# Neuroscience

## Program Requirements

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

<table>
<thead>
<tr>
<th>Requirements</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 1.0 credit in:</td>
<td>1.0</td>
</tr>
<tr>
<td>NEUR 5100 [1.0]</td>
<td>Fundamentals in Neuroscience</td>
</tr>
<tr>
<td>2. 0.5 credit in:</td>
<td>0.5</td>
</tr>
<tr>
<td>NEUR 5201 [0.5]</td>
<td>Statistics for Neuroscience I</td>
</tr>
<tr>
<td>3. 0.5 credit from:</td>
<td>0.5</td>
</tr>
<tr>
<td>NEUR 5202 [0.5]</td>
<td>Statistics for Neuroscience II</td>
</tr>
<tr>
<td>NEUR 5800 [0.5]</td>
<td>Special Topics in Neuroscience</td>
</tr>
<tr>
<td>NEUR 5801 [0.5]</td>
<td>Knowledge Mobilization</td>
</tr>
<tr>
<td>NEUR 5000 [0.5]</td>
<td>Foundations in Neuroscience</td>
</tr>
<tr>
<td>4. 3.0 credits in:</td>
<td>3.0</td>
</tr>
</tbody>
</table>

**Total Credits** 5.0

**Ph.D. Neuroscience (10.0 credits)**

<table>
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<tr>
<td>1. 1.0 credit in:</td>
<td>1.0</td>
</tr>
<tr>
<td>NEUR 6100 [1.0]</td>
<td>Advanced Seminar in Neuroscience</td>
</tr>
<tr>
<td>2. 1.0 credit in:</td>
<td>1.0</td>
</tr>
<tr>
<td>NEUR 6200 [1.0]</td>
<td>Comprehensive Examination (to be completed within the first two years of PhD study)</td>
</tr>
<tr>
<td>3. 0.5 credit in:</td>
<td>0.5</td>
</tr>
<tr>
<td>NEUR 5201 [0.5]</td>
<td>Statistics for Neuroscience I (unless taken previously, in which case substitute with 0.5 credits of optional courses)</td>
</tr>
<tr>
<td>4. 0.5 credit in:</td>
<td>0.5</td>
</tr>
<tr>
<td>NEUR 5202 [0.5]</td>
<td>Statistics for Neuroscience II (unless taken previously, in which case substitute with 0.5 credits of optional courses)</td>
</tr>
<tr>
<td>5. 7.0 credits in:</td>
<td>7.0</td>
</tr>
<tr>
<td>NEUR 6909 [7.0]</td>
<td>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)</td>
</tr>
</tbody>
</table>

**Total Credits** 10.0

### Optional courses

Candidates may choose from the following list of optional courses:

<table>
<thead>
<tr>
<th>Courses</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NEUR 5000 [0.5]</td>
<td>Foundations in Neuroscience</td>
</tr>
<tr>
<td>NEUR 5800 [0.5]</td>
<td>Special Topics in Neuroscience</td>
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<tr>
<td>NEUR 6301 [0.5]</td>
<td>Techniques in Neuroscience I</td>
</tr>
<tr>
<td>NEUR 6302 [0.5]</td>
<td>Techniques in Neuroscience II</td>
</tr>
<tr>
<td>NEUR 6401 [0.5]</td>
<td>Independent Research in Neuroscience I</td>
</tr>
</tbody>
</table>

### 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.

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.

### 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]
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 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.
Precludes additional credit for HLTH 5300.

NEUR 5900 [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 6602 [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 6900 [7.0 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