Neuroscience (NSC) Graduate Program

Overview

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Typical Timeline and “Fast Track”

M.Sc. Program

- Fall 2017: TAC #1
- Winter 2018: Submit Annual Progress report
- Summer 2018: Fall 2018
- Winter 2019: TAC #2 Transfer to PhD “Fast Track”
- Summer 2019: TAC #2 Seek permission to write thesis

Ph.D. Program

- Fall 2017: TAC #1
- Winter 2018: Submit Annual Progress report
- Summer 2018: Fall 2018
- Winter 2019: TAC #2
- Summer 2019: Comprehensive Exam
Expectations of a NSC Graduate Student

- Meet program requirements (TAC meetings, courses, seminars, comprehensive exam)
- Develop expertise in your field of study
- Gain a comprehensive knowledge in neuroscience
- Develop new and innovative research ideas
- Generate new knowledge (scholarly publication in journals or presentation in scientific conferences)
- Improve your writing and presentation skills
- Actively participate in academic activities
- Responsible for timely completion of thesis
- Defend your thesis and data
NSC Program Requirements

M.Sc. Program
1) Minimum of three sessions (one year) on a full-time basis; must be spent on a supervised research project; must complete all their degree requirements within four (4) years
2) Six (6) credits of course work, including either NSC 5102 (fall) or 5104 (winter) (3 credits)
3) One seminar course (NSC 8324S; 3 credits)
4) Professional Skills Training (MED 8166)
5) Master’s Thesis (NSC 7999)
6) Annual Thesis Advisory Committee (TAC) meetings/reports

Ph.D. Program
1) Minimum of six sessions (two years) on a full-time basis; must be spent on a supervised research project; must submit a thesis for defence within six (6) years
2) Twelve (12) credits of course work to include both NSC 5102 and NSC 5104 if not taken during M.Sc.
3) One seminar course (NSC 8325S, 3 credits)
4) Professional Skills Training (MED 8166)
5) Comprehensive examination (NSC 9998)
6) Present one research seminar to the Cellular and Molecular Medicine Department prior to thesis submission
7) Presentation and defense of a thesis based on original research (NSC 9999)
8) Annual Thesis Advisory Committee (TAC) meetings/reports

Fast Track Transfer to the Ph.D. Program
Students performing well in the M.Sc. program may be recommended for transfer to the Ph.D. program without being required to write a Master's thesis. This must be completed by the 5th session
Thesis Advisory Committee (TAC)

Composition:
• Consist of 2 Faculty members (1 must be in the Neuroscience program) plus thesis supervisor for M.Sc.
• Consist of 3 Faculty members (1 must be in the Neuroscience program) plus thesis supervisor for Ph.D.
• Members chosen in consultation with thesis supervisor
• First meeting within 4 months of start date
• Meet once a year or more, if needed

Role:
• Serve as advisors and mentors (intellectual, experimental, academic etc.)
• Evaluate student’s knowledge of the field and monitor progress of the thesis project
• Consent to thesis completion, Fast Track to Ph.D., serve in comprehensive exam (Ph.D.)
Thesis Advisory Committee (TAC)

Student’s responsibility:

- Contact and organize meeting (time; room coordinated with Grad Office)
- Submit a research/progress report to your TAC at least 1 week before the meeting date
- The report should contain an introduction, objectives, experimental approach or methodology, results, future directions
- The first report should include a more extensive review of the literature. This may be summarized in subsequent reports
- Raise any concerns or issues before the start of the TAC meeting
- Briefly present an outline of the thesis, experimental approach, results and interpretation, future direction
Compulsory Courses:

- **FALL 2017** - **NSC 5102 CELLULAR AND MOLECULAR NEUROSCIENCE** (3 cr.) Slack
  The molecular and cellular properties of neurons. Emphasis to be placed on the molecular basis of electrical activity of neurons and chemical synaptic transmission.

- **WINTER 2018** - **NSC 5104 SYSTEMS NEUROSCIENCE** (3 cr.) Maler/Beique
  Structure and function of representative components of the nervous system to be presented in an integrated and comprehensive manner, emphasizing a reductionist approach to the study of neural networks and their behavioural output.

Elective Courses:

- **WINTER 2017** - **NSC 5106 MOLECULAR PSYCHIATRY** (3 cr.) Albert
  Genetic and neurochemical bases of mental illnesses including transgenic and gene knockout mouse models, animal behavioral paradigms, in vivo imaging, genetic and therapeutic approaches in psychiatry and the influence of environmental stressors.

- **Winter 2017** - **NSC 8103 DEVELOPMENTAL NEUROSCIENCE** (3 cr.) Lagace
  Fundamental concepts of development of the nervous system with an emphasis on those aspects unique to this tissue type. Topics to include control of proliferation and differentiation, axonal outgrowth and pathfinding, synaptogenesis and formation of neuronal maps, neuronal plasticity, growth factor action and neural regeneration.

