foundation in biology, chemistry, physics, statistics, and genetics (foundation courses). These are followed by a two-semester course sequence that covers the fundamentals of neuroscience and behavior. Students can then pick five or more electives focusing on areas of interest.

NSB students are encouraged to take advantage of research experiences in the laboratories of the psychology and biology faculty in the program. This provides valuable experience with cutting-edge equipment and techniques. Some students may share aspects of a larger project, whereas others may be relatively independent and design their own project under supervision. In either case, important skills are gained by the discipline of gathering data, analyzing and interpreting it, and presenting it to a broader audience.

The curriculum provides most of the requirements and recommended courses for students seeking admission to graduate school and to professional schools in medicine and veterinary medicine. Students who might choose not to go on to advanced degrees are well-prepared for employment as skilled technicians in research laboratories or, if their interests are in animal behavior, as field research assistants or animal trainers. With additional courses in education, the B.S. in NSB also qualifies graduates to teach at the elementary, junior high, and high school levels.

Faculty participating in the NSB major combine a love of teaching and student mentoring with a passion for research, and encourage student participation. Research facilities that students can use include the Integrative Animal Behavior and Ecoacoustics laboratory, the confocal imaging center, the Hubbard Center for Genomic Studies, and the many marine, freshwater, and estuarine laboratories associated with UNH programs. Students can also take summer courses at the Shoals Marine Laboratory.

Requirements

Students majoring in NSB are required to take foundation courses in basic science, core courses, and five electives from an extensive list of courses, including some offered by other departments including biochemistry, molecular and cellular biology, and natural resources. Minimum grade of D- or better is required in CHEM 403, CHEM 404, CHEM 545/CHEM 546, and PHYS 401; minimum grade of C- or better is required in all other courses. Finally, a capstone experience is required. This may be independent research, an advanced seminar, or other special student activity. It is meant to integrate prior experience and take the student to a new level in an area of special interest.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>NSB 400</td>
<td>Topics Neuroscience &amp; Behavior</td>
<td>1</td>
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<tr>
<td>BIOL 411</td>
<td>Introductory Biology Molecular and Cellular</td>
<td>8</td>
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<tr>
<td>&amp; BIOL 412</td>
<td>and Introductory Biology: Evolution, Biodiversity and Ecology (2 semesters)</td>
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<tr>
<td>CHEM 403</td>
<td>General Chemistry I</td>
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<tr>
<td>&amp; CHEM 404</td>
<td>and General Chemistry II (2 semesters)</td>
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<tr>
<td>CHEM 545</td>
<td>Organic Chemistry</td>
<td>5</td>
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<tr>
<td>&amp; CHEM 546</td>
<td>and Organic Chemistry Laboratory</td>
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<tr>
<td>BMCB 658</td>
<td>General Biochemistry</td>
<td>5</td>
</tr>
<tr>
<td>&amp; BMCB 659</td>
<td>and General Biochemistry Lab</td>
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<tr>
<td>PHYS 401</td>
<td>Introduction to Physics I</td>
<td>4</td>
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<tr>
<td>&amp; PSYC 402</td>
<td>Statistics in Psychology</td>
<td>4</td>
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<tr>
<td>or BIOL 528</td>
<td>Applied Biostatistics I</td>
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<tr>
<td>GEN 604</td>
<td>Principles of Genetics</td>
<td>4</td>
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<tr>
<td>NSB 500</td>
<td>Fundamentals of Neuroscience and Behavior I</td>
<td>5</td>
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<tr>
<td>&amp; NSB 501</td>
<td>and Fundamentals of Neuroscience and Behavior II Laboratory</td>
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<tr>
<td>NSB 502</td>
<td>Fundamentals of Neuroscience and Behavior II Systems Neuroscience</td>
<td>5</td>
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<tr>
<td>&amp; NSB 503</td>
<td>and Fundamentals of Neuroscience and Behavior II Laboratory</td>
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Electives (Choose 5) 20-22

