

# Neuroscience

This section presents the requirements for programs in:

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

## Program Requirements

### M.Sc. Neuroscience (5.0 credits)

#### Requirements:

<b>1. 1.0 credit in:</b>	1.0
NEUR 5100 [1.0] Fundamentals in Neuroscience	
<b>2. 0.5 credit in:</b>	0.5
NEUR 5201 [0.5] Foundations in Statistics for Neuroscience	
<b>3. 0.5 credit from:</b>	0.5
NEUR 5203 [0.5] Systematic Reviews and Meta-Analysis	
NEUR 5800 [0.5] Special Topics in Neuroscience	
NEUR 5801 [0.5] Knowledge Mobilization	
Or additional graduate level course offered by units outside of Carleton's Neuroscience Department, with approval from the Graduate Chair	
<b>4. 3.0 credits in:</b>	3.0
NEUR 5909 [3.0] M.Sc. Thesis	
<b>Total Credits</b>	<b>5.0</b>

### Ph.D. Neuroscience (3.0 credits)

#### Requirements:

<b>1. 1.0 credit in:</b>	1.0
NEUR 6100 [1.0] Advanced Seminar in Neuroscience	
<b>2. 1.0 credit in:</b>	1.0
NEUR 6200 [1.0] Comprehensive Examination (to be completed within the first two years of PhD study)	
<b>3. 0.5 credit in:</b>	0.5
NEUR 5201 [0.5] Foundations in Statistics for Neuroscience (unless taken previously, in which case substitute with 0.5 credits from item #4)	
<b>4. 0.5 credit from:</b>	0.5
NEUR 5203 [0.5] Systematic Reviews and Meta-Analysis	
NEUR 5800 [0.5] Special Topics in Neuroscience	
NEUR 5801 [0.5] Knowledge Mobilization	
NEUR 6301 [0.5] Techniques in Neuroscience I	
NEUR 6302 [0.5] Techniques in Neuroscience II	
NEUR 6401 [0.5] Independent Research in Neuroscience I	
NEUR 6402 [0.5] Independent Research in Neuroscience II	
NEUR 6501 [0.5] Directed Studies in Neuroscience I	
NEUR 6502 [0.5] Directed Studies in Neuroscience II	
Or additional graduate level course in another discipline with the approval from the Graduate Chair	
<b>5. 0.0 credits in:</b>	<b>0.0</b>

NEUR 6909 [0.0]	Ph.D. Thesis (candidates must successfully complete a research thesis on a topic in Neuroscience supervised by a faculty member in the Department of Neuroscience)
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**Total Credits**

**3.0**

## Regulations

See the General Regulations section of this Calendar.

## Admission

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 bachelor's honours degrees in related disciplines will also be considered provided the applicant can demonstrate a strong background that relates to neuroscience.

In addition to transcripts and letters of reference, application packages must include a statement of interest.

Meeting the minimum requirements does not automatically guarantee acceptance into the program.

## Admission

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.

## 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. Advanced standing will be given for NEUR 5201. The decision and required approvals to fast track must be completed by July 31 of the student's third semester.

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

## 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]****Foundations in Statistics for Neuroscience**

Extensive use of statistical software to analyze neuroscience data sets to gain practical applied statistical skills. Concepts include data management, statistical modelling through analysis of variance and regression, covariates and hierarchical techniques.

Includes: Experiential Learning Activity

**NEUR 5203 [0.5 credit]****Systematic Reviews and Meta-Analysis**

Introduces the methodology for conducting systematic reviews and meta-analysis. Topics include: conducting literature searches, extracting relevant literature, assessing quality of studies, and synthesizing findings across studies. Students will be expected to identify a research question, identify relevant literature, and carry out the statistical software.

Prerequisite(s): NEUR 5201.

Also offered at the undergraduate level, with different requirements, as NEUR 4002, for which additional credit is precluded.

**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 5801 [0.5 credit]****Knowledge Mobilization**

Knowledge mobilization concepts, tools, and frameworks, the challenges and value of translational research, and processes involved in integrated knowledge mobilization. Skills to maximize research impacts will be developed.

Includes: Experiential Learning Activity

Precludes additional credit for HLTH 5300.

Also offered at the undergraduate level, with different requirements, as NEUR 4003, for which additional credit is precluded.

**NEUR 5909 [3.0 credits]****M.Sc. Thesis**

Includes: Experiential Learning Activity

**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.

Includes: Experiential Learning Activity

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.

Includes: Experiential Learning Activity

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 [7.0 credits]****Ph.D. Thesis**

Includes: Experiential Learning Activity