<table>
<thead>
<tr>
<th>1.0 Degree Title</th>
<th>Specify the two degrees for concurrent degree programs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Bachelor of Science (B. Sc.)</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>1.1 Major (Legacy = Subject) (30-char. max.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neuroscience</td>
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</table>

<table>
<thead>
<tr>
<th>1.2 Concentration (Legacy = Concentration/Option)</th>
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<tbody>
<tr>
<td>If applicable (30 char. max.)</td>
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<table>
<thead>
<tr>
<th>1.3 Minor (with Concentration, if applicable) (30 char. max.)</th>
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<table>
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<tr>
<th>1.4 Category</th>
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<tbody>
<tr>
<td>☐ Faculty Program (FP)</td>
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<td>☐ Major</td>
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<tr>
<td>☐ Joint Major</td>
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<tr>
<td>☐ Major Concentration (CON)</td>
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<tr>
<td>☐ Minor</td>
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<tr>
<td>☐ Minor Concentration (CON)</td>
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<td>☐ Honours (HON)</td>
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<td>☐ Joint Honours Component (HC)</td>
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<td>☐ Internship/Co-op</td>
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<td>☐ Thesis (T)</td>
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<tr>
<td>☐ Non-Thesis (N)</td>
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<tr>
<td>☐ Other</td>
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<td>☐ Please specify</td>
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</table>

| 1.5 B.Sc.; Major in Neuroscience                        |

<table>
<thead>
<tr>
<th>2.0 Administering Faculty/Unit</th>
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<tbody>
<tr>
<td>Faculty of Science, Dean’s Office; Multidisciplinary Program</td>
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<table>
<thead>
<tr>
<th>Offering Faculty/Department</th>
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<tbody>
<tr>
<td>Medicine and Science – Biology, Physiology &amp; Psychology</td>
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<table>
<thead>
<tr>
<th>3.0 Effective Term of revision or retirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Please give reasons in 5.0 “Rationale” in the case of retirement</td>
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<tr>
<td>(Ex. Sept. 2004 = 200409) Retirement</td>
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<tr>
<td>Term: 201101</td>
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<table>
<thead>
<tr>
<th>4.0 Existing Credit Weight</th>
<th>Proposed Credit Weight</th>
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</thead>
<tbody>
<tr>
<td>67 – 68</td>
<td>64 - 65</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>5.0 Rationale for revised program</th>
</tr>
</thead>
<tbody>
<tr>
<td>The program is highly regarded. The current revisions are aimed at further strengthening the program and eliminating problems that some students have had in fulfilling the requirements. Justification for each of the specific changes is given in Appendix 1.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>6.0 Revised Program Description (Maximum 150 words)</th>
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</thead>
<tbody>
<tr>
<td>The Major program in Neuroscience 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, as well as mathematics, physics, computer science and immunology. To ensure that students have the appropriate foundation, they are required to take 29 credits in lower-level courses from physiology, biology, mathematics, computer science, psychology and ethics. While flexible, 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 upper-level complementary courses to obtain more specialized training in areas of neuroscience that best suit their interest.</td>
</tr>
<tr>
<td>Notes on admission to the Neuroscience Major Program: Please note that enrolment in the Neuroscience Major is limited to a total of 50 students per year. Students seeking admission to the program must have a minimum CGPA of 3.2 and have completed BIOL 112, CHEM 110, CHEM 120, MATH 139 or MATH 140, MATH 141, PHYS 101 and PHYS 102 (or equivalent).</td>
</tr>
</tbody>
</table>
### Core Required Courses
(19 - 20 credits)

- BIOL 200  (3) Molecular Biology
- CHEM 212*  (4) Introductory Organic Chemistry 1
- NSCI 200  (3) Introduction to Neuroscience 1
- NSCI 201  (3) Introduction to Neuroscience 2
- NSCI 300  (3) Neuroethics
- NSCI 400 D1/D2  (1) Neuroscience Seminar
- PSYC 311  (3) Human Cognition and the Brain

* Note: If CHEM 212 is taken prior to the start of the program, credits must be replaced with an alternative course with approval from the program coordinator.

