The programs offered in Physiology differ in their orientation but they all have a common core of material covering cardiovascular, respiratory, gastrointestinal and renal physiology, neurophysiology, endocrinology and immunology. The specified U1 courses are identical for all programs except the Joint Major Programs in Physiology and Physics, Physiology and Mathematics, and the Joint Honours Program in Immunology and thus afford the student maximal flexibility before deciding on a particular program to follow in U2 and U3.

All new students interested in a Physiology program are asked to contact the Department for information regarding academic advising.

### FACULTY PROGRAM IN PHYSIOLOGY (54 credits) [MARS Program Code 4-750000]

If not previously taken 180-212A,B Organic Chemistry I must be completed in addition to the 54 program credits.

#### Required Courses (30 credits)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>552-209A</td>
<td>Mammalian Physiology I</td>
<td>3</td>
</tr>
<tr>
<td>552-210B</td>
<td>Mammalian Physiology I</td>
<td>3</td>
</tr>
<tr>
<td>552-212D</td>
<td>Introductory Physiology Lab</td>
<td>2</td>
</tr>
<tr>
<td>552-311A</td>
<td>Intermediate Physiology I</td>
<td>3</td>
</tr>
<tr>
<td>552-312B</td>
<td>Intermediate Physiology II</td>
<td>3</td>
</tr>
<tr>
<td>552-313B</td>
<td>Intermediate Physiology III</td>
<td>3</td>
</tr>
<tr>
<td>177-200A</td>
<td>Molecular Biology</td>
<td>3</td>
</tr>
<tr>
<td>177-202A,B</td>
<td>Basic Genetics</td>
<td>3</td>
</tr>
<tr>
<td>177-301A,B</td>
<td>Cell and Molecular Laboratory</td>
<td>3</td>
</tr>
<tr>
<td>180-222A,B</td>
<td>Organic Chemistry II</td>
<td>4</td>
</tr>
</tbody>
</table>

#### Complementary Courses (24 credits)

6 credits selected from:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>177-201B</td>
<td>Cell Biology and Metabolism</td>
<td>3</td>
</tr>
<tr>
<td>507-212B</td>
<td>Molecular Mechanisms of Cell Function</td>
<td>3</td>
</tr>
<tr>
<td>177-373A</td>
<td>Biostatistical Analysis</td>
<td>3</td>
</tr>
<tr>
<td>or 177-309A</td>
<td>Mathematical Models in Biology</td>
<td>3</td>
</tr>
</tbody>
</table>

6 credits selected from upper level physiology courses

12 credits selected from upper level science courses

### MAJOR PROGRAM IN PHYSIOLOGY (63-64 credits) [MARS Program Code 1-750000]

The Major Program includes, in addition to some intensive studies in Physiology, a strong core content of related biomedical and physical sciences. Admission to the Major Program will be in U2, upon completion of the U1 required courses, and in consultation with the student’s adviser.

If not previously taken 180-212A,B Organic Chemistry I must be completed in addition to the 63-64 program credits.

#### U1 Required Courses (18 credits)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>552-209A</td>
<td>Mammalian Physiology I</td>
<td>3</td>
</tr>
<tr>
<td>552-210B</td>
<td>Mammalian Physiology I</td>
<td>3</td>
</tr>
<tr>
<td>552-212D</td>
<td>Introductory Physiology Lab</td>
<td>2</td>
</tr>
<tr>
<td>177-200A</td>
<td>Molecular Biology</td>
<td>3</td>
</tr>
<tr>
<td>177-202A,B</td>
<td>Basic Genetics</td>
<td>3</td>
</tr>
<tr>
<td>180-222A,B</td>
<td>Organic Chemistry II</td>
<td>4</td>
</tr>
</tbody>
</table>

#### U2 and U3 Required Courses (15 credits)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>552-311A</td>
<td>Intermediate Physiology I</td>
<td>3</td>
</tr>
<tr>
<td>552-312B</td>
<td>Intermediate Physiology II</td>
<td>3</td>
</tr>
<tr>
<td>552-313B</td>
<td>Intermediate Physiology III</td>
<td>3</td>
</tr>
<tr>
<td>177-301A,B</td>
<td>Cell and Molecular Laboratory</td>
<td>3</td>
</tr>
<tr>
<td>507-311A</td>
<td>Metabolic Biochemistry</td>
<td>3</td>
</tr>
</tbody>
</table>

#### Complementary Courses (30-31 credits)

12-13 credits selected from:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>177-201B</td>
<td>Cell Biology and Metabolism</td>
<td>3</td>
</tr>
<tr>
<td>507-212B</td>
<td>Molecular Mechanisms of Cell Function</td>
<td>3</td>
</tr>
<tr>
<td>177-373A</td>
<td>Biostatistical Analysis</td>
<td>3</td>
</tr>
<tr>
<td>or 177-309A</td>
<td>Mathematical Models in Biology</td>
<td>3</td>
</tr>
</tbody>
</table>

9 credits selected from upper level physiology courses

9 credits selected from upper level science courses

### JOINT MAJOR PROGRAM IN PHYSIOLOGY AND MATHEMATICS (71 credits) [MARS Program Code 1-725400]

#### U1 Required Courses (14 credits)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>552-212D</td>
<td>Introductory Physiology Lab</td>
<td>2</td>
</tr>
<tr>
<td>189-222A,B</td>
<td>Calculus III</td>
<td>3</td>
</tr>
<tr>
<td>189-247A</td>
<td>Linear Algebra</td>
<td>3</td>
</tr>
<tr>
<td>177-200A</td>
<td>Molecular Biology</td>
<td>3</td>
</tr>
<tr>
<td>177-309A</td>
<td>Mathematical Models in Biology</td>
<td>3</td>
</tr>
</tbody>
</table>

#### U1 Complementary Courses (15 credits)

9 credits selected from:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>552-209A</td>
<td>Mammalian Physiology I</td>
<td>3</td>
</tr>
<tr>
<td>or 552-210B</td>
<td>Mammalian Physiology II</td>
<td>3</td>
</tr>
<tr>
<td>or 552-201A,B</td>
<td>Human Physiology:Control Systems</td>
<td>3</td>
</tr>
<tr>
<td>or 552-202B</td>
<td>Human Physiology:Body Functions</td>
<td>3</td>
</tr>
<tr>
<td>or 507-212B</td>
<td>Molecular Mechanisms of Cell Function</td>
<td>3</td>
</tr>
</tbody>
</table>

6 credits selected from:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>189-248A</td>
<td>Advanced Calculus I</td>
<td>3</td>
</tr>
<tr>
<td>or 189-314A,B</td>
<td>Advanced Calculus</td>
<td>3</td>
</tr>
<tr>
<td>or 189-325A,B</td>
<td>Ordinary Differential Equations</td>
<td>3</td>
</tr>
<tr>
<td>or 189-315A,B</td>
<td>Ordinary Differential Equations</td>
<td>3</td>
</tr>
</tbody>
</table>

#### U2 Required Courses (21 credits)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>552-311A</td>
<td>Intermediate Physiology I</td>
<td>3</td>
</tr>
<tr>
<td>552-312B</td>
<td>Intermediate Physiology II</td>
<td>3</td>
</tr>
<tr>
<td>552-313B</td>
<td>Intermediate Physiology III</td>
<td>3</td>
</tr>
<tr>
<td>189-242A</td>
<td>Analysis I</td>
<td>3</td>
</tr>
<tr>
<td>189-243B</td>
<td>Real Analysis</td>
<td>3</td>
</tr>
<tr>
<td>189-323A</td>
<td>Probability Theory</td>
<td>3</td>
</tr>
<tr>
<td>189-324B</td>
<td>Statistics</td>
<td>3</td>
</tr>
</tbody>
</table>

