NEUROSCIENCE AND BEHAVIOR (M.S.)

https://colsa.unh.edu/biological-sciences/program/ms/neuroscience-behavior

Description

The M.S. Neuroscience and Behavior degree is only available as an accelerated B.S./M.S. program.

The program in neuroscience and behavior aims to:

- Improve opportunities for excellent undergraduates to prepare for competitive Ph.D. programs or add an additional credential before entering a competitive job market; and
- Allow students interested in neuroscience and behavior to advance and further specialize their biological sciences education in only one additional year at UNH.

The NSB Accelerated BS-MS offers interdisciplinary graduate training for students whose research interests include molecular and cellular neuroscience, evolutionary and developmental neurobiology, and cognitive, behavioral and computational neuroscience.

Requirements

This degree option is available only through the accelerated B.S. to M.S. program. Students admitted to the Accelerated Master's (AM) program may apply up to 12 credits of prior upper-level UNH coursework in accordance with AM policies. Up to twelve credits can count toward both the BS and MS degrees. This coursework counts as electives and does not count toward the core requirements for the undergraduate neuroscience and behavior major. Students must fulfill all programmatic requirements for the master's degree program and fulfill all programmatic requirements for their bachelor's degree.

A minimum of **30 credits** are required as follows:

Code	Title	Credits
Requirements		
Responsible Conduct of Research [1]		Cr/F
BIOL 950	Scientific Communication	2
Statistics		
Two semesters of advanced statistics, at least one of which is 800-900 level. [2]		
Research Techniques		
Select one course from the following: [2]		
NSB 903	Neuroscience and Behavior Research Methods	
MCBS 901	Introduction to Research in the Life Sciences	
Graduate Seminar		
Select a minimum of two semesters, select from the following:		
NSB 997	Neuroscience and Behavior Graduate Seminar	
or Equivalent seminar series in PSYC		
Teaching Strategies		
Required for all student Teaching Assistants at UNH		
GRAD 950	Issues in College Teaching	
Electives		
Students work with advisor and committee to identify additional courses appropriate for their area of specialization and career objectives.		
Master's Thesis		
NSB 899	Neuroscience and Behavior Master's Thesis [3]	1

1 Responsible Conduct in Research is a non-credit program requirement.

2 Students mentored by a Psychology faculty member can fulfill both the Statistics and Research Introduction requirements with the 3-semester sequence of PSYC 805 Research Methodology and Statistics I, PSYC 806 Research Methodology and Statistics II , PSYC 907 Research Methods and Statistics III .

3 All students in the Neuroscience and Behavior Graduate Program are expected to present their research in public seminars (including the UNH Graduate Research Conference).

Code	Title	Credits
Elective Courses		
ANFS 933	Design, Analysis, and Interpretation of Experiments	4
BCHM 802	Endocrinology	4
BCHM 860	Pharmacology	4
BCHM 894	Protein Structure and Function	4
BIOL 806	Data Science with R for the Life Sciences	4
BIOL 827	Animal Communication	4
BIOL 902	Writing and Publishing Science	2
COMM 805	Research Methods in Communication Sciences and Disorders	3
COMM 811	Brain and Behavior	3
COMM 812	Dysphagia	3
COMM 824	Motor Speech Disorders	3
COMM 841	Cognitive Communication Disorders	2
GEN 811	Genomics and Bioinformatics	0
GEN 812	Programming for Bioinformatics	5
HDS 800	Mathematics and Statistics for Health Data Science	3
KIN 805	Topics in Applied Physiology	4
KIN 806	Neurology	4
KIN 798	Special Topics	1
MCBS 895	Special Topics	1
MCBS 913	Applied Bioinformatics	3
MCBS 995	Special Topics	1
MICR 805	Immunology	3
NURS 978	Psychopharmacology of Mental Health Disorders Across the Lifespan I	2
PSYC 917	Advanced Seminar in Sensory and Perceptual Processes	4
PSYC 945	Advanced Seminar in Behavioral Analysis	4

Guidance and Thesis Committee

Students will have worked with their advisor as a Senior and during the first semester of the graduate year will establish a **Thesis Guidance Committee** (at least 3 faculty in addition to the advisor, with representation from at least 2 departments, e.g., Biological Sciences; Molecular Cellular, and Biomedical Sciences; Psychology; or Communication Sciences and Disorders). The Thesis Guidance Committee will evaluate the soundness, originality, and feasibility of the research and approve a plan for completion of the study including required coursework. Other than the advisor (or co-advisors in some cases), the members of the committee, should not be directly involved in the student's proposed research. The student will submit the Thesis Guidance Committee Nomination Form to the Graduate School.

Research Proposal

The **written research proposal** typically follows the format of NIH NRSA predoctoral F31 fellowship (sample F31 proposals are available for review. Alternatively, for research that is more related to areas funded by NSF or other agencies, the proposal may follow the graduate research fellowship format for those agencies. Students are expected to present a feasible project utilizing available resources at UNH, the advisor's laboratory, and collaborative supports.

