NEUROSCIENCE MAJOR (B.SC.) (65 CREDITS)

Offered by: Science (Faculty of Science)
Degree: Bachelor of Science
Program credit weight: 65

Program Description

The Neuroscience Major is a focused program for students interested in how the nervous system functions. It is highly interdisciplinary and borrows principles and methodologies from a number of fields including: biology, biochemistry, physiology, psychology, mathematics, physics, computer science, and immunology. To ensure that they have the appropriate foundation, students are required to take 29 credits in lower-level courses from physiology, biology, mathematics, computer science, psychology, and ethics. The program offers students a concentrated selection of 15 credits to be taken from one of three areas of current scientific activities in the neurosciences:

- Cell/Molecular,
- Neurophysiology/Computation, or
- Cognition/Behaviour.

In addition, students select 21 credits from a wide array of complementary courses to obtain more specialized training in areas of neuroscience that best suit their interests.

Enrolment in the Neuroscience Major is limited to a total of 50 students per year. U0 students seeking admission to this program should consult the neuroscience website for admissions requirements and should have completed the courses listed below or their equivalents.

Degree Requirements — B.Sc.

This program is offered as part of a Bachelor of Science (B.Sc.) degree.

To graduate, students must satisfy both their program requirements and their degree requirements.

- The program requirements (i.e., the specific courses that make up this program) are listed under the Course Tab (above).
- The degree requirements—including the mandatory Foundation program, appropriate degree structure, and any additional components—are outlined on the Degree Requirements page.

Students are responsible for ensuring that this program fits within the overall structure of their degree and that all degree requirements are met. Consult the Degree Planning Guide on the SOUSA website for additional guidance.

Note: For information about Fall 2025 and Winter 2026 course offerings, please check back on May 8, 2025. Until then, the "Terms offered" field will appear blank for most courses while the class schedule is being finalized.

Program Prerequisites

Students may complete this program with a minimum of 65 or a maximum of 67 credits.

Notes on admission to the Neuroscience Major program: Enrolment in the Neuroscience Major is limited to a total of 50 students per year. U0 students seeking admission to this program should consult the neuroscience website for admissions requirements and should have completed the courses listed below or equivalent.

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Course	Title	Credits
BIOL 112	Cell and Molecular Biology.	3
CHEM 110	General Chemistry 1.	4
CHEM 120	General Chemistry 2.	4
MATH 139	Calculus 1 with Precalculus.[1]	4
MATH 140	Calculus 1.[1]	3
MATH 141	Calculus 2.[2]	4
MATH 150	Calculus A.[1]	4
MATH 151	Calculus B.[2]	4
PHYS 101	Introductory Physics - Mechanics.[3]	4
PHYS 102	Introductory Physics - Electromagnetism.[4]	4
PHYS 131	Mechanics and Waves.[3]	4
PHYS 142	Electromagnetism and Optics.[4]	4

[1] Students complete one of MATH 139 Calculus 1 with Precalculus., MATH 140 Calculus 1. OR MATH 150 Calculus A..
[2] Students complete one of either MATH 141 Calculus 2. OR MATH 151 Calculus B..
[3] Students complete one of either PHYS 101 Introductory Physics - Mechanics. OR PHYS 131 Mechanics and Waves..
[4] Students complete one of either PHYS 102 Introductory Physics - Electromagnetism. OR PHYS 142 Electromagnetism and Optics..

Core Required Courses (20 credits)

Note: Students who have successfully completed an equivalent of CHEM 212 Introductory Organic Chemistry 1. in CEGEP or elsewhere must replace these credits with a 3-credit elective course to satisfy the total credit requirement for the Neuroscience Major.