#### U2 Complementary Courses (3 credits)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>198-413A</td>
<td>The Physical Basis of Physiology</td>
<td>3</td>
</tr>
<tr>
<td>or 189-437A</td>
<td>Mathematical Methods in Biology</td>
<td>3</td>
</tr>
</tbody>
</table>

#### U3 Required Courses (3 credits)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>189-319B</td>
<td>Partial Differential Equations</td>
<td>3</td>
</tr>
</tbody>
</table>

#### U3 Complementary Courses (15 credits)

6 credits selected from Physiology courses (e.g. 552-461D)

3 credits selected from upper level science courses

6 credits selected from:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>189-316B</td>
<td>Functions of a Complex Variable</td>
<td>3</td>
</tr>
<tr>
<td>or 189-249B</td>
<td>Advanced Calculus II</td>
<td>3</td>
</tr>
<tr>
<td>or 189-317A,B</td>
<td>Numerical Analysis</td>
<td>3</td>
</tr>
<tr>
<td>189-322B</td>
<td>Dynamical Systems, Fractals and Chaos</td>
<td>3</td>
</tr>
<tr>
<td>189-447B</td>
<td>Stochastic Processes</td>
<td>3</td>
</tr>
</tbody>
</table>

### JOINT MAJOR PROGRAM IN PHYSIOLOGY AND PHYSICS (77 credits) [MARS Program Code 1-725500]

This program provides a firm foundation in physics, mathematics and physiology. It is appropriate for students interested in applying methods of the physical sciences to problems in physiology and allied biological sciences.

#### U1 Required Courses (17 credits)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>552-212D*</td>
<td>Introductory Physiology Lab</td>
<td>2</td>
</tr>
<tr>
<td>198-230A</td>
<td>Dynamics of Simple Systems</td>
<td>3</td>
</tr>
<tr>
<td>198-232B</td>
<td>Heat and Waves</td>
<td>3</td>
</tr>
<tr>
<td>198-241B</td>
<td>Signal Processing</td>
<td>3</td>
</tr>
<tr>
<td>198-259D</td>
<td>Lab in Mechanics, Heat &amp; Optics</td>
<td>3</td>
</tr>
<tr>
<td>189-222A,B</td>
<td>Calculus III</td>
<td>3</td>
</tr>
</tbody>
</table>

#### U1 Complementary Courses (12 credits)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>552-209A</td>
<td>Mammalian Physiology I</td>
<td>3</td>
</tr>
<tr>
<td>or 552-210B*</td>
<td>Mammalian Physiology II</td>
<td>3</td>
</tr>
<tr>
<td>or 552-201A</td>
<td>Human Physiology:Control Systems</td>
<td>3</td>
</tr>
<tr>
<td>or 552-202B</td>
<td>Human Physiology:Body Functions</td>
<td>3</td>
</tr>
<tr>
<td>or 189-223A</td>
<td>Linear Algebra</td>
<td>3</td>
</tr>
</tbody>
</table>
If not previously taken 180-212A,B Organic Chemistry I must be taken by entering students in the Honours programs. Students who do not maintain Honours standing may transfer their registration to the General Program. The Department reserves the right to restrict the number of entering students in the Honours programs. Students who do not maintain Honours standing may transfer their registration to the Major Program in Physiology. The deadline to apply to the Honours Program is June 1. Application forms are available in McIntyre 1021. Students should include in their letters of application at least two telephone numbers where they can be reached during the last week of August. Students are responsible for picking up their letters of decision in McIntyre 1021 no later than one week before classes start.

Graduation: To graduate from the Honours Physiology Program the student will have a CGPA of 3.2 with a mark no less than a B in U2 Physiology courses.

HONOURS PROGRAM IN PHYSIOLOGY (71 credits) [MARS Program Code 2-750000]

All admissions to the Honours program will be in U2, and the student must have a U1 GPA of 3.3, with no less than a B in 552-209A and 210B. Admission to U3 requires a U2 CGPA of 3.2 with no less than a B in U2 Physiology courses. Decisions for admission to U3 will be heavily influenced by student standing in U2 courses.

The Department reserves the right to restrict the number of entering students in the Honours programs. Students who do not maintain Honours standing may transfer their registration to the Major Program in Physiology.

The deadline to apply to the Honours Program is June 1. Application forms are available in McIntyre 1021. Students should include in their letters of application at least two telephone numbers where they can be reached during the last week of August. Students are responsible for picking up their letters of decision in McIntyre 1021 no later than one week before classes start.

Graduation: To graduate from the Honours Physiology Program the student will have a CGPA of 3.2 with a mark no less than a B in all Physiology courses.

If not previously taken 180-212A,B Organic Chemistry I must be completed in addition to the 71 program credits.

Required Courses (53 credits)
552-209A (3) Mammalian Physiology I
552-210B (3) Mammalian Physiology II
552-212D (2) Introductory Physiology Lab
552-311A (3) Intermediate Physiology I
552-312B (3) Intermediate Physiology II
552-313B (3) Intermediate Physiology III
552-351B (3) Research Techniques in Physiology
552-359D (1) Tutorial in Physiology
552-459D (6) Physiology Seminar
552-461D (6) Experimental Physiology
177-200A (3) Molecular Biology
177-202A,B (3) Basic Genetics
177-301A,B (3) Cell and Molecular Laboratory
180-222A,B (4) Organic Chemistry II
504-261A (4) Introduction to Dynamic Histology
507-311A (3) Metabolic Biochemistry

Complementary Courses (18 credits)
9 credits selected from:
177-201B (3) Cell Biology and Metabolism
or 507-212B (3) Molecular Mechanisms of Cell Function

or 189-247A (3) Linear Algebra
189-314B (3) Advanced Calculus
or 189-248A (3) Advanced Calculus I

The corequisite 177-200A, 177-201B is waived for this program.

U2 Required Courses (21 credits)
552-311A (3) Intermediate Physiology I
552-312B (3) Intermediate Physiology II
552-313B (3) Intermediate Physiology III
198-328A (3) Electronics
198-333B (3) Thermal & Statistical Physics
198-339B (3) Measurements Laboratory
198-340A (3) Electricity and Magnetism

U2 Complementary Courses (6 credits)
198-413A (3) The Physical Basis of Physiology
or 189-437A (3) Mathematical Methods in Biology
198-315A (3) Ordinary Differential Equations
or 198-325B (3) Ordinary Differential Equations

U3 Required Courses (12 credits)
552-461D (6) Experimental Physiology
198-446A (3) Quantum Physics
399-519A (3) Analysis of Biomedical Systems and Signals

U3 Complementary Courses (9 credits)
3 credits selected from upper level Physiology courses
3 credits selected from upper level science courses

INTERDEPARTMENTAL HONOURS PROGRAM IN IMMUNOLOGY The Departments of Biochemistry, Microbiology and Immunology, and Physiology offer an Interdepartmental Honours Program in Immunology. Physiology students interested in the program should contact Dr. W.S. Lapp. Details of this program may be found in section 11.14.

COURSE DESCRIPTIONS

The following courses are considered acceptable as upper level physiology courses: Biomedical Engineering 399-519A; Experimental Medicine 516-502A, 516-503B, 516-506B, 516-507A, 516-508B and 516-509A. See the appropriate department entry for course descriptions.

The course credit weight is given in parentheses (#) after the course title.

Denotes courses not offered in 1999-2000.
Denotes courses offered in alternate years only
Denotes limited enrolment

For more detailed information about courses and programs consult the Department's website.

