

Neuroscience

- M.Sc. Neuroscience
- Ph.D. Neuroscience

M.Sc. Neuroscience

About the Program

Neuroscience is a multidisciplinary field, encompassing different aspects of psychology, biology, chemistry, neurophysiology, genetics and epidemiology. Members of the Department of Neuroscience are engaged in a range of research topics examining the function of the central nervous system in both normal and disease states, using state-of-the-art facilities for microscopy, histology, neurochemistry, behavioural analysis, electrophysiology and molecular genetic analysis. Students will have the opportunity to learn these valuable techniques, and develop research projects aimed at the elucidation of many aspects of brain functioning and associated mental health diseases, including addiction, depression, Parkinson's disease, obesity, dementia and traumatic injury. As human behaviour is also an important area of study, there are laboratories in which to conduct human research related to the flourishing relationship between neuroscience and health psychology. Graduates of our program are well qualified to seek careers in the public sector, pharmaceutical research, and academia.

Academic Regulations

See the General Regulations section of this Calendar.

Admission Requirements

The minimum requirement for admission to the Master's program in Neuroscience is either a B.Sc. (Honours) in Neuroscience, Biology, or related field, or a B.A. (Honours) in Psychology. Applicants with other Bachelors honours degrees in related disciplines will also be considered provided the applicant can demonstrate a strong background that relates to Neuroscience. Applicants without a background in neuroscience may be required to complete NEUR 5000 as part of their M.Sc. program.

Meeting the minimum requirements does not automatically guarantee acceptance into the program. In addition to transcripts and letters of reference, application packages must include a statement of interest.

Program Requirements

M.Sc. Neuroscience (5.0 credits)

1. 1.0 credit in:	1.0
NEUR 5100 [1.0] Fundamentals in Neuroscience	
2. 0.5 credit in:	0.5
NEUR 5201 [0.5] Statistics for Neuroscience I	
3. 0.5 credit from:	0.5
NEUR 5202 [0.5] Statistics for Neuroscience II	
NEUR 5800 [0.5] Special Topics in Neuroscience	
NEUR 5000 [0.5] Foundations in Neuroscience	

4. 3.0 credits in:	3.0
NEUR 5909 [3.0] M.Sc. Thesis	
Total Credits	5.0

Fast Track Option

Students who enroll in the M.Sc. program, and intend to subsequently continue into a Ph.D., may have the option of being fast-tracked into the Ph.D. program. Eligibility will be determined by recommendation from the M.Sc. thesis committee, the Graduate Chair in Neuroscience, and the Dean of Graduate and Postdoctoral Affairs.

Regulations governing requirements for the Master's thesis, including deadlines for submission, are outlined in the General Regulations section of this Calendar.

Ph.D. Neuroscience

About the Program

Neuroscience is a multidisciplinary field, encompassing different aspects of psychology, biology, chemistry, neurophysiology, genetics and epidemiology. Members of the Department of Neuroscience are engaged in a range of research topics examining the function of the central nervous system in both normal and disease states, using state-of-the-art facilities for microscopy, histology, neurochemistry, behavioural analysis, electrophysiology and molecular genetic analysis. Students will have the opportunity to learn these valuable techniques, and develop research projects aimed at the elucidation of many aspects of brain functioning and associated mental health diseases, including addiction, depression, Parkinson's disease, obesity, dementia and traumatic injury. As human behaviour is also an important area of study, there are laboratories in which to conduct human research related to the flourishing relationship between neuroscience and health psychology. Graduates of our program are well qualified to seek careers in the public sector, pharmaceutical research, and academia.

Academic Regulations

See the General Regulations section of this Calendar.

Admission Requirements

An M.Sc. from an appropriate university is usually required for entry to the Ph.D. program.

Meeting the minimum requirements does not automatically guarantee acceptance into the program. In addition to transcripts and letters of reference, application packages must include a statement of interest.

Program Requirements

Ph.D. Neuroscience (10.0 credits)

1. 1.0 credit in:	1.0
NEUR 6100 [1.0] Advanced Seminar in Neuroscience	
2. 1.0 credit in:	1.0
NEUR 6200 [1.0] Comprehensive Examination (to be completed within the first two years of PhD study)	
3. 0.5 credit in:	0.5

NEUR 5201 [0.5]	Statistics for Neuroscience I (unless taken previously, in which case substitute with 0.5 credits of optional courses)	
4. 0.5 credit in:		0.5
NEUR 5202 [0.5]	Statistics for Neuroscience II (unless taken previously, in which case substitute with 0.5 credits of optional courses)	
5. 7.0 credits in:		7.0
NEUR 6909 [10.0]	Ph.D. Thesis (Candidates must successful complete a research thesis on a topic in Neuroscience supervised by a faculty member of the Department of Neuroscience)	
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Total Credits		10.0

Optional courses

Students who are already enrolled in the M.Sc. program, and intend to subsequently continue into a Ph.D., may have the option of being fast-tracked into the Ph.D. program. Eligibility will be determined by recommendation from the M.Sc. thesis committee, the Graduate Chair in Neuroscience, and the Dean of Graduate and Postdoctoral Affairs.