- **Winter 2018** - **NSC 8105 MOLECULAR BIOLOGY OF THE NEURON** (3 cr.) Tiberi
  Emphasis on how signal transduction regulates neuronal function. Topics to include the role of the cytoskeleton in neuronal function, membrane sorting in exocytosis and endocytic pathways, metabotropic and ionotropic receptor signaling, signaling by the GTP-binding proteins, plasma membrane and vesicular transporters, role of protein-protein interactions in the regulation of neuronal signaling, and genomic and proteomic approaches to study neuronal signaling.
Additional Elective NSC Graduate Courses

- **Fall 2018 - NSC 8106 MECHANISMS OF NEUROLOGICAL DISEASE** (3 cr.) Ngsee
  Current knowledge of select neuropathologies with emphasis on the underlying genetics and biochemistry of these conditions. Examination of some fundamental cellular processes important for understanding neurological diseases.

- **Winter 2018 - NSC 7100 NEUROTRANSMISSION AND NEUROMODULATION** (3 cr.) Maler/Beique
  Molecular and cell biology of neurotransmission including the identity, actions and mechanisms of neurotransmitters and neuromodulators. Use of computer simulations to explore the complex interactions between synaptic input and the electrical architecture of neurons.

- **SUMMER 2018 - NSC 8104 COMPUTATIONAL NEUROSCIENCE** (3 cr.) Maler
  Basic concepts of sensory-motor processing from the cellular level of excitable membranes and synaptic signalling mechanisms to the emergent properties of complex neural networks.

- **WINTER 2018 – NSC/CMM 8340 NEUROMUSCULAR FUNCTION AND DYSFUNCTION** (3 cr.) Jasmin
  Topics to be covered include factors controlling muscle- and synapse-specific gene expression, regulation of myogenesis and muscle cell growth, formation of the neuromuscular junction, motor neuron - muscle interactions, the role of the cytoskeleton in organization of post-synaptic domains, functional role of ion channels in muscle, molecular genetics of neuromuscular disease. **Prerequisite:** CMM 5340 or equivalent.
Seminar Courses

• NSC 8324 SEMINAR FOR M.Sc. STUDENTS
All students enrolled in the M.Sc. program must attend a minimum of 20 neuroscience seminars for one year (Tuesdays, 1-2 PM). One seminar and 1 poster must be presented by each student during the year.

• NSC 8325 SEMINAR FOR Ph.D. STUDENTS
All students enrolled in the Ph.D. program must attend a minimum of 20 neuroscience seminars for one year. One seminar and 1 poster must be presented by each student during the year.

Opportunities to interact and learn from experts in different fields after the seminars

Student seminar presentations: one marked by Faculty in January. Student also presents a poster at the end of the session. A prize award ($250) is given to the best seminar and poster presentations for each category.

Journal Club / Work in Progress: provides a forum to present ongoing research projects (Mondays, 11-12 PM; pizza lunch)

Announcement by weekly email “What’s Happening in Neuroscience”
Fast Track to Ph.D.

- Transfer to the Ph.D. program without completing a Master's thesis
- Students must have obtained a minimum of A- in all M.Sc. level courses and a minimum of B+ in the last 30 units
- Transfer exam evaluates a student’s knowledge and skill to be a successful Ph.D. candidate
- Two-part exam: a written component (a thesis proposal) and an oral examination; must pass both
- Transfer exam must be successfully completed before the end of the 5th session. This is a hard deadline
Thesis

- NSC 7999 THÈSE DE MAÎTRISE / M.Sc. THESIS

- NSC 9999 THÈSE DE DOCTORAT / Ph.D. THESIS
  Students must be registered for these course annually until completion of the degree

- NSC 9998 EXAMEN DE SYNTHÈSIS (DOCTORAT) / COMPREHENSIVE EXAM (Ph.D.)
  This applies only to Ph.D. only. Students must be registered in the appropriate session. Must be completed within 24 months from the start date
Professional Skills Training (MED 8166)

• Research ethics workshop
  Academic integrity issues such as, data manipulation, plagiarism, medical ethics, animal care, professional etiquette, time and stress management, conflict management, teamwork

• Scientific writing and presentation seminars
  How to write a scientific paper, poster presentation, oral scientific presentation, proper citation

• Intellectual property seminars
  Copyright, protection of intellectual property, patent

• Social media in science
Student Support Services

Go to the Faculty of Medicine Graduate and Postdoctoral Studies:
http://med.uottawa.ca/graduate-postdoctoral/
Contact information on the right hand side under “Need Help?”

Student Academic Success Service (SASS) provides a wide range of support services:
  • Academic Writing Help Centre
  • Career Services
  • Counseling Service
  • Access Service
SASS Main Office (Office in RGN coming soon)
100 Marie-Curie (4th Floor)
Tel: 613-562-5101
Fax: 613-562-5964
Email: SASS@uottawa.ca

Graduate office staff and program Director provides assistance with academic issues