552-100A THE BODY MATTERS. (3) (3-hour seminar per week)
(Not open to students who have taken or are taking 552-201, 552-202, 552-209, 552-210, or 552-211.) Designed for anyone with an interest in exercise, the course covers the principles of medicine and physiology as they apply to current lifestyles. Topics will include how and why injuries occur, the effects of exercise on the body, and general health considerations such as "Does exercise prevent or promote osteoarthritis?". Professor Shrier

552-198A FEEDBACK & RHYTHMS IN PHYSIOLOGY. (3) (3 hours seminar) (FY5 – for first year students only, maximum 25.) (Corequisite: 189-140) An interdisciplinary course about physiological rhythms and control systems. The concept of feedback will be introduced and applied to physiological systems such as white blood-cell production and control of respiration by CO2. Both normal physiological and abnormal pathophysiological rhythms will be treated. Professors Guevara and Mackey

552-199A HISTORY OF GENETIC ENGINEERING. (3) (3 hours seminar per week) (FY5 - for first year students only, maximum 20.) The history of molecular biology and genetic engineering will be surveyed through a series of essays and reviews written by historic figures and prominent scientists of today. The course will trace key players and principal advances in our understanding of the gene, its manipulation, and the future of genetic engineering. Professor White

552-201A HUMAN PHYSIOLOGY: CONTROL SYSTEMS. (3) (3 hours lecture weekly) (Prerequisites: collegial courses in biology or anatomy, and in chemistry and physics; with 180-212 or equivalent, as a pre- or co-requisite.) (For students in Physical and Occupational Therapy, Nursing, and others with permission of the course coordinator.) (Not open to students who have taken 552-209A.) Physiology of body fluids, blood, nerve and muscle, peripheral nerves, central nervous system, special senses, autonomic nervous system, defense mechanisms. Professor White and Staff

552-202B HUMAN PHYSIOLOGY: BODY FUNCTIONS. (3) (3 hours lecture weekly) (Prerequisites: collegial courses in biology or anatomy and in chemistry and physics; with 180-212 or equivalent, as a pre- or co-requisite.) For students in Physical and Occupational Therapy, Nursing, Education, and others with permission of the course coordinator. (Not open to students who took 552-201A in 1976-77 or earlier, or 552-210B.) Physiology of the cardiovascular, respiratory, excretory, endocrine, and digestive systems; organic...
and energy metabolism; nutrition; exercise and environmental stress. 

Professor Orlowski and Staff

552-201A and 552-202B are companion courses and it is recommended that they be taken in that sequence, but they may be taken in separate years or in the reverse sequence.

552-209A MAMMALIAN PHYSIOLOGY I. (3) (3 hours lectures weekly) (Prerequisites: as for 552-201A and 552-202B. Pre- or co-requisites: 177-200A, 177-201B or 507-212B) (Not open to students who have taken 552-211D or 552-202A.) (For students in the Faculty of Science, and other students by permission of the instructor.) The course covers the physiology of body fluids, blood, body defense mechanisms, peripheral and central nervous system, muscle. Students must be prepared to attend evening (19:00 - 20:00) class tests. 

Professor Stochaj and Staff

552-210B MAMMALIAN PHYSIOLOGY II. (3) (3 hours lectures weekly) (Prerequisites: as for 552-201A and 552-202B. Pre or co-requisites: 177-200A, 177-201B or 507-212.) (Not open to students who have taken 552-211D or 552-202B.) (For students in the Faculty of Science, and other students by permission of the instructor.) (Although 552-210B may be taken without the prior passing of 552-209A, students should note that they may have some initial difficulties because of lack of familiarity with some basic concepts introduced in 552-209A.) The course covers the physiology of the autonomic nervous system; cardiovascular, respiratory and digestive systems; of the kidney; and of physical exercise. Students must be prepared to attend evening (19:00 -20:00) class tests. Tutorials are given from 18:00 to 19:00 hours. 

Professor Trippenbach and Staff

552-212D INTRODUCTORY PHYSIOLOGY LAB. (2) (One 3-hour lab and one 1-hour lecture every second week) (Corequisites: 552-209A and 552-210B.) (Required for Physiology students enrolled in 552-209A and 552-210B. Open to Honours and Major students from some other departments.) Exercises illustrating fundamental principles in human physiology: blood, neurophysiology, smooth muscle; cardiovascular, respiratory, endocrine, and renal physiology. 

Professors Cullen, Wechsler and Staff

552-311A INTERMEDIATE PHYSIOLOGY I. (3) (3 hours of lectures per week; 1-3 hours optional lab/demonstration/tutorial arranged for a maximum of 3 afternoons per term.) (Prerequisite: 552-209A and 552-210B or equivalent, or permission of the instructor.) The in-depth presentation of experimental results and hypotheses on cellular communication in the nervous system and the endocrine system. 

Professors Cooper, Farookhi and Staff

552-312B INTERMEDIATE PHYSIOLOGY II. (3) (3 hours of lectures per week; 1-3 hours optional lab/demonstration/tutorial arranged for a maximum of 3 afternoons per term) (Prerequisite: 552-209A and 552-210B or equivalent, 552-311A or permission of the instructor.) In-depth presentation of experimental results and hypotheses on cellular communication in the nervous system and the endocrine system. 

Professor Hanrahan and Staff

552-313B INTERMEDIATE PHYSIOLOGY III. (3) (3 hours of lectures per week; 1-3 hours optional lab/demonstration/tutorial arranged for a maximum of 3 afternoons per term) (Prerequisite: 552-209A and 552-210B or equivalent, 552-311A or permission of the instructor.) In-depth presentation of experimental results and hypotheses underlying our current understanding of topics in immunology, kidney function and respiration explored beyond the introductory level. 

Professor Frojmovic and Staff

552-351B RESEARCH TECH. IN PHYSIOLOGY. (3) (2 hour lecture and 3 hour lab weekly) (Prerequisites: 552-209, 552-210 and 552-311. Corequisites: 552-312 and 552-313.) (Restricted to Honours Physiology students.) The course provides an overview of common research methods in Physiology, including critical analysis and practical experience with some of the methods. Topics include ethics of animal experimentation, instrumentation, signal analysis, membrane biophysics, radioimmunossay, ion sensitive dyes, immunocytochemistry, autoradiography, electron microscopy, and molecular biology. 

Staff

552-359D TUTORIAL IN PHYSIOLOGY. (1) (Prerequisites: 552-209A and 552-210B or equivalent. Corequisites: 552-311, 552-312 and 552-313. Enrolment restricted to Honours Physiology students.) The course consists of regularly scheduled meetings between each individual student and a chosen staff member, to consider current problems in biomedical research and to develop background for a research project to be carried out in U3. Brief written summaries of each meeting are required. 

Staff

552-419D PROJECT & SEMINAR IN IMMUNOLOGY. (9) (7 hours lab, 2 hours seminar weekly) (Enrolment restricted to U3 Honours Immunology students.) (Please see regulations concerning Project Courses, section 2.6.2 on page 339 in the Faculty Degree Requirements section.) Individual research projects in Immunology under the guidance of staff members in the three participating departments: Physiology, Biochemistry, and Microbiology and Immunology. The students will meet to discuss their research projects in a seminar format during the winter term. They will be evaluated on their laboratory and seminar performance. 

Professor Lapp

552-423A PHYSIOLOGICAL DYNAMICS. (3) (Prerequisite: 552-209A and 552-210B or equivalent, and 177-309 or 189-315, or permission of the instructor.) The control of physiological system function from a theoretical standpoint. The basic roles of mass and momentum transport, pacemaker activity and wave propagation, and neural information processing are emphasized. These are related to the concepts of feedback, stability, and oscillation in normal and patho-physiological states. 

Professors Mackey and Glass

552-444A THEORETICAL ELECTROPHYSIOLOGY. (3) (3 hours lecture/seminar per week) (Prerequisites: 552-209A and 552-210B or equivalent; 177-309 or 189-315A,B.) (Offered in even numbered years.) 

Professor Wechsler and Staff

552-451A ADVANCED NEUROPHYSIOLOGY, (3) (3 hours lecture) (Prerequisite: 552-311A or equivalent and 177-301B.) (Limited enrolment. Password required.) Topics of current interest in neurophysiology including the development of neurons and synapses, physiology of ionic channels, presynaptic and postsynaptic events in synaptic transmission and neuronal interactions in CNS function. 