### Complementary Courses
(48 credits)

12 core credits selected as follows:

- 3 credits from:
  - PSYC 211  (3) Introductory Behavioural Neuroscience
  - PSYC 212  (3) Perception
  - PSYC 213  (3) Cognition

- 3 credits from:
  - BIOL 373  (3) Biometry
  - PSYC 305  (3) Statistics for Experimental Design

- 3 credits from:
  - COMP 202  (3) Introduction to Computing 1
    or equivalent in Computer Science

- 3 credits from:
  - MATH 222 **  (3) Calculus 3
  - BIOL 309  (3) Mathematical Models in Biology

** Note: Students who have successfully completed an equivalent to MATH 222 at CEGEP or elsewhere must substitute another 3-credit course for MATH 222.

### Streams
15 credits selected from one of the following three Streams:

A. Cell and Molecular Stream (15 credits)
- BIOL 201  (3) Cell Biology and Metabolism
- BIOL 212 (3) Molecular Mechanisms of Cell Function
- BIOL 202  (3) Basic Genetics
- BIOC 311  (3) Metabolic Biochemistry
- MIMM 314  (3) Immunology
- PHGY 311  (3) Channels, Synapses & Hormones

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---

### Proposed program (list courses as follows: Subj Code/Crse Num, Title, Credit weight, under the headings of: Required Courses, Complementary Courses, Elective Courses)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
<th>Credit Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 200</td>
<td>Molecular Biology</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 212*</td>
<td>Introductory Organic Chemistry 1</td>
<td>4</td>
</tr>
<tr>
<td>NSCI 200</td>
<td>Introduction to Neuroscience 1</td>
<td>3</td>
</tr>
<tr>
<td>NSCI 201</td>
<td>Introduction to Neuroscience 2</td>
<td>3</td>
</tr>
<tr>
<td>NSCI 300</td>
<td>Neuroethics</td>
<td>3</td>
</tr>
<tr>
<td>NSCI 400 D1/D2</td>
<td>Neuroscience Seminar</td>
<td>1</td>
</tr>
<tr>
<td>PSYC 311</td>
<td>Human Cognition and the Brain</td>
<td>3</td>
</tr>
</tbody>
</table>

* Note: If CHEM 212 is taken prior to the start of the program, credits must be replaced with an alternative course with approval from the program coordinator.

### Complementary Courses
(45 credits)

9 core credits selected as follows:

- 3 credits from:
  - BIOL 373  (3) Biometry
  - PSYC 305  (3) Statistics for Experimental Design
  - Note: The prerequisite for PSYC 305 is PSYC 204.

- 3 credits from:
  - COMP 202  (3) Introduction to Computing 1
    or equivalent in Computer Science

- 3 credits from:
  - MATH 222 **  (3) Calculus 3
  - BIOL 309  (3) Mathematical Models in Biology

** Note: Students who have successfully completed an equivalent to MATH 222 at CEGEP or elsewhere must substitute another 3-credit course for MATH 222.

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15 credits selected from one of the following three Streams:

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- BIOL 202  (3) Basic Genetics
- BIOC 311  (3) Metabolic Biochemistry
- MIMM 314  (3) Immunology
- PHGY 311  (3) Channels, Synapses & Hormones

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Program/Major or Minor/ Concentration Revision Form P2-2
**Program/Major Revision Form – Attachment**

### Existing Program

#### B. Neurophysiology/Neural Computation Stream (15 credits)
- ANAT 321 (3) Circuitry of the Human Brain
- BIOL 201 (3) Cell Biology and Metabolism OR BIOC 212 (3) Molecular Mechanisms of Cell Function
- BIOL 306 (3) Neural Basis of Behaviour OR PHGY 314 (3) Integrative Neuroscience
- MATH 222 (3) Calculus 3 OR BIOL 309 (3) Mathematical Models in Biology
- COMP 206 (3) Introduction to Software Systems
- PHGY 311 (3) Channels, Synapses & Hormones

#### C. Cognitive/Behavioural Stream (15 credits)
- PSYC 213 (3) Cognition
- PSYC 318 (3) Behavioural Neuroscience 2
- And 12 credits chosen from:
  - BIOL 306 (3) Neural Basis of Behaviour OR PHGY 314 (3) Integrative Neuroscience
  - LING 390 (3) Neuroscience of Language
  - PSYC 317 (3) Genes and Behaviour
  - PSYC 342 (3) Hormones and Behaviour
  - PSYC 410 (3) Special Topics in Neuropsychology
  - PSYC 427 (3) Sensorimotor Behaviour
  - PSYC 470 (3) Memory and Brain

