NEUROSCIENCE (NSC) – PH.D. DEGREE

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Admission

Appointment Requirements

Candidates for the Ph.D. Program must meet the following eligibility requirements:

- Completion of a bachelor's degree, preferably in the biological or physical sciences, from an accredited institution.
- A minimum cumulative undergraduate GPA of 3.0 on a 4.0 scale. GPAs from graduate degrees may also be considered for competitive candidates if improvement of academic record is evident.
- Applications are considered only if submitted within the application submission window of September 1 – December 1 each year, for appointment in the following academic year. See also Admissions and Application Process (https://college.mayo.edu/academics/biomedical-research-training/phd-program/how-to-apply/).
- Degree conferral before the program begins (program begins in July)
- The Ph.D. program does consider international applicants who can demonstrate proof of English language proficiency. See also international applicant information (https://college.mayo.edu/academics/biomedical-research-training/phd-program/how-to-apply/international-applicant-information/).

Suggested undergraduate coursework:

- Applicants to our Ph.D. program are encouraged to have completed coursework with demonstrated proficiency (B average or above) in their math and science courses. Additionally, advanced courses in biology, chemistry, and physiology are encouraged.
- Applicants interested in applying to the Biomedical Engineering and Physiology Track are advised to take courses in quantitative science and engineering, such as signal processing, computer science, and instrumentation.

Authority to make appointments rests with the Mayo Clinic Graduate School of Biomedical Sciences Education Committee. Falsifying or omitting information on or accompanying the application may disqualify an applicant from admission or subject a student to dismissal. The application and supporting documents become the property of MCGSBS upon receipt. The average number of years to degree is 5.2.

Inquiries regarding admission to the MCGSBS Ph.D. Program should be sent to this inquiry form (https://college.mayo.edu/academics/biomedical-research-training/contact/).

Admissions/Financial Support

- PhD students are fully supported through a guaranteed internal fellowship for five years, eliminating the need to identify a faculty member to provide financial support. The annual base stipend for PhD students funded by Mayo Clinic for the 2025-2026 academic year is $41,200, deposited electronically bi-monthly in the student's bank of choice. The annual tuition fee is waived in full ($27,000).
- Appointment and funding are conditional on remaining actively enrolled in the program, continuously meeting the qualifications, standards and requirements of the program and track.
- Funding may consist of graduate school, external fellowships and/or internal scholarships.
- Students are appointed for five years with designated program start and end dates.
- If required training exceeds the appointment length, a request for extension may be made for consideration. All extension requests require graduate school approval and funding to cover all student costs during the extension period are typically paid by the student's mentor.
- Training must be completed within a maximum of seven years, regardless of funding availability.
- Students who enter MCGSBS with pre-awarded Mayo department/division funding will continue under the terms of any such arrangements throughout the duration of their PhD training.

Transfer Credits

A total of 21 credits may be transferred into the Ph.D. Program. For more details, see the Credit Conversion, Transfer, Waiver, and Substitution Policy on the MCGSBS Policies and Procedures intranet site.

Course Work

The curriculum for the Predoctoral degree consists of **68 credits**, which can include a maximum of 24 Research credits. (Matriculants prior to 2020 have 42 credit requirement, not counting Research credit.)

Code	Title	Hours
MGS		
MGS 6000	Responsible Conduct of Research	1
MGS 5000	Foundational Skills	1
MGS 5050	Critical Thinking and Scientific Writing [1]	2
MGS 5051	Critical Thinking and Scientific Writing, Part II	1
MGS 5010	Rigor, Reproducibility, Experimental Design, and Data Management	1
MGS 5030	Core Concepts in Genome Dynamics, Biochemistry, Cellular Biology, and Physiology [1]	3
Statistics [2]		**1**
CTSC 5590	Foundations of Statistics in Clinical and Translational Research	
CTSC 5600	Introduction to Statistics in Clinical and Translational Research	
Lab Rotations [3]		
6 credits maximum, a minimum of 3 rotations		
MGS 5102	Ph.D. Laboratory Rotation	2
MGS 5107	Ph.D. Laboratory Rotation	2
MGS 5108	Ph.D. Laboratory Rotation	2
Track Requirements		
NSC 6210	Neurobiology of Disease	3
NSC 6310	Methods in Neuroscience Research	2
NSC 6250	Skills for Effective Presentations	2

NSC 6401	Practical Neuroanatomy [1]	2
NSC 6600	Neuroscience Journal Club (1 cr./yr.; two credits maximum)	2
NSC 6650	Neuroscience Works In Progress (two credits maximum)	2
NSC 6857	Systems Neuroscience and Behavior	3
NSC 6862	Molecular and Cellular Neuroscience	3
NSC 6900	NSC Thesis Proposal	2
Advanced Coursework		**7**
Select seven credits required of the following:		
NSC 5600	Behavioral Neurology	
BME 6300	Tutorial in Neurophysiology	
IMM 5100	Basic Graduate Immunology	
BMB 5450	Genomics and Functional Genomics	
MPET 5900	Molecular Pharmacology and Receptor Signaling	
REGS 6820	Principles to Practice	
Research		
MGS 6890	Predoctoral Research (3 cr./qtr x minimum 8 terms) [4]	24
Total Hours		**68**