Professors Cohen and Cooper

552-459D PHYSIOLOGY SEMINAR. (6) (2 hours seminar) (Prerequisite: permission of instructors.) (Required course for U3 Honours students. Limited enrolment – 12 students maximum. Password required.) Discussion of topics in mammalian, cellular and molecular physiology. Students will be required to write one essay and make at least one oral presentation per term. A final course essay is required. 

Professor Farookhi

552-461D EXPERIMENTAL PHYSIOLOGY. (6) (Permission of the instructor required. Password required.) (This course is a requirement for U3 students in the Honours Physiology program and the Major program in Physiology and Physics, and is open to a limited number of other U3 Physiology students.) (Please see regulations concerning Project Courses, section 2.6.2 on page 339 in the Faculty Degree Requirements section.) Individual project work under the supervision of Departmental Staff members. 

Professor Wechsler and Staff

552-502B EXERCISE PHYSIOLOGY. (3) (Prerequisite: 552-311A, 552-312B, and 552-313B) Behaviour of physiological processes in response to physical effort, in areas such as structural basis of muscle contraction, neural control of muscle, mechanics and energetics of muscle contraction, fuel utilization, fatigue, physiological adjustments during exercise and influence of training. 

Professor Ward and Staff

552-508A ADVANCED RENAL PHYSIOLOGY. (3) (Prerequisite: 552-312B or the equivalent.) (Limited enrolment. Open to advanced undergraduate and graduate students.) Offered in conjunction with the Department of Medicine. Lectures and seminars will cover advanced concepts in selected areas of kidney physiol-
ogy (glomerular and tubular function) as well as membrane and epithelial transport. Students will be expected to critically discuss selected experimental papers. **Professor Levy and Staff**

552-513B **CELLULAR IMMUNOLOGY.** (3) (4 hours lectures plus term paper) (Prerequisites: 528-314B, or permission of the instructor.) This course deals with cellular interactions, regulation and effector mechanisms of the normal immune response in relation to diseases and pathogenic processes. It is taught at an advanced level. **Professor Lapp**

552-515A **PHYSIOLOGY OF BLOOD I.** (3) (2 hours lecture plus 1 hour seminar weekly) (Prerequisites: 552-313B, or permission of the instructor.) Study of the cell and molecular physiology of hemostasis and its pathophysiology (bleeding and thrombosis). Emphasis on molecular mechanisms regulating clot formation, fibrinolysis, and cell adherence/aggregation. Experimental approaches and specific clinical disorders will be analyzed. Weekly discussions, and a major term paper. **Professors Frojmovic, Solymoss and staff**

552-516B **PHYSIOLOGY OF BLOOD II.** (3) (2 hours lecture plus 1 hour seminar weekly) Bone marrow hematopoiesis, with emphasis on regulation of stem cell proliferation and differentiation along hematopoietic pathways. Formation and differentiation of red and white blood cells and some of the diseases associated with hematopoiesis will be covered. Emphasis will be given to the molecular mechanisms involved in the normal and pathological conditions. **Professors Ponka and Hiscott**

552-517B **ARTIFICIAL INTERNAL ORGANS.** (3) (Prerequisite: permission of instructors. Password required.) Physiological, bioengineering, chemical and clinical aspects of artificial organs including basic principles and physiopathology of organ failure. Examples: oxygenator, cardiac support, vascular substitutes, cardiac pacemaker, biomaterials and tissue engineering, biocompatibility. **Professors Sipehia and Chang**

552-518A **ARTIFICIAL CELLS & BIOTECHNOLOGY.** (3) (Prerequisite: permission of instructors. Password required.) Physiology, biotechnology, chemistry and biomedical application of artificial cells, blood substitutes, immobilized enzymes, microorganisms and cells, hemoperfusion, artificial kidneys, and drug delivery systems. 552-517B and 552-518A when taken together, will give a complete picture of this field. However, the student can select one of these. **Professors Chang and Yu**

552-520B **ION CHANNELS.** (3) (1½ hour lecture, 1½ hour seminar) (Prerequisite: 552-311A) (Priority to Graduate and Honours students; others by permission of instructors. Password required.) (Offered in odd numbered years.)

552-531B **TOPICS IN APPLIED IMMUNOLOGY.** (3) (Permission of the instructor. U3 InterDept. Honours Immunology students and graduate students with strong immunology background i.e. 552-513A and 550-503B.) Seminar format course in which experts in immunologic mechanisms of resistance against a variety of infectious diseases, including AIDS, malaria, and tuberculosis oversee student moderators in their presentation of recent scientific literature in the field. **Proffessors Stevenson and Bernard**

552-552B **CELLULAR & MOLECULAR PHYSIOLOGY.** (3) (1 hour lecture, 2 hours seminar weekly) (Pre-requisite: 552-311A) (Preference will be given to Physiology Honours and Graduate students. Limited enrolment.) Discussions of recent significant advances in our understanding of the gene products involved in diverse cellular signalling pathways. Topics will include cell-surface hormone receptors, nuclear steroid hormone receptors, and ion channels and transporters. Students will present and critically evaluate experimental approaches, results and interpretations of selected research publications. **Professors Orlowksi and White**

552-556B **TOPICS IN SYSTEMS NEUROSCIENCE.** (3) (Permission of the instructor required. Limited enrolment. Password required.) (Not open to students who have taken 552-456B.) Topics of current interest in systems neurophysiology and behavioural neuroscience including: the neural representation of sensory information and motor behaviours, models of sensory motor integration, and the computational analysis of problems in motor control and perception. Students will be expected to present and critically discuss journal articles in class. **Professors Cullen and Guitton**

11.26 **Psychiatry (555)**

Department of Psychiatry
Research & Training Building
1033 Pine Avenue West
Montreal, QC H3A 1A1
Telephone: (514) 398-4176

Chair — Joel Paris

**Professors**

Joel Paris; M.D.(McG.)

Gilbert Pinard; M.D.(Montr.)

Simon Young; B.A.(Oxon.), M.Sc., Ph.D.(Lond.)

**Associate Professors**

Frances V. Abbott; B.Sc.(Trent), M.Sc., Ph.D.(McG.)

Patrick Bokska; B.Sc., Ph.D.(McG.)

Bernardo Dubrovsky; M.D.(Buenos Aires)

Alain Grattan; Ph.D.(C'dia)

Roberta Palmour; B.A.(Texas W.), Ph.D.(Texas)

Judes Poirier; B.Sc., Ph.D.(Montr.)

**Assistant Professors**

Kathryn Gill; Ph.D.(C'dia)

Satyabrata Kar; Ph.D.(Lond.)

Joseph Rochford; B.Sc., Ph.D.(C'dia)

Lalit Srivastava; B.Sc., Ph.D.(J. Nehru)

Dominque Walker; B.Sc., Ph.D.(Geneva)(joint appt. with Anatomy & Cell Biology)

The course credit weight is given in parentheses (#) after the course title.

[* Denotes limited enrolment]

555-199A **MENTAL ILLNESS AND THE BRAIN.** (3) (1 hour lecture and 2 hours seminar weekly) (FYS - for first year students only, maximum 25. No prerequisites.) This course will introduce the student to the fundamentals of neuroscience, and then use these principles to illustrate recent advances made on the biological causes of, and treatments for, mental disorders with a strong biological component: schizophrenia, depression, mania, anxiety disorders, obsessive-compulsive disorder, Alzheimer’s and Parkinson’s diseases and alcohol and drug abuse. **Professors Boksa and Rochford**

555-301B **ISSUES IN DRUG DEPENDENCE.** (3) (3 hours) (Prerequisites: 552-201A or 552-209A or 552-210B or 204-100A or 177-210B or equivalent as authorized by instructor.) The course credit weight is given in parentheses (#) after the course title.