#### Upper Level (21 credits)
- 21 credits from the following:
  - At least 18 of the 21 credits must be at the 400- or 500-level
  - 3 – 9 credits – one course MUST be taken from the following list:
    - BIOL 301 (4) Cell and Molecular Laboratory
    - BIOL 389 (3) Laboratory in Neurobiology
    - NSCI 410 (6) Independent Research 1 OR NSCI 420 D1/D2 (9) Independent Research 2
  - 12 – 18 credits from the following list:
    - 200- and 300-level courses:
      - BIOC 311 (3) Metabolic Biochemistry
      - BIOL 300 (3) Molecular Biology of the Gene

### Proposed Program

#### B. Neurophysiology/Neural Computation Stream (15 credits)
- ANAT 321 (3) Circuitry of the Human Brain
- BIOL 201 (3) Cell Biology and Metabolism OR BIOC 212 (3) Molecular Mechanisms of Cell Function
- BIOL 306 (3) Neural Basis of Behaviour OR PHGY 314 (3) Integrative Neuroscience
- MATH 222 (3) Calculus 3 OR BIOL 309 (3) Mathematical Models in Biology
- PHGY 311 (3) Channels, Synapses & Hormones

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- PSYC 213 (3) Cognition
- PSYC 318 (3) Behavioural Neuroscience 2
- And 12 credits chosen from:
  - BIOL 306 (3) Neural Basis of Behaviour OR PHGY 314 (3) Integrative Neuroscience
  - LING 390 (3) Neuroscience of Language
  - PSYC 317 (3) Genes and Behaviour
  - PSYC 342 (3) Hormones and Behaviour
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  - 12 – 18 credits from the following list:
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<td>Cell and Molecular Laboratory</td>
</tr>
<tr>
<td>BIOL 306</td>
<td>Neural Basis of Behaviour</td>
</tr>
<tr>
<td>BIOL 389</td>
<td>Laboratory in Neurobiology</td>
</tr>
<tr>
<td>CHEM 222</td>
<td>Introductory Organic Chemistry 2</td>
</tr>
<tr>
<td>COMP 206</td>
<td>Introduction to Software Systems</td>
</tr>
<tr>
<td>LING 390</td>
<td>Neuroscience of Language</td>
</tr>
<tr>
<td>MATH 315</td>
<td>Ordinary Differential Equations</td>
</tr>
<tr>
<td>MATH 323</td>
<td>Probability</td>
</tr>
<tr>
<td>MATH 324</td>
<td>Statistics</td>
</tr>
<tr>
<td>NEUR 310</td>
<td>Cellular Neurobiology</td>
</tr>
<tr>
<td>PHGY 311</td>
<td>Channels, Synapses &amp; Hormones</td>
</tr>
<tr>
<td>PHGY 314</td>
<td>Integrative Neuroscience</td>
</tr>
<tr>
<td>PHIL 306</td>
<td>Philosophy of Mind</td>
</tr>
<tr>
<td>PHIL 341</td>
<td>Philosophy of Science 1</td>
</tr>
<tr>
<td>PSYC 317</td>
<td>Genes and Behaviour</td>
</tr>
<tr>
<td>PSYC 318</td>
<td>Behavioural Neuroscience 2</td>
</tr>
<tr>
<td>PSYC 342</td>
<td>Hormones and Behaviour</td>
</tr>
</tbody>
</table>

400- and 500-level courses:
- BIOL 514 (3) Neurobiology of Learning and Memory OR
- PSYC 514 (3) Neurobiology of Learning and Memory
- BIOL 530 (3) Advances in Neuroethology
- BIOL 532 (3) Developmental Neurobiology Seminar
- BIOL 588 (3) Molecular/Cellular Neurobiology
- BMDE 519 (3) Biomedical Signals and Systems
- MATH 437 (3) Mathematical Methods in Biology OR
- PHYS 413 (3) Physical Basis of Physiology
- MIMM 414 (3) Advanced Immunology
- MIMM 509 (3) Inflammatory Processes
- NEUR 550 (3) Free Radical Biomedicine
- PHAR 562 (3) General Pharmacology 1
- PHAR 563 (3) General Pharmacology 2
- PHGY 451 (3) Advanced Neurophysiology
- PHGY 513 (3) Cellular Immunology
- PHGY 556 (3) Topics in Systems Neuroscience
- PSYC 410 (3) Special Topics in Neuropsychology
- PSYC 427 (3) Sensorimotor Behaviour
- PSYC 470 (3) Memory and Brain
- PSYC 505 (3) The Psychology of Pain
- PSYC 526 (3) Advances in Visual Perception
- PSYC 532 (3) Cognitive Science
- PSYT 500 (3) Advances: Neurobiology of Mental Disorders