1. M.D.-Ph.D. students may exclude these in accordance with M.D.-Ph.D. requirements. Ph.D. students with an existing M.D. may request a credit transfer or conversion to satisfy this requirement.
2. Choose one of the following options. Students must complete a minimum of 1 credit of statistics courses.
3. M.D.-Ph.D. students satisfy this requirement with three one-month full-time rotations.
4. Must enroll every quarter once a thesis laboratory is selected for remainder of program. Directed research projects under the supervision of a faculty mentor

Thesis Mentor

Ideally, you will have identified a thesis mentor by the end of your third rotation. However, additional rotations can be performed if necessary. If you have not identified a thesis mentor after three rotations, you should meet with the program director to discuss any problems/concerns you may have experienced during your rotations and to discuss the identification of another rotation. If you are unable to choose a mentor after 5 rotations you must resign from the program.

Thesis Advisory Committee

You should form your thesis advisory committee within 90 days of selecting your mentor and joining their lab. This committee has a minimum of 5 members who should be identified with the help of your thesis mentor. The committee composition must be approved by the program director. In consultation with your mentor you should select one committee member other than your mentor to serve as the chair of this committee and they must, therefore, have full graduate faculty privileges. Overall, three of the committee members must have full graduate privileges, two of the members must have successfully mentored a student to degree, and two members must be from your degree track. This committee is intended to help you become a successful scientist – as such, and due to the natural evolution of Ph.D. research projects, the committee composition may change over time. Any changes should be discussed thoroughly with your thesis mentor and approved by the program director. Appropriate paperwork for the committee roster must be filed within 90 days of selecting your thesis mentor.

Your First TAC Meeting

Your first TAC meeting should occur within 90 days of selecting your thesis lab. At this meeting you will introduce your committee to your proposed thesis project area and should include the hypothesis, specific aims, and experimental objectives that you intend to accomplish during your Ph.D. research. Your committee will discuss your intentions and determine whether they represent an appropriate *starting point* for your thesis research. The initial thesis proposal is not a contract between you and the committee – all Ph.D. projects evolve in response to actual experimentation and your final thesis research may differ substantially from your original proposal. Likewise, your committee may modify their expectations and requirements throughout the course of your thesis research. An important aspect of successful Ph.D. training is constant communication with your thesis committee.

Qualifying Exams and Thesis Research

Written Qualifying Exam

Neuroscience students will meet the requirement of the written qualifying exam by preparing a submission-ready pre-doctoral grant application (F31 or equivalent) by the end of fall quarter, year 2. Students will receive ample instruction into the format and expected content of the proposal during MGS 5050 and MGS 5051 the scientific writing courses. All pre-doctoral grants will be reviewed by faculty for quality before a passing grade is conferred. Completion of an acceptable pre-doctoral grant will constitute a passing grade on the written qualifying exam. All students are ***required*** to submit the application to a funding agency during the following calendar year (January-December/Yr2-3).

Oral Qualifying Exam

The oral qualifying exam is a critical step on the road to acquiring the Ph.D. You are *strongly* encouraged to discuss the oral exam with the program director or educational coordinator well in advance of the end of your 6th quarter.

Timing: The graduate school formally allows students to delay their oral exam until the end of the 2nd year. While this remains an option, Oral qualifying exams should be scheduled no earlier than the 5th quarter, but before the end of your 8th quarter (basically towards the end of your second year). Students will disseminate their Thesis Proposal (F31 or equivalent grant application prepared for the written qualifying exam) to members of their oral exam committee at least 3 weeks before the exam. This document will be used as the basis for your oral exam. Paperwork must be submitted with the graduate school at least three weeks before the scheduled exam.

Committee Composition: The oral exam committee usually mirrors your TAC and includes a minimum of 4 members chosen for their expertise in the general area of research relevant to the student's proposal. The oral exam committee will always include two designated examiners, one of whom should be a member of the NSC Education Committee in order to ensure that all candidates meet a standard level of general background knowledge and to ensure that each candidate is tested fairly on the basis of their readiness for advancement to candidacy, rather than upon the quality of their preliminary data, the nature of their research project, or the influence of their faculty mentor. All members must be approved by the program director and site-specific associate director and should be

selected after extensive discussion between the student and their faculty mentor.