Candidates may choose from the following list of optional courses:

Up to 1.0 credit in:

NEUR 5000 [0.5]	Foundations in Neuroscience
NEUR 5800 [0.5]	Special Topics in Neuroscience

Up to 1.0 credit in:

NEUR 6301 [0.5]	Techniques in Neuroscience I
NEUR 6302 [0.5]	Techniques in Neuroscience II

Up to 1.0 credit in:

NEUR 6401 [0.5]	Independent Research in Neuroscience I
NEUR 6402 [0.5]	Independent Research in Neuroscience II

Up to 1.0 credit in:

NEUR 6501 [0.5]	Directed Studies in Neuroscience I
NEUR 6502 [0.5]	Directed Studies in Neuroscience II

Neuroscience (NEUR) Courses

NEUR 5000 [0.5 credit]

Foundations in Neuroscience

A comprehensive, lecture-based course which will cover the foundational principles of neuroscience for students with a limited background in neuroscience. Topics include neural signalling, sensation, movement, neurodevelopment, neuroplasticity, neuroendocrinology, learning and memory, and other complex brain functions. Prerequisite(s): permission of the Department.

NEUR 5100 [1.0 credit]

Fundamentals in Neuroscience

A general course covering core neuroscience topics including organization of the nervous system, sensory and motor systems, neuroendocrinology, motivation learning and memory, emotion, attention, and pathology. Course includes attendance of the neuroscience colloquium series.

Also listed as BIOL 5304.

Precludes additional credit for PSYC 5200.

NEUR 5201 [0.5 credit]

Statistics for Neuroscience I

Concepts and applications of basic statistical methods. Power determinations, t-tests, analysis of variance designs, including factorial, within groups, and hierarchical designs, analysis of covariance, and follow-up tests. Extensive use of statistical software.

Precludes additional credit for PSYC 5410.

NEUR 5202 [0.5 credit]

Statistics for Neuroscience II

Concepts and applications of advanced regression analyses, including multiple regression, hierarchical and polynomial techniques, factor analysis and cluster analysis. Extensive use of statistical software.

Precludes additional credit for PSYC 5411.

NEUR 5800 [0.5 credit]

Special Topics in Neuroscience

An in depth study of current topics in neuroscience and health. Course content varies yearly and has recently included cognitive neuroscience, neuropharmacology, neurodegeneration, neuroimmunology, behavioural medicine, neurobiology of learning and memory, brain mechanisms of ingestive behaviour and energy balance, and molecular neuroscience.

Also listed as BIOL 6203.

NEUR 5909 [3.0 credits]

M.Sc. Thesis

NEUR 6100 [1.0 credit]

Advanced Seminar in Neuroscience

A comprehensive pro-seminar series, covering issues ranging from cellular and molecular processes through to neural systems and behaviours as well as psychopathology. Students will also be required to attend the Neuroscience colloquia series as part of this course. Also listed as BIOL 6305.

Precludes additional credit for PSYC 6200, PSYC 6202, PSYC 6203, BIOL 6303, BIOL 6306.

Prerequisite(s): NEUR5100 or equivalent.

NEUR 6200 [1.0 credit]

Comprehensive Examination

The comprehensive examination will consist of either a grant proposal or a review paper, to be decided by the student in consultation with their supervisor. The topic of the comprehensive examination must be outside of the candidate's primary area of specialization and must be completed within the first two years of PhD study.

NEUR 6301 [0.5 credit]**Techniques in Neuroscience I**

Completion of a research project carried out under the supervision of a neuroscience faculty member, normally not the current supervisor. The student will learn a new neuroscience technique and apply it to a research objective. Students must obtain prior approval from the graduate committee.

Precludes additional credit for PSYC 6204.

NEUR 6302 [0.5 credit]**Techniques in Neuroscience II**

Completion of a research project carried out under the supervision of a neuroscience faculty member, normally not the current supervisor. The student will learn a new neuroscience technique and apply it to a research objective. Students must obtain prior approval from the graduate committee.

Precludes additional credit for PSYC 6204.

NEUR 6401 [0.5 credit]**Independent Research in Neuroscience I**

Permission to register and approval of research plan must be obtained from the graduate committee. A final research report must be filed in the departmental office prior to submission of course grade.

Precludes additional credit for PSYC 5901 and PSYC 6901.

NEUR 6402 [0.5 credit]**Independent Research in Neuroscience II**

Permission to register and approval of research plan must be obtained from the graduate committee. A final research report must be filed in the departmental office prior to submission of course grade.

Precludes additional credit for PSYC 5901 and PSYC 6901.

NEUR 6501 [0.5 credit]**Directed Studies in Neuroscience I**

In-depth investigation of selected topics in neuroscience by means of directed library research. Registration is restricted, permission to register being granted only by the graduate committee. A final report must be filed in the departmental office prior to submission of course grade.

Precludes additional credit for PSYC 5900 and PSYC 6900.

NEUR 6502 [0.5 credit]**Directed Studies in Neuroscience II**

In-depth investigation of selected topics in neuroscience by means of directed library research. Registration is restricted, permission to register being granted only by the graduate committee. A final report must be filed in the departmental office prior to submission of course grade.

Precludes additional credit for PSYC 5900 or PSYC 6900.

NEUR 6909 [10.0 credits]**Ph.D. Thesis**

Summer session: some of the courses listed in this Calendar are offered during the summer. Hours and scheduling for summer session courses will differ

significantly from those reported in the fall/winter Calendar. To determine the scheduling and hours for summer session classes, consult the class schedule at central.carleton.ca

Not all courses listed are offered in a given year. For an up-to-date statement of course offerings for the current session and to determine the term of offering, consult the class schedule at central.carleton.ca