The remainder 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 410 or NSCI 420 D1/D2 research courses:

200- and 300-level courses:
- BIOL 201 (3) Cell Biology and Metabolism OR
- BIOC 212 (3) Molecular Mechanisms of Cell Function
- BIOC 311 (3) Metabolic Biochemistry
- BIOL 300 (3) Molecular Biology of the Gene
- BIOL 301 (4) Cell and Molecular Laboratory
- BIOL 306 (3) Neural Basis of Behaviour
- BIOL 389 (3) Laboratory in Neurobiology
- CHEM 222 (4) Introductory Organic Chemistry 2
- COMP 206 (3) Introduction to Software Systems OR equivalent 300- or 400-level Computer Science course
- LING 390 (3) Neuroscience of Language
- MATH 315 (3) Ordinary Differential Equations
- MATH 323 (3) Probability
- MATH 324 (3) Statistics
- MIMM 314 (3) Immunology
- NEUR 310 (3) Cellular Neurobiology
- PHGY 311 (3) Channels, Synapses & Hormones
- PHGY 314 (3) Integrative Neuroscience
- PHIL 306 (3) Philosophy of Mind
- PHIL 341 (3) Philosophy of Science 1
- PSYC 315 (3) Computational Psychology
- PSYC 317 (3) Genes and Behaviour
- PSYC 318 (3) Behavioural Neuroscience 2
- PSYC 342 (3) Hormones and Behaviour

400- and 500-level courses:
- BIOL 514 (3) Neurobiology of Learning and Memory OR
- PSYC 514 (3) Neurobiology of Learning and Memory
- BIOL 530 (3) Advances in Neuroethology
- BIOL 532 (3) Developmental Neurobiology Seminar
- BIOL 588 (3) Molecular/Cellular Neurobiology
- BMDE 519 (3) Biomedical Signals and Systems
- MATH 437 (3) Mathematical Methods in Biology OR
- PHYS 413 (3) Physical Basis of Physiology
- MIMM 414 (3) Advanced Immunology
- MIMM 509 (3) Inflammatory Processes
- NEUR 550 (3) Free Radical Biomedicine
- PHAR 562 (3) General Pharmacology 1
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<tr>
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<tbody>
<tr>
<td>PHAR 563</td>
<td>General Pharmacology 2</td>
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<tr>
<td>PHGY 425</td>
<td>Analyzing Physiological Systems</td>
</tr>
<tr>
<td>PHGY 451</td>
<td>Advanced Neurophysiology</td>
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<tr>
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<td>PSYC 501</td>
<td>Auditory Perception</td>
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<td>PSYC 505</td>
<td>The Psychology of Pain</td>
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<tr>
<td>PSYC 522</td>
<td>Neurochemistry and Behaviour</td>
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<td>Advances in Visual Perception</td>
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<tr>
<td>PSYC 532</td>
<td>Cognitive Science</td>
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<tr>
<td>PSYT 500</td>
<td>Advances: Neurobiology of Mental Disorders</td>
</tr>
<tr>
<td>PSYT 505</td>
<td>Neurobiology of Schizophrenia</td>
</tr>
</tbody>
</table>

Section 8.0

Consultation with the Neuroscience Curriculum Committee occurred on June 21, 2010 concerning revisions to the Major Program for Neuroscience. Committee members are:

- Dr. Monroe Cohen
- Dr. Kathleen Cullen
- Dr. Rüdiger Krahe
- Dr. Gerald Pollack
- Dr. Edward Ruthazer
- Dr. Gillian O’Driscoll
- Dr. Julio Martinez-Trujillo

The committee was unanimously in favour of the above revisions.

Approval was obtained from the Chairs of the Departments of Biology, Physiology and Psychology – see attached.

Coordinators of the following courses approved the addition of their courses to the program (see attached course outlines/syllabi):

- ANAT 321
- PHGY 425
- PSYC 315
- PSYC 501
- PSYC 502
- PSYC 522
- PSYT 505