Exam Format: The exam will be driven by a well-written, in-depth F31-like proposal focused upon the student's general research area. The oral exam will emphasize general neuroscience knowledge, the ability to generate hypotheses, the ability to "think on your feet", and the ability to diagram and explain scientific concepts (a "chalk talk" format). The exam will also probe the depth of knowledge specific to the proposed area of research. Ultimately, any aspect of scientific thinking and general scientific knowledge is fair game, but the intention of this exam is not to trick or confuse but rather to provide a fair and supportive environment in which each student can prove their readiness for advancement to candidacy.

Fellowships

All eligible students are *required* to apply for pre-doctoral funding via the National Research Service Award (NRSA) mechanism (F31) or equivalent. The written qualifying exam and thesis proposal format is intended to assist in the preparation of a competitive NRSA application. Further information is available at http://grants.nih.gov/training/nrsa.htm or the Publication Requirement Policy.

Lab Changes

Changes in thesis mentor are strongly discouraged after the 6th quarter. If changes are requested after this time they will be approved at the discretion of the program director and School.

Suggested Sequence

This is a suggested sequence based on a summer term start. Individual course plans may vary depending on true start date, program, and research interests. Be sure to confirm you have met your requirements using your degree planning tool. Course offerings may vary slightly. Current course offerings are posted in the course catalog.

Code	Title	Hours
First Year - Summer Term		
MGS 5000	Foundational Skills	1
MGS 5010	Rigor, Reproducibility, Experimental Design, and Data Management	1
MGS 5030	Core Concepts in Genome Dynamics, Biochemistry, Cellular Biology, and Physiology	3
MGS 5102	Ph.D. Laboratory Rotation	2
MGS 6000	Responsible Conduct of Research	1
CTSC 5590	Foundations of Statistics in Clinical and Translational Research [1]	1

Code	Title	Hours
First Year - Fall Term		
MGS 5107	Ph.D. Laboratory Rotation	2
MGS 5108	Ph.D. Laboratory Rotation	2
NSC 6862	Molecular and Cellular Neuroscience	3
NSC 6250	Skills for Effective Presentations	2
NSC 6650	Neuroscience Works In Progress	1

Code	Title	Hours
First Year - Winter Term		
NSC 6210	Neurobiology of Disease (Offered every other year)	3
NSC 6857	Systems Neuroscience and Behavior	3
CTSC 5600	Introduction to Statistics in Clinical and Translational Research [1]	3

Code	Title	Hours
First Year - Spring Term		
NSC 6210	Neurobiology of Disease (Offered every other year)	3
NSC 6310	Methods in Neuroscience Research (Offered every other year)	2
NSC 6401	Practical Neuroanatomy (Offered every other year)	2

Code	Title	Hours
Second Year - Summer Term		
MGS 5050	Critical Thinking and Scientific Writing	2
NSC 6310	Methods in Neuroscience Research (Offered every other year)	2

Code	Title	Hours
Second Year - Fall Term		
MGS 5051	Critical Thinking and Scientific Writing, Part II	1
NSC 6650	Neuroscience Works In Progress	1
NSC 6600	Neuroscience Journal Club	1

Code	Title	Hours
Second Year - Winter Term		
NSC 6210	Neurobiology of Disease (Offered every other year)	3

Code	Title	Hours
Second Year - Spring Term		
NSC 6210	Neurobiology of Disease (Offered every other year)	3
NSC 6310	Methods in Neuroscience Research (Offered every other year)	2
NSC 6401	Practical Neuroanatomy (Offered every other year)	2

Code	Title	Hours
Third Year - Summer Term		
MGS 6890	Predoctoral Research	3
Electives		3

Code	Title	Hours
Third Year - Fall Term		
NSC 6600	Neuroscience Journal Club	1
NSC 6650	Neuroscience Works In Progress	1
MGS 6890	Predoctoral Research	3
Electives		2

Code	Title	Hours
Third Year - Winter Term		
MGS 6890	Predoctoral Research	3
NSC 6900	NSC Thesis Proposal	2

Code	Title	Hours
Third Year - Spring Term		
MGS 6890	Predoctoral Research	3

Code	Title	Hours
Fourth Year - Summer Term		
MGS 6890	Predoctoral Research	3

Code	Title	Hours
Fourth Year - Fall Term		
MGS 6890	Predoctoral Research	3

Code	Title	Hours
Fourth Year - Winter Term		
MGS 6890	Predoctoral Research	3

Code	Title	Hours
Fourth Year - Spring Term		
MGS 6890	Predoctoral Research	3

Code	Title	Hours
Fifth Year - Summer Term		
MGS 6890	Predoctoral Research	3

Code	Title	Hours
Fifth Year - Fall Term		
MGS 6890	Predoctoral Research	3

Code	Title	Hours
Fifth Year - Winter Term		
MGS 6890	Predoctoral Research	3

Code	Title	Hours
Fifth Year - Spring Term		
MGS 6890	Predoctoral Research	3

[1] A minimum of 1 credit of statistics courses are required. See program requirements for course options and details.