- BIOL 541 | Ecology |
- BIOL 675 | Medical Botany |
- BIOL 714 | Model Organisms in Biological and Medical Research |
- BMCB 605 | Principles of Cell Biology |
- BMCB 760 | Pharmacology |
- BMS 507 | Human Anatomy and Physiology I |
& BMS 508 | and Human Anatomy and Physiology II |
- BMS 702 | Endocrinology |
- BMS 711 | Toxicology |
- BMS 718 | Mammalian Physiology |
- GEN 706 | Human Genetics |
- KIN 706 | Neurology |
& KIN 707 | and Neurology Lab |
- MEFB 714 | Field Animal Behavior (SML, C) |
- NSB 705 | Molecular and Cellular Neurobiology (C) |
- NSB 727 | Animal Communication (C) |
- NSB 728 | Research Methods in Animal Behavior (C) |
- PHIL 520 | Neuroscience and Philosophy |
- PSYC 511 | Sensation and Perception |
- PSYC 512 | Psychology of Primates |
- PSYC 513 | Cognitive Psychology |
- PSYC 521 | Behavior Analysis |
- PSYC 710 | Visual Perception (C) |
- PSYC 716 | Cognitive Neuroscience (C) |
- PSYC 720 | Animal Cognition (C) |
- PSYC 731 | Brain and Behavior (C) |
- PSYC 733 | Drugs and Behavior (C) |
- PSYC 735 | Neurobiology of Mood Disorders (C) |
- PSYC 736 | Attention Disorders (C) |
- PSYC 737 | Behavioral Medicine (C) |
- ZOOL 613 | Animal Behavior |
- PSYC 747W | Special Topics Neuroscience of Memory, Behavioral Neuroscience, Science of Daydreaming (C) |
- ZOOL 625 | Principles of Animal Physiology |
& ZOOL 626 | and Animal Physiology Laboratory (C) |
- ZOOL 690 | Evolution |
- ZOOL 726 | Conservation Behavior (C) |
- ZOOL 733 | Behavioral Ecology (C) |
- ZOOL 736 | Genes and Behavior (C) |
- ZOOL 777 | Neuroethology (C) |

Capstone

- 795/796 or 799 Independent Study, (C)

Both must be taken to count as one of the 5 required major electives

Total Credits 69-71
Neuroscience and Behavior Major (B.S.)

1. One experience totaling at least 4 credits, but can be earned over the course of two consecutive semesters provided the experience is with the same research mentor. Can only substitute for one elective.

2. Courses that are eligible to fulfill the Capstone requirement are indicated with a (C) and must be taken senior year. You can: 1) designate a course as a Capstone course, with additional requirements as determined by the instructor; 2) complete one semester of Capstone Research (BIOL 795, PSYC 795, or INCO 790); 3) do an honors thesis in Neuroscience and Behavior (NSB 799H) or Biology or Psychology (BIOL 799 or PSYC 797/PSYC 799) or; 4) participate in an alternative activity with approval from the student’s academic advisor.

3. NSB majors may use BIOL 411, BIOL 412, CHEM 403, CHEM 404, PHYS 401, PHYS 407 and either PSYC 402 or BIOL 528 to fulfill the Biological Sciences, Physical Sciences, Discovery Lab, and Quantitative Reasoning Discovery requirements. Students transferring into the NSB program from other UNH majors must hold a cumulative GPA of at least 3.2 at the time of requested major change.

**Student Learning Outcomes**

Students demonstrate that they understand basic principles of neuroscience and behavior.

- Apply the core principles of biology, chemistry, physics, and statistics to more advanced concepts in neuroscience and behavior.
- Apply the principles of evolution and genetics to understand how genotype and phenotype affect the structure and function of animal nervous systems and behavior.
- Describe the basic features of animal nervous system development, organization, signaling, integration, and higher-level processing, and how these are altered in diseases of the nervous system.
- Explain the four levels of analysis emphasized in modern animal behavior research: causation, development, function, and evolution.
- Describe molecular and cellular approaches to the study of brain structure, function, and development, as well as behavioral and cognitive neuroscience approaches to studying higher level brain functions.

Students demonstrate that they can undertake scientifically valid methods of inquiry.

- Apply appropriate research methods, laboratory techniques, and statistical methods to investigate scientific questions in neuroscience and behavior.

Students demonstrate that they can think critically and analytically.

- Read and critique primary research literature related to the nervous system, how nervous system function generates behavior, and how behavior addresses fitness-related challenges across a diversity of species.

Students demonstrate that they can communicate effectively.

- Demonstrate scientific writing skills, and proficiency in delivering oral presentations related to both the primary literature and findings from student investigations in neuroscience and behavior.

Students practice science responsibly and ethically, and acknowledge the influence of cultural and historical biases in the sciences.