555-500B **NEUROBIOLOGY OF MENTAL DISORDERS.** (3) (3 hours) (Prerequisites: 507-212B and 507-311A, or 507-312B, or 177-200A and 177-210B, or 552-311A, or 204-422B, or 204-308A and an upper level biological science course with permission of the instructors, or equivalent. Basic knowledge of cellular and molecular biology is required. Open to U3 and graduate students only. Strongly recommended for M.Sc. students in Psychiatry.) Current theories on the neurobiological basis of most well known mental disorders (e.g. schizophrenia, depression, anxiety, dementia). Methods and strategies in research on genetic, physiological and biochemical factors in mental illness will be discussed. Discussion will also focus on the rationale for present treatment approaches and on promising new approaches. **Professors Boksa, Srivastava and Staff**

555-502A **BRAIN EVOLUTION & PSYCHIATRY.** (3) (Prerequisites: 177-115B or equivalent as authorized by instructor.) The course
will focus on the transcendental importance of evolution of nervous systems for normal and pathological behavior. Studies of allomorphic brain growth and recent evolutionary theories of brain organization as they relate to normal and abnormal behavior will be emphasized. 

Professor Dubrovsy

11.27 Psychology (204)
Stewart Biological Sciences Building, Room W8/1
1205 Avenue Docteur Penfield
Montreal, QC, H3A 1B1
Telephone: (514) 398-6100
Fax: (514) 398-4896
Email: info@hebb.psych.mcgill.ca
Website: www.psych.mcgill.ca

Chair — A.J.J. Marley

Emeritus Professors
Albert S. Bregman; M.A.(Tor.), Ph.D.(Yale)
Virginia I. Douglas; B.A.(Qu.), M.A., M.S.W., Ph.D.(Mich.)
George A. Ferguson; B.A.(Dal.), M.Ed., Ph.D.(Edin.), F.R.S.C.
Wallace Lambert; M.A.(Colgate), Ph.D.(N.Carolina), F.R.S.C.
Ronald Melzack; M.Sc., Ph.D.(McG.), F.R.S.C. (E. P. Taylor
Emeritus Professor of Psychology)
Peter M. Milner; B.Sc.(Leeds), M.Sc., Ph.D.(McG.)

Professors
Frances E. Aboud; B.A.(Tor.), M.A., Ph.D.(McG.)
Irving M. Bik; B.A.(N.Y.U.), B.H.L.(Jewish Theological
Seminary), M.A., Ph.D.(Penn.)
Maggie Bruce; B.A.(Wheaton), M.A., Ph.D.(Mcg.)
Keith B.J. Franklin; B.A., M.A.(Auck.), Ph.D.(Lond.)
Fred H. Geneebee; B.A.(W.Ont.), M.A., Ph.D.(McG.)
A.A.J. Marley; B.Sc.(Birm.), Ph.D.(Calif.)
David J. Ostry; B.A.Sc., M.Sc., Ph.D.(Tor.)
Michael Petrides; B.Sc., M.Sc.(Lond.), Ph.D.(Cantab.)
Robert O. Pihl; B.A., Ph.D.(Ariz.)
James O. Ramsay; B.Ed.(Alta.), Ph.D.(Prin.)
Barbara B. Sherwin; B.A., M.A., Ph.D.(C’dia)
Thomas R. Shultz; B.A.(Minn.), Ph.D.(Yale)
Yoshio Takane; B.L., M.A.(Tokyo), Ph.D.(N.Carolina)
Donald M. Taylor; B.A., M.A., Ph.D.(W.Ont.)
Norman M. White; B.A.(McG.), M.S., Ph.D.(Pitt.)
David C. Zuroff; B.A.(Harv.), M.A., Ph.D.(Conn.)

Associate Professors
A.G. Baker; B.A.(McG.), M.A., Ph.D.(Dal.)
Mark Baldwin; B.A.(Tor.), M.A., Ph.D.(Waterloo)
Avi Chaudhuri; B.Sc., M.Sc.(Tor.), Ph.D.(Berk.)
Blaine Ditto; B.S.(Iowa), Ph.D.(Ind.)
Don C. Donderi; B.A., B.Sc.(Chic.), Ph.D.(C’nell)
Kevin Dunbar; B.A., M.A.(University College of Dublin),
Ph.D.(Tor.)

Richard F. Koestner; B.A., Ph.D.(Roch.)
John Lydon; B.A.(Netre Dame), M.A., Ph.D.(Wat.)
Morton J. Mendelson; B.Sc.(McG.), A.M., Ph.D.(Harv.)
Debbie S. Moskowitz; B.S.(Kirkland), M.A., Ph.D.(Col.)
Laura Ann Petitto; B.S.(Ramapo St.), M.A.(N.Y.U.), Ph.D.(Harv.)
Matthew Lewis Shapiro; B.A., M.A., Ph.D.(Johns H)
Frances E. Wilkinson; B.A.(McG.), M.A., Ph.D.(Dal.)

Assistant Professors
Jess H. Groen; B.A.(Pomona), Ph.D.(M.I.T)
Gillian A. O'Driscoll; B.A.(Wellesley), M.A., Ph.D.(Harv.)

Lecturers
Nicole Allard; B.A.(W.Ont.), M.A.(Guelph), M.Ed.(McG)
Rhonda Amsel; B.Sc., M.Sc.(McG.)

Associate Members
Clinical Research Institute of Montreal: Terrance J. Codere;
Douglas Hospital: Howard Steiger;
Family Medicine: Vlma Patel;
Montreal Neurological Institute: Barbara Jones, Marilyn Jones-
Gottman, Brenda Milner, Robert Zatorre;
Psychiatry: Frances Abbott; Sharon Weiner

Vision Research Unit (Opthomology): Curtis Baker, Robert Hess,
Frederick A.A. Kingdom, Kathleen Mullen

Part-time Appointments
Ian F. Bradley; B.Sc., M.Sc.(Tor.), Ph.D.(Wat.)
James C. Macdougall; B.A.(Car.), M.A., Ph.D.(Mcg.)
Zbigniew Pleszewski; M.A., Ph.D.(U. of Poznan)
Zeev Rosberger; B.Sc.(McG.), M.A., Ph.D.(Conc.)
Yuriko Oshima-Takane; B.A., M.A.(Tokyo), Ph.D.(McG.)
Carol Schopflocher; B.A.(W.Ont.), M.A.(Queen’s)
Y. Steiner; B.A.(Hebrew), Ph.D.(Montr.)
Camilo Zacchia; B.A.(McG.), M.S.(Florida State), Ph.D.(McG.)
Philip R. Zelazo; B.A.(Amer.Intl.Coll.), M.S.(N.Carolina),
Ph.D.(Wat.)

The Department of Psychology offers programs in both Arts
and Science. Students planning to do a B.A. Honours, Major
or Minor Concentrations should refer to the Faculty of Arts
section 11.37 for B.A. program information.

Psychology is the scientific study of mind and behaviour. It is
both a social and a biological science. As a social science, psy-
chology studies social interactions. As a biological science, it
regards humans as the product of evolution and so studies them
in biological perspective, comparing and contrasting human be-
haviour with that of other species.

The data of psychology are collected within the psychological
laboratory by the use of experimental methods in the study of be-
haviour, and outside the laboratory by systematic observation
of the behaviour of humans. The aim is to formulate general
principles of perception, learning, motivation, cognition and social psy-
chology that are relevant to different aspects of human life.

Although a number of undergraduate courses in psychology
have applied implications, applied training is in no way the purpose
of the undergraduate curriculum. The purpose of that curriculum is
to introduce the student to an understanding of the basic core of
psychological knowledge, theory, and method, regardless of ques-
tions of practical application.

