

Program/Major or Minor/Concentration Revision Form

(07/2004)

1.0 Degree Title	2.0 Administering Faculty/Unit
Specify the two degrees for concurrent degree programs Bachelor of Science (B. Sc.)	Faculty of Science, Dean's Office; Multidisciplinary Program
	Offering Faculty/Department
1.1 Major (Legacy= Subject) (30-char. max.)	Medicine and Science – Biology, Physiology & Psychology
Neuroscience	
1.2 Concentration (Legacy = Concentration/Option) If applicable (30 char. max.)	 3.0 Effective Term of revision or retirement Please give reasons in 5.0 "Rationale" in the case of retirement (Ex. Sept. 2004 = 200409) Retirement
	Term: 201101
1.3 Minor (with Concentration, if applicable) (30 char. max.)1.4 Category	4.0 Existing Credit Weight 67 – 68 5.0 Rationale for revised program
	The program is highly regarded. The surrent
 Faculty Program (FP) Major Joint Major Major Concentration (CON) Minor Minor Concentration (CON) Minor Concentration (CON)	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.
1.5 B.Sc.; Major in Neuroscience	

6.0 Revised Program Description (Maximum 150 words)

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.

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).

7.0 List of existing program and proposed program

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

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

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 (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.

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 OR BIOC 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

Section 7.0 Continued	Proposed Program
Existing Program	B. Neurophysiology/Neural Computation Stream (15 credits)
B. Neurophysiology/Neural Computation Stream (15 credits)	ANAT 321 (3) Circuitry of the Human Brain
ANAT 321 (3) Circuitry of the Human Brain BIOL 201 (3) Cell Biology and Metabolism OR	BIOC 201 (3) Cell Biology and Metabolism OR BIOC 212 (3) Molecular Mechanisms of Cell Function
BIOC 212 (3) Molecular Mechanisms of Cell Function	BIOL 306 (3) Neural Basis of Behaviour OR PHGY 314 (3) Integrative Neuroscience
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
MATH 222 (3) Calculus 3 OR BIOL 309 (3) Mathematical Models in Biology	OR COMP 206 (3) Introduction to Software Systems
OR COMP 206 (3) Introduction to Software	PHGY 311 (3) Channels, Synapses & Hormones
Systems PHGY 311 (3) Channels, Synapses & Hormones	C. Cognitive/Behavioural Stream (15 credits)
C. Cognitive/Behavioural Stream (15 credits)	PSYC 213 (3) Cognition PSYC 318 (3) Behavioural Neuroscience 2 BIOL 306 (3) Neural Basis of Behaviour OB
PSYC 318 (3) Behavioural Neuroscience 2	<u>PHGY 314 (3) Integrative Neuroscience</u> ANAT 321 (3) Circuitry of the Human Brain
And 12 credits chosen from:	
BIOL 306 (3) Neural Basis of Behaviour OR	And $\frac{12.3}{2}$ credits chosen from:
PHGY 314 (3) Integrative Neuroscience	BIOL 306 (3) Neural Basis of Behaviour OR
PSYC 317 (3) Genes and Behaviour	ING 390 (3) Neuroscience of Language
PSYC 342 (3) Hormones and Behaviour	PSYC 317 (3) Genes and Behaviour
PSYC 410 (3) Special Topics in Neuropsychology	PSYC 342 (3) Hormones and Behaviour
PSYC 427 (3) Sensorimotor Behaviour	PSYC 410 (3) Special Topics in Neuropsychology
PSYC 470 (3) Memory and Brain	PSYC 427 (3) Sensorimotor Behaviour
	PSYC 470 (3) Memory and Brain
Upper Level (21 credits)	
21 credits from the following:	Upper Level (21 credits)
At least 18 of the 21 credits must be at the 400- or	21 credits from the following:
500-level	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:	Other Complementary Courses (21 – 23 credits)
BIOL 301 (4) Cell and Molecular Laboratory	2. O gradita one course MUST he taken from the
NSCL 410 (6) Independent Research 1 OR	5 9 credits one course wros r be taken nom the following list:
NSCI 420 D1/D2 (9) Independent Research 2	3 - 16 credits from:
	BIOL 301 (4) Cell and Molecular Laboratory
12 - 18 credits from the following list:	BIOL 389 (3) Laboratory in Neurobiology
	NSCI 410 (6) Independent Research 1 OR
200- and 300-level courses:	NSCI 420 D1/D2 (9) Independent Research 2
BIOC 311 (3) Metabolic Biochemistry	
BIOL 300 (3) Molecular Biology of the Gene	12 18 credits from the following list:

	BIOL 301 (4) Cell and Molecular Laboratory	The remainder of the credits should be taken from
	BIOL 306 (3) Neural Basis of Behaviour	the following lists. At least 15 of the 21-23 credits
	BIOL 389 (3) Laboratory in Neurophology	must be at the 400- or 500-level which could
	CHFM 222 (4) Introductory Organic Chemistry 2	include the above NSCI 410 or NSCI 420 D1/D2
	COMP 206 (3) Introduction to Software Systems	research courses.
ļ	Or aquivalent 200 or 400 level Computer	<u>research courses.</u>
	Of equivalent 500- of 400-level Computer	200
1	Science course	200- and 300-level courses:
	LING 390 (3) Neuroscience of Language	BIOL 201 (3) Cell Biology and Metabolism OR
	MATH 315 (3) Ordinary Differential Equations	BIOC 212 (3) Molecular Mechanisms of Cell
l	MATH 323 (3) Probability	Function
	MATH 324 (3) Statistics	BIOC 311 (3) Metabolic Biochemistry
	NEUR 310 (3) Cellular Neurobiology	BIOL 300 (3) Molecular Biology of the Gene
	PHGY 311 (3) Channels, Synapses & Hormones	BIOL 301 (4) Cell and Molecular Laboratory
	PHGY 314 (3) Integrative Neuroscience	BIOL 306 (3) Neural Basis of Behaviour
1	PHIL 306 (3) Philosophy of Mind	BIOL 389 (3) Laboratory in Neurobiology
	PHIL 341 (3) Philosophy of Science 1	CHEM 222 (4) Introductory Organic Chemistry 2
	PSYC 317 (3) Genes and Behaviour	COMP 206 (3) Introduction to Software Systems
	PSYC 318 (3) Behavioural Neuroscience 2	Or equivalent 300- or 400-level Computer
	PSVC 3/2 (3) Hormones and Behaviour	Science course
	151C 5+2 (5) Hormones and Denaviour	LING 300 (3) Neuroscience of Language
	400 and 500 level courses	MATH 215 (2) Ordinary Differential Equations
	400- and 500-level courses.	MATH 222 (2) Drobability
	BIOC 455 (5) Incurochemistry	MATH 325 (3) Probability
1	BIOL 514 (3) Neurobiology of Learning and	MATH 324 (3) Statistics
l	Memory OR	MIMM 314 (3) Immunology
	PSYC 514 (3) Neurobiology of Learning and	NEUR 310 (3) Cellular Neurobiology
	Memory	PHGY 311 (3) Channels, Synapses & Hormones
	BIOL 530 (3) Advances in Neuroethology	PHGY 314 (3) Integrative Neuroscience
	BIOL 532 (3) Developmental Neurobiology	PHIL 306 (3) Philosophy of Mind
	Seminar	PHIL 341 (3) Philosophy of Science 1
	BIOL 588 (3) Molecular/Cellular Neurobiology	PSYC 315 (3) Computational Psychology
	BMDE 519 (3) Biomedical Signals and Systems	PSYC 317 (3) Genes and Behaviour
	MATH 437 (3) Mathematical Methods in Biology	PSYC 318 (3) Behavioural Neuroscience 2
	OR	PSYC 342 (3) Hormones and Behaviour
	PHYS 413 (3) Physical Basis of Physiology	
1	MIMM 414 (3) Advanced Immunology	400- and 500-level courses
	MIMM 509 (3) Inflammatory Processes	BIOC 455 (3) Neurochemistry
	NEUR 550 (3) Free Radical Biomedicine	BIOL 514 (3) Neurobiology of Learning and
	PHAR 562 (3) General Pharmacology 1	Memory OR
	PHAR 563 (3) General Pharmacology 2	PSVC 514 (3) Neurophiology of Learning and
	PHGV 451 (3) Advanced Neurophysiology	Memory
	PHCV 512 (3) Collular Immunology	RIOL 520 (2) Advances in Neuroethology
	PHOT 515 (3) Central Infinitutiology	DIOL 530 (3) Advances in Neurobiology
	PHOT 550 (5) Topics in Systems Neuroscience	Sinch Size (5) Developmental Neurobiology
	PSYC 410 (3) Special Topics in Neuropsychology	Seminar
	PSYC 427 (3) Sensorimotor Behaviour	BIOL 588 (3) Molecular/Cellular Neurobiology
	PSYC 470 (3) Memory and Brain	BMDE 519 (3) Biomedical Signals and Systems
	PSYC 505 (3) The Psychology of Pain	MATH 437 (3) Mathematical Methods in Biology
	PSYC 526 (3) Advances in Visual Perception	OR
	PSYC 532 (3) Cognitive Science	PHYS 413 (3) Physical Basis of Physiology
	PSYT 500 (3) Advances: Neurobiology of	MIMM 414 (3) Advanced Immunology
	Mental Disorders	MIMM 509 (3) Inflammatory Processes
		NEUR 550 (3) Free Radical Biomedicine
I		PHAR 562 (3) General Pharmacology 1

PHAR 563 (3) General Pharmacology 2
PHGY 425 (3) Analyzing Physiological Systems
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 501 (3) Auditory Perception
PSYC 502 (3) Psychoneuroendocrinology
PSYC 505 (3) The Psychology of Pain
PSYC 522 (3) Neurochemistry and Behaviour
PSYC 526 (3) Advances in Visual Perception
PSYC 532 (3) Cognitive Science
PSYT 500 (3) Advances: Neurobiology of
Mental Disorders
PSYT 505 (3) Neurobiology of Schizophrenia

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