Specifically, the written section should include the following (NIH format):

- **Specific Aims:** a one-page summary that outlines the gap-in-knowledge, the research's main objectives, the main hypotheses, and the potential impact the research could have. This should be structured to include 2 specific aims, each with a testable hypothesis.
- **Research Strategy:**
  - **Background, Significance, and Premise:** a summary of the existing knowledge in the field, with an emphasis on the importance of the proposed research in advancing our understanding of neurobiological processes while addressing broader socioeconomic needs. This should raise specific questions that will be addressed in the research and describe the scientific foundation and importance of the proposed work.
  - **Innovation:** A concise description of the uniqueness of the project, specifically the technical and/or conceptual novelty of the proposed research.
  - **Approach:** A description of the methods and approaches to be employed, including identification of resources and expertise that the student will engage to tackle the research. This section should also highlight potential challenges and limitations and provide alternative approaches, in case the initial approach fails.
  - **Timeline:** A general timeline that outlines the anticipated milestones and deadlines for completing the research. This demonstrates the student's ability to plan and undertake a research project effectively.

The research proposal is submitted to the Thesis Committee during the first semester of the graduate year. Committee members may approve or reject the written proposal. If a committee member rejects the submitted proposal, they must provide a response to the student, with copy to the advisor and other committee members. The response should articulate specific shortcomings and steps the student may take to rectify each of them. The advisor is responsible for reconvening the Committee to collectively assess the quality of the revised proposal. After the discussion, the committee will provide general comments and additional revision critiques specifying strengths and weaknesses of the proposal, as well as any necessary improvements that must be made by the student before proceeding with the research. After a majority of the members of the advisory committee has approved the written proposal, the student moves to complete the study and undertake the oral defense.

Thesis and Defense

Students in the Accelerated Master's program will meet with the Guidance Committee in the first year of the graduate program to obtain approval for the thesis topic and timeline. The Thesis Proposal Defense will occur in Year 4 of the combined program.

The Thesis Committee will meet prior to the formal thesis defense to determine whether the project is ready to defend. The Thesis Defense should normally occur during Year 5 of the combined program.

Students must meet the Graduate School's requirements for a graduate degree. The MS degree in NSB requires the completion of course work and thesis research, and generation of a manuscript that is deemed of publishable quality by their Committee. This is expected to be completed in one year following completion of the undergraduate degree. Although not a program requirement, MS students are encouraged to present their research discoveries in scientific conferences and publish research article(s) in peer-reviewed scientific journals.

Accelerated Master's

This degree option is available only through the accelerated B.S. to M.S. program. Students admitted to the Accelerated Master's (AM) program may apply up to 12 credits of prior upper-level UNH coursework in accordance with AM policies.

Up to twelve credits can count toward both the BS and MS degrees. This coursework counts as electives and does not count toward the core requirements for the undergraduate neuroscience and behavior major. Students must fulfill all programmatic requirements for the master's degree program and fulfill all programmatic requirements for their bachelor's degree.

Sample BS-MS program sequence:

Fourth Year		
Fall		**Credits**
BIOL 806	Data Science with R for the Life Sciences	4
Advanced Elective		3-4
Advanced Elective		3-4
NSB 997	Neuroscience and Behavior Graduate Seminar	1
NSB 899	Neuroscience and Behavior Master's Thesis	1-4
	Credits	**12-17**
Spring		
BIOL 811	Experimental Design & Analysis	4
Advanced Elective		3-4
Advanced Elective		3-4
NSB 997	Neuroscience and Behavior Graduate Seminar	1
NSB 899	Neuroscience and Behavior Master's Thesis	1-4
	Credits	**12-17**
Fifth Year		
Fall		
Complete thesis research and other requirements.		
Advanced Elective		3-4
NSB 997	Neuroscience and Behavior Graduate Seminar	1
NSB 899	Neuroscience and Behavior Master's Thesis	1
	Credits	**5-6**
Spring		
Complete thesis research and other requirements.		
NSB 899	Neuroscience and Behavior Master's Thesis	1
	Credits	**1**
	Total Credits	**30-41**

Student Learning Outcomes

Program Learning Outcomes

- Students will have an advanced understanding of neuroscience and behavior with special emphasis in the specialty area that they chose.
- Students will be able to effectively communicate their research through various science strategies including but not limited to peer-reviewed publications, poster and oral presentations.
- Students will participate in research including hypothesis formulation, testing and experimentation, data analysis and dissemination of research results.
- Students will enhance their leadership, teamwork, ethical, and interpersonal skills to interact effectively with colleagues.
- Students will be prepared to transition to PhD programs in the biomedical and biological sciences, health professional schools, or immediately to the workforce.