The B.Sc. or B.A. with a Major or Honours degree in psychology
is not a professional qualification. It does not qualify the individual
to carry on professional work in psychology. In the Province of
Québec the minimum requirement for membership in the Order of
Psychologists, the professional association governing the work of
psychologists in the province, is an M.A. or M.Sc. degree, or other
equivalent degree. All students planning to practise in the Province of
Québec will be examined on their proficiency in French before
being admitted to the professional association. Undergraduate
courses in psychology may prove of considerable value to
students planning careers in professional fields other than psy-
chology, such as medicine, education, social work, human com-
munication sciences, or business and industry.

Students who are interested in psychology as a career must
pursue graduate studies. Persons who hold graduate degrees in
psychology, usually the Ph.D., may find employment in universi-
ties, research institutes, hospitals, community agencies, govern-
ment departments, large corporations, or may act as self-
employed consultants. At the graduate level, psychology has
many specialized branches including social psychology, physio-
logical psychology, experimental psychology, clinical psychology,
child psychology, industrial psychology, community psychology, educational psychology, and others.

Although requirements for admission to graduate studies in psychology vary from one university to another, both the Honours and Major degrees in psychology may qualify the student for admission to many graduate schools, provided, of course, that sufficiently high grades are obtained.

The essential differences between the Honours and the Major program are an emphasis on research methodology courses and practice in the Honours program, and that higher academic standards are required of Honours students. Honours students also have an opportunity to work in small groups closely with staff members.

INFORMATION MEETINGS FOR NEW STUDENTS

All new students entering the Psychology undergraduate program are required to attend an Information Meeting prior to registration. Students who have been accepted into a Bachelor of Science program in Psychology must attend the meeting on August 25, 1999 at 13:00. The meeting will be held in Room S1/3 of the Stewart Biological Sciences Building. Students accepted into a Bachelor of Arts program must attend a separate information meeting. For details, consult the Psychology program listing in the Faculty of Arts section. At this meeting, Nicole Allard, the Academic Advisor, will explain the requirements of the Department's programs. Incoming students will have an opportunity to ask questions and receive advice on how to plan their courses. After this meeting students will make appointments for individual advising sessions, during which they will fill out their Study Plan form for registration.

(For students entering the Psychology program in the winter term 2000, there will be an Information Meeting on December 14 at 11:30 in Room N2/200 of the Stewart Biological Sciences Building.)

Entering students must bring their letter of acceptance and a copy of their collegial transcript(s). They will also need this Calendar and a preliminary Timetable. Students will also find the Psychology Department Handbook helpful. This Handbook contains more detailed descriptions of Psychology courses, as well as providing guidelines for how students might pursue particular areas of interest.

The Psychology Department Handbook can be purchased for $3.00 (including tax) in Room N7/8, Stewart Biological Sciences Building. Out-of-town residents may have a copy mailed to them upon receipt of $3.00. Requests should be mailed to the Department of Psychology Adviser's Office, 1205 Avenue Docteur Penfield, Montreal, QC H3A 1B1.

MINOR PROGRAM IN PSYCHOLOGY (24 credits)

[MARS Program Code 6 810000] A Minor program in Psychology is available to students registered in any B.Sc. program (other than Psychology). This program is intended to complement a student's primary field of study by providing a focused introduction to specialized topics in psychology. Students may declare their intent to follow a Minor program at the beginning of their U2 year. They must then consult with the Chief Academic Advisor of the Department of Psychology in order to obtain approval for their course selection. A separate Minor program exists for students registered in a program in the Faculty of Arts. Please consult the Psychology listing in the Faculty of Arts section for more information.

The Minor program for Science students requires the completion of 24 credits, of which no more than 6 may overlap with the primary program. All courses in the Minor program must be passed with a minimum grade of C. A prerequisite to the program is Psychology 204-204 or equivalent, see “Course Overlap” on page 339.

Complementary Courses (24 credits)

at least 3, but no more than 6, credits selected from:

204-211 (3) Learning and Motivation
204-212 (3) Perception
204-213 (3) Cognition
204-215 (3) Social Psychology

18-21 credits selected from among Psychology courses at the 300 level or above

FACULTY, MAJOR, HONOURS PROGRAMS IN PSYCHOLOGY

Recommended Background

It is expected that most students who enter a Major, Honours or Faculty Program in Psychology will have taken introductory psychology, biology and statistics at the collegial level. Recommended CEGEP courses include: Psychology 350-101 or 350-102, Biology 101-301 or 101-401, Mathematics 201-307 or 201-337. Students must obtain a minimum grade of 75% in their CEGEP level statistics course. In the first year those students who have not taken the recommended collegial level statistics course, or those who have obtained a grade below 75%, must take Psychology 204-204.

Those who have not taken the recommended collegial level biology must take 177-111A or 112B, and those who have not taken Introductory Psychology in college must take 204-100A.

Areas of Specialization:

The study of psychology covers many fields. To develop a breadth of understanding in psychology, students are expected to obtain knowledge beyond the introductory level in several areas of psychology. To ensure this requirement is met, Psychology courses are divided into six areas of specialization in the lists below:

Cognitive Psychology

204-310 (3) Human Intelligence
204-316 (3) Psychology of Deafness
204-334 (3) Computer Simulation - Psych. Processes
204-335 (3) Formal Models of Psych Processes
204-340 (3) The Psychology of Language
204-341 (3) Psychology of Bilingualism
204-352 (3) Laboratory in Cognitive Psychology
204-401 (3) Theories of Cognition
204-413 (3) Cognitive Development
204-428 (3) Human Communication and its Disorders
204-437 (3) Reading Ability and Disability
204-472 (3) Scientific Thinking and Reasoning
204-501 (3) Auditory Perception
204-513 (3) Seminar on the Mental Lexicon
204-530 (3) Applied Topics in Deafness
204-532 (3) Cognitive Science

Health Psychology and Psychopathology

204-337 (3) Intro: Abnormal Psychology I
204-338 (3) Intro: Abnormal Psychology 2
204-408 (3) Principles of Cognitive Behaviour Therapy
204-412 (3) Deviations in Child Development
204-429 (3) Health Psychology
204-436 (3) Human Sexuality and its Problems
204-491 (6) Advanced Study in Behavioural Disorder
204-533 (3) International Health Psychology

Behavioural Neuroscience

204-308 (3) Physiological Psychology I: Fundamentals
204-311 (3) Human Behaviour and the Brain
204-318 (3) Physiological Psychology II: Motivation and Learning
204-342 (3) Hormones and Behaviour
204-353 (3) Laboratory in Human Perception
204-410 (3) Special Topics in Neuropsychology
204-422 (3) Neurochemical Basis of Behaviour
204-427 (3) Sensorimotor Behaviour
204-431 (3) Environment and the Developing Brain
204-470 (3) Memory and Brain
204-505 (3) The Psychology of Pain
204-526 (3) Advances in Visual Perception

Social and Personality

204-331 (3) Inter-Group Relations
204-332 (3) Introduction to Personality
204-333 (3) Personality and Social Psychology
204-351 (3) Research Methods in Social Psychology
204-354 (3) Interpersonal Relationships
U1 Required Courses (12 credits)

204-211 (3) Learning and Motivation
204-212 (3) Perception
204-213 (3) Cognition
204-215 (3) Social Psychology

Note: 204-100A may be taken as a co-requisite with these basic courses.