Expand allContract all

Course	Title	Credits
BIOL 200	Molecular Biology.	3
CHEM 212	Introductory Organic Chemistry 1.	4
NSCI 200	Introduction to Neuroscience 1.	3
NSCI 201	Introduction to Neuroscience 2.	3
NSCI 300	Neuroethics.	3
NSCI 400D1	Neuroscience Seminar.	.5
NSCI 400D2	Neuroscience Seminar.	.5
PSYC 311	Human Cognition and the Brain.	3

Complementary Courses (45-47 credits)

3 credits from:

Expand allContract all

Course	Title	Credits
BIOL 373	Biometry.	3
MATH 324	Statistics.	3
PSYC 305	Statistics for Experimental Design.	3

3 credits from:

Expand allContract all

Course	Title	Credits
COMP 202	Foundations of Programming.	3
COMP 204	Computer Programming for Life Sciences.	3

3 credits from:

Note: Students who have successfully completed an equivalent to MATH 222 Calculus 3. at CEGEP or elsewhere, must replace these credits with a 3-credit elective course to satisfy the total credit requirement for the Neuroscience Major.

Expand allContract all

Course	Title	Credits
BIOL 309	Mathematical Models in Biology.	3
MATH 222	Calculus 3.	3

Streams

15 credits selected from one of the following streams:

A. Cell and Molecular Stream

9 credits as follows:

Expand allContract all

Course	Title	Credits
BIOC 311	Metabolic Biochemistry.	3
BIOL 202	Basic Genetics.	3
PHGY 311	Channels, Synapses and Hormones.	3

3 credits from:

Expand allContract all

Course	Title	Credits
BIOC 212	Molecular Mechanisms of Cell Function.	3
BIOL 201	Cell Biology and Metabolism.	3

3 credits from:

Expand allContract all

Course	Title	Credits
MIMM 214	Introductory Immunology: Elements of Immunity.	3
PHAR 300	Drug Action.	3

B. Neurophysiology/Neural Computation Stream

3 credits as follows:

Expand allContract all

Course	Title	Credits
PHGY 311	Channels, Synapses and Hormones.	3

3 credits as follows:

Expand allContract all

Course	Title	Credits
BIOC 212	Molecular Mechanisms of Cell Function.	3
BIOL 201	Cell Biology and Metabolism.	3

3 credits from:

Expand allContract all

Course	Title	Credits
BIOL 306	Neural Basis of Behaviour.	3
PHGY 314	Integrative Neuroscience.	3

6 credits from:

Note: Students who have successfully completed an equivalent to MATH 222 Calculus 3. at CEGEP or elsewhere, must replace these credits with a 3-credit elective course to satisfy the total credit requirement for the Neuroscience Major.

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Course	Title	Credits
ANAT 321	Circuitry of the Human Brain.	3
BIOL 309	Mathematical Models in Biology.	3
COMP 206	Introduction to Software Systems.[1]	3
COMP 250	Introduction to Computer Science.	3
MATH 222	Calculus 3.	3
MATH 223	Linear Algebra.	3

[1] Students take either COMP 206 Introduction to Software Systems. or COMP 250 Introduction to Computer Science., but not both.

C. Cognitive/Behavioural Stream

6 credits as follows:

Expand allContract all

Course	Title	Credits
PSYC 213	Cognition.	3
PSYC 318	Behavioural Neuroscience 2.	3

3 credits from:

Expand allContract all

Course	Title	Credits
BIOL 306	Neural Basis of Behaviour.	3
PHGY 314	Integrative Neuroscience.	3

6 credits from:

Expand allContract all

Course	Title	Credits
ANAT 321	Circuitry of the Human Brain.	3
PSYC 302	Pain.	3
PSYC 317	Genes and Behaviour.	3
PSYC 342	Hormones and Behaviour.	3

Other Complementary Courses

21-23 credits chosen as follows:

3-16 credits from:

Expand allContract all

Course	Title	Credits
BIOL 301	Cell and Molecular Laboratory.	4
BIOL 389	Laboratory in Neurobiology.	3
NSCI 410D1	Independent Research 1.	3
NSCI 410D2	Independent Research 1.	3
NSCI 420D1	Independent Research 2.	4.5
NSCI 420D2	Independent Research 2.	4.5

5-20 of the credits should be taken from the following lists. At least 15 of the 21-23 credits must be at the 400- or 500-level, which could include the above NSCI 410D1 Independent Research 1./NSCI 410D2 Independent Research 1. or NSCI 420D1 Independent Research 2./NSCI 420D2 Independent Research 2. research courses:

200- and 300-level Courses

Expand allContract all

Course	Title	Credits
ANAT 321	Circuitry of the Human Brain.	3
BIOC 212	Molecular Mechanisms of Cell Function.[1]	3
BIOC 311	Metabolic Biochemistry.	3
BIOL 201	Cell Biology and Metabolism.[1]	3
BIOL 202	Basic Genetics.	3
BIOL 300	Molecular Biology of the Gene.	3
BIOL 306	Neural Basis of Behaviour.	3
BIOL 307	Behavioural Ecology.	3
BIOL 320	Evolution of Brain and Behaviour.	3
CHEM 222	Introductory Organic Chemistry 2.	4
COMP 206	Introduction to Software Systems.[2]	3
COMP 250	Introduction to Computer Science.[2]	3
MATH 223	Linear Algebra.	3
MATH 315	Ordinary Differential Equations.	3
MATH 323	Probability.	3
MATH 324	Statistics.	3
MIMM 214	Introductory Immunology: Elements of Immunity.	3
MIMM 314	Intermediate Immunology.	3
NEUR 310	Cellular Neurobiology.	3
PHAR 300	Drug Action.	3
PHGY 210	Mammalian Physiology 2.	3
PHGY 311	Channels, Synapses and Hormones.	3
PHGY 314	Integrative Neuroscience.	3
PSYC 213	Cognition.	3
PSYC 302	Pain.	3
PSYC 315	Computational Psychology.	3
PSYC 317	Genes and Behaviour.	3
PSYC 318	Behavioural Neuroscience 2.	3
PSYC 319	Computational Models - Cognition.	3
PSYC 342	Hormones and Behaviour.	3

[1] Students take either BIOL 201 Cell Biology and Metabolism. OR BIOC 212 Molecular Mechanisms of Cell Function., but not both.

[2] Students take either COMP 206 Introduction to Software Systems. or COMP 250 Introduction to Computer Science., but not both.

400- and 500-level Courses

Expand allContract all

Course	Title	Credits
BIOL 414	Invertebrate Brain Circuits and Behaviours .	3
BIOL 506	Neurobiology of Learning.	3
BIOL 530	Advances in Neuroethology.	3
BIOL 532	Developmental Neurobiology Seminar.	3
BIOL 580	Genetic Approaches to Neural Systems.	3
BIOL 588	Advances in Molecular/Cellular Neurobiology.	3
BMDE 519	Biomedical Signals and Systems.	3
COMP 546	Computational Perception.	4
MATH 437	Mathematical Methods in Biology.	3
MIMM 414	Advanced Immunology.	3
MIMM 509	Inflammatory Processes.	3
NEUR 502	Basic and Clinical Aspects of Neuroimmunology.	3
NEUR 503	Computational Neuroscience.	3
NEUR 507	Topics in Radionuclide Imaging.	3
PHAR 562	Neuropharmacology.	3
PHGY 425	Analyzing Physiological Systems.	3
PHGY 451	Advanced Neurophysiology.	3
PHGY 513	Translational Immunology.	3
PHGY 524	Chronobiology.	3
PHGY 556	Topics in Systems Neuroscience.	3
PSYC 410	Special Topics in Neuropsychology.	3
PSYC 427	Sensorimotor Neuroscience.	3
PSYC 433	Cognitive Science.	3
PSYC 443	Affective Neuroscience.	0-3
PSYC 444	Sleep Mechanisms and Behaviour.	3
PSYC 470	Memory and Brain.	3
PSYC 502	Psychoneuroendocrinology.	3
PSYC 506	Cognitive Neuroscience of Attention.	3
PSYC 513	Human Decision-Making.	3
PSYC 514	Neurobiology of Memory.	3
PSYC 522	Neurochemistry and Behaviour.	3
PSYC 526	Advances in Visual Perception.	3
PSYC 529	Music Cognition.	3
PSYT 500	Advances: Neurobiology of Mental Disorders.	3