U1 or U2 Required Course (3 credits)

204-305 (3) Statistics for Experimental Design

Complementary Courses (39 credits)

18 credits of Psychology courses:
- select 6 credits from each of the six areas of specialization
- 9 credits of Psychology courses, selected from:
  - courses at the 400 or 500 level
12 credits at the 300 level or higher, selected from:
- Psychology, Anatomy, Biology, Biochemistry, Chemistry, Computer Science, Mathematics, Physiology, Psychiatry

B.Sc. HONOURS PROGRAM IN PSYCHOLOGY (54 credits) [MARS Program Code 2-810000]

Honours in Psychology prepares students for graduate study, and so emphasizes practice in the research techniques which are used in graduate school and professionally later on. Students are accepted into Honours at the beginning of their U2 year, and the two-year sequence of Honours courses continues through U3. Admission to Honours is selective. There is normally room for 25-30 new Honours students each year. Students with a cumulative grade point average of 2.8 or better are eligible to apply; however during the past several years it has been possible to accept a maximum of 30 students with averages above 3.5 based on a 27-30 graded credit program over 2 terms. Once in the Honours program, the student must obtain a GPA of 3.0 in the U2 year in order to continue in the program for U3. Students in the Honours program are required to complete a minimum of 27 graded credits per academic year (Fall and Winter semesters).

Applications can be obtained from the Undergraduate Office of the Department of Psychology, Room N7/9A, Stewart Biological Sciences Building. The applications must be completed and returned to the Undergraduate Office by August 20, 1999. Candidates will be advised of the Department's decision through a notice posted in front of the Undergraduate Adviser's Office, N7/9, shortly after classes begin in September.

Students should note that awarding of the Honours degree will depend on both cumulative grade point average and a minimum grade of B on 204-380D, 480D, 481D, "First Class Honours" is awarded to students who obtain a minimum cumulative grade point average of 3.5 and a minimum CGPA of 3.5 in the three Honours courses of which 12 out of 18 credits (2 courses) received at least an A- grade. "Honours" is awarded to students with a minimum cumulative grade point average of 3.0 and a minimum CGPA of 3.0 on these three courses. Moreover, the awarding of the Honours degree normally requires completion of two full years of study, U2 and U3, in the Psychology Department. Exceptionally good students may be admitted for the U3 year only on the basis of their marks and research experience, however these students must complete 6 credits in each of three areas of specialization.

U1 Required Courses (12 credits)

204-211 (3) Learning and Motivation
204-212 (3) Perception
204-213 (3) Cognition
204-215 (3) Social Psychology

Note: 204-100A may be taken as a co-requisite with these basic courses.

U1 or U2 Required Course (3 credits)

204-305 (3) Statistics for Experimental Design

U2 Required Course (6 credits)

204-380D (6) Honours Research Project and Seminar

U3 Required Courses (12 credits)

204-480D (6) Foundations of Modern Psychology
204-481D (6) Honours Thesis Research
Complementary Courses (21 credits)
12 credits of Psychology courses:

select 6 credits from each of two of the six areas of specialization
9 credits at the 300 level or higher selected from:
- Psychology, Anatomy, Biology, Biochemistry, Chemistry, Computer Science, Mathematics, Physiology, Psychiatry

MINOR IN COGNITIVE SCIENCE
Students following a Major or Honours program in Psychology with an interest in cognition may want to consider the Minor in Cognitive Science.

COURSE DESCRIPTIONS
The course credit weight is given in parentheses (#) after the course title.


NOTE: Prerequisites: A basic introductory course in psychology is a prerequisite for all Psychology courses with the following exceptions: 204-100A, 204-204, 204-211, 204-212, 204-213, 204-215, 204-305. All courses are open to students other than Major and Honours students in Psychology provided the prerequisites are met and unless otherwise specified. Due to sabbatic leaves and other considerations some courses may not be given in a particular year.

For more detailed information about courses and programs in Psychology consult the Department’s Website or the Psychology Undergraduate Handbook which is on sale in the Departmental Advising Office, N7/9 Stewart Biological Sciences Building.

204-100A INTRODUCTION TO PSYCHOLOGY. (3) (2 lectures; 1 conference) (Not open to students who have passed Psychology 101 or 102 in CEGEP.) Introduction to the scientific study of mind and behavior. Learning, perception, motivation and thinking are explained in a way which emphasizes the continuity of human behavior and the behavior of other species, and which emphasizes the role of the central nervous system in organizing and regulating behavior.

204-204A,B INTRODUCTION TO PSYCHOLOGICAL STATISTICS. (3) (2 lectures, 1 conference) (Not open to students who have passed one of the following courses in CEGEP with a minimum grade of 75%: Mathematics 307, 337 or the combination of Quantitative Methods 300 with Mathematics 300.) (Note: This course is a prerequisite for 204-305, 204-435, 204-406, 204-310, 204-336.) (Credit for other statistics courses may preclude credit for this course and conversely. See “Course Overlap” on page 339.) The course includes an introduction to research data, frequency distributions, graphic representation; measures of central tendency and variability; elementary sampling theory and tests of significance.

204-211B LEARNING AND MOTIVATION. (3) (2 lectures) (Prerequisite: 204-100A or equivalent.) An introduction to contemporary research on learning and motivation from a behavioral, biological and evolutionary perspective. Topics include: internal and external influences on behavior, classical and instrumental conditioning, attention, biological constraints on learning and motivation, and cognitive processes. Much of the material will be drawn from the literature on research with animals.

Section 01 Limited to Psychology Major and Honours students
Section 02 Limited to Psychology Minor students (CAPPED)
Section 03 Limited to non-Psychology students (CAPPED)

Professor Amsel (A)
Professor Ostry (B)

204-212A PERCEPTION. (3) (2 lectures, 1 conference) Perception is the organization of sensory input into a representation of the environment. Topics include: survey of sensory coding mechanisms (visual, auditory, tactile, olfactory, gustatory), object recognition, spatial localization, perceptual constancies and higher level influences.

Section 01 Limited to Psychology Major and Honours students
Section 02 Limited to Psychology Minor students (CAPPED)

Professor A. Baker

204-213B COGNITION. (3) (2 lectures, 1 conference) An introduction to the study of higher mental processes. Topics such as: attention, memory, development of thought and language, problem solving, reasoning, concept formation, imagery, artificial intelligence.

Section 01 Limited to Psychology Major and Honours students
Section 02 Limited to Psychology Minor students (CAPPED)
Section 03 Limited to non-Psychology students (CAPPED)

Professor Wilkinson

204-215A SOCIAL PSYCHOLOGY. (3) (3 lectures) (Not open to students who have taken 204-330A, 280-221 or 166-216) The course offers students an overview of the major topics in social psychology. Three levels of analysis are explored beginning with individual processes (e.g., attitudes, attribution), then interpersonal processes (e.g., attraction, communication, love) and finally social influence processes (e.g., conformity, norms, roles, reference groups).

Section 01 Limited to Psychology Major and Honours students
Section 02 Limited to Psychology Minor students (CAPPED)
Section 03 Limited to non-Psychology students (CAPPED)

Professor Gropen

204-304A CHILD DEVELOPMENT. (3) (2 lectures, 1 conference) (Prerequisites: two courses from 204-211, 204-212, 204-213, and 204-215 or permission of the instructor.) (Note: This course is a prerequisite for 204-412, 204-413, 204-414, 204-416, 204-431, 204-438.) A basic introduction to developmental psychology. Various aspects of psychological development in children are considered, including prenatal development and infancy, perceptual and cognitive development, language acquisition, social and personality development and social interaction.

Section 01 Limited to Psychology Major and Honours students
Section 02 Limited to Psychology Minor students (CAPPED)
Section 03 Limited to non-Psychology students (CAPPED)

Staff

204-305A,B STATISTICS FOR EXPERIMENTAL DESIGN. (3) (2 lectures; 1 conference) (Prerequisite: 204-204A,B or equivalent) (Note: This course is required of all students who propose to enter an Honours or Major program in Psychology.) (Credit for other statistics courses may preclude credit for this course and conversely. See “Course Overlap” on page 339.) An introduction to the design and analysis of experiments, including analysis of variance, planned and post hoc tests and a comparison of anova to correlational analysis.

Section 01 Limited to Psychology Major and Honours students
Section 02 Limited to Psychology Minor students (CAPPED)
Section 03 Limited to non-Psychology students (CAPPED)

Professor Oshima-Takane (A term)
Professor Ramsay (B term)

204-308A PHYSIOLOGICAL PSYCHOLOGY I: FUNDAMENTALS. (3) (3 lectures, each 1 hour, 1 conference) (Prerequisite: CEGEP Human Biology 101-921 or equivalent.) (Not open to students who have taken or are taking 504-321A or 177-306A or 552-311A.) The neural basis of mammalian behavior. Basic neuroanatomy, neurophysiology and neurochemistry. Sensory and motor systems. How the nervous system acquires and integrates information and uses it to produce behavior.

Professor Shapiro

204-310B HUMAN INTELLIGENCE. (3) (2 lectures) (Prerequisite: 204-204 or any equivalent course.) An introduction to the measurement, structure, development, and correlates of human intelligence; the role of environment and heredity in its formation; social, cultural, and race differences will be explored.

Professor Genesee

204-311A HUMAN BEHAVIOUR AND THE BRAIN. (3) (2 lectures, 1 conference) The course is concerned with the effects of various types of brain lesions on perception, memory, language, and emotion. For the most part, studies involving human subjects will be considered, but experiments involving brain lesions in monkeys will also be introduced.

Section 01 Limited to Psychology Major and Honours students
204-314B THINKING AND CONCEPTS. (3) (2 lectures) (Prerequisite: 204-213)

204-316A PSYCHOLOGY OF DEAFNESS. (3) (2 lectures; 1 conference) (Prerequisite: 204-100 or equivalent or permission of instructor.) (Not open to students who have taken 204-457B.)

204-318B PSYCHOLOGY OF DÉROEA. (3) (2 lectures) (Prerequisites: Introductory Psychology, and 204-340 or introduction to linguistics; or permission of instructor.)

204-331B INTER-GROUP RELATIONS. (3) (2 lectures) (Prerequisite: 204-215A) The course focuses on the social psychology of societal groups such as racial minorities, aboriginal groups and women. The ideological bases of current theories is first established. This is followed by a review of current theories and currently current controversies are explored including new forms of racism and affirmative action.

204-332B INTRODUCTION TO PERSONALITY. (3) (3 lectures) (Prerequisite: 204-100A) This course examines some of the major theories of personality, e.g., those of Freud, Rogers, and Bandura. Empirical research inspired by these theories will also be examined. Topics include the nature of human motivation, the role of the self-concept, and the consistency and stability of personality.

204-333A PERSONALITY AND SOCIAL PSYCHOLOGY. (3) (2 lectures) (Prerequisite: 204-215A) Human behavior is a product of both factors residing within the person and factors residing in one’s environment (other individuals, relationships, groups, and momentary situations). The course will consider traditional approaches to person-situation interactions and a more dynamic approach based on recent research on goals and social cognition.

204-337A INTRO: ABNORMAL PSYCHOLOGY 1. (3) (2 lectures, 1 conference) (Note: This course is prerequisite for 204-338B.) A survey of the genetic, physiological and environmental origins of intellectual and emotional disorders.

204-337A INTRO: ABNORMAL PSYCHOLOGY 2. (3) (2 lectures, 1 conference) (Prerequisite: 204-337A) (Note: This course is prerequisite for 204-491D.) An introduction to psychotic behaviour problems, character disorders and behaviour modification.

204-340A THE PSYCHOLOGY OF LANGUAGE. (3) (2 ½ hour lectures) (Prerequisite: An introductory course in Psychology or Linguistics.) A survey of issues in psycholinguistics, focusing on the nature and processing of language (e.g., how we understand speech sounds, words, sentences, and discourse). Also surveyed: language and thought, the biological foundations of language, and first language acquisition.

204-341B PSYCHOLOGY OF BILINGUALISM. (3) (2 lectures) (Prerequisites: Introductory Psychology, and 204-340 or introduction to linguistics; or permission of instructor.)

204-342B HORMONES AND BEHAVIOUR. (3) (2 lectures, 1 conference) (Prerequisite: 177-111A, 177-112B, 177-115B or equivalent) The role of hormones in organization of CNS function, as effectors of behaviour, in expression of behaviours and in mental illness.

204-343B LANGUAGE ACQUISITION IN CHILDREN. (3) (2 lectures plus conference) This course will examine the human capacities that make the profound feat of language acquisition possible. Topics will include analyses of empirical, methodological, and theoretical issues in language acquisition and will draw upon evidence from the cognitive neuroscience, psycholinguistic, linguistic and philosophical literatures.
Students present reports on progress and write a final research report.

- 204-401B THEORIES OF COGNITION. (3) (2 lectures) (Prerequisites: 204-213 or permission of instructor.)

- 204-402A MODERN PSYCHOLOGY IN HISTORICAL PERSPECTIVE. (3) (2 lectures) A survey of the social and ideological influences on psychology from its philosophical beginnings through the period of the schools to its modern situation.

Section 01 Limited to Psychology students
Section 02 Limited to non-Psychology students (CAPPED)

Professor Pieszewski

204-406B PSYCHOLOGICAL TESTS AND MEASUREMENT. (3) (2 lectures, 1 conference) (Prerequisites: 204-204 or equivalent.) An introduction to the theory and practice of psychological measurement in educational, clinical and industrial/organizational settings. Attention to procedures for developing and validating assessment devices. Techniques include: intelligence tests, projective tests, questionnaires, structured interviews, rating scales, and behavioural/performance tests.

Section 01 Limited to Psychology students
Section 02 Limited to non-Psychology students (CAPPED)

Professor Moskowitz

204-408A PRINCIPLES OF COGNITIVE BEHAVIOUR THERAPY. (3) (2 lectures) Knowledge of basic neuropsychology at the level covered in 204-311A is assumed. This course will trace developments in human brain mapping and in cognitive neuroscience via readings from primary sources. Topics include the neural bases for perception, language, and memory, and their relationship to structural and functional brain organization. Emphasis is placed on integrating knowledge from behavioral lesion experiments and functional activation studies.

Professor Zatorre

204-410B SPECIAL TOPICS IN NEUROPSYCHOLOGY. (3) (2 lectures, 1 conference) (Prerequisites: 204-311A or 204-308A. Knowledge of basic neuropsychology at the level covered in 204-311A is assumed.) This course will trace developments in human brain mapping and in cognitive neuroscience via readings from primary sources. Topics include the neural bases for perception, language, and memory, and their relationship to structural and functional brain organization. Emphasis is placed on integrating knowledge from behavioral lesion experiments and functional activation studies.

Professor Bradley

204-412A DEVIATIONS IN CHILD DEVELOPMENT. (3) (2 lectures, 1 conference) (Prerequisite: 204-304A or 204-337A or permission of instructor. Students will also require a basic knowledge of research design.) Deviations in the perceptual, cognitive, social and emotional development of children. Emphasis is placed on research to explore constitutional and environmental causes and symptoms associated with such disorders as conduct disorder, attention deficit hyperactivity disorder, anxiety-withdrawal disorders, and childhood autism.

Section 01 Limited to Psychology students
Section 02 Limited to non-Psychology students (CAPPED)

Professor Douglas

204-413A COGNITIVE DEVELOPMENT. (3) (3 hours) (Prerequisites: 204-304A or 204-213 or equivalent.)

204-414A SOCIAL DEVELOPMENT. (3) (Prerequisites: 204-304A and 204-305) Advanced study of the development of social behaviour and social cognition in children. Topics include: socialization, attachment, aggression, exploration, role taking, communication, family and peer relations, self and person perception. The development of these social processes within the framework of three general theories of development: psychoanalytic, learning, and cognitive-developmental.

Section 01 Limited to Psychology students
Section 02 Limited to non-Psychology students (CAPPED)

Professor Aboud

204-416B ADVANCED TOPICS IN CHILD DEVELOPMENT. (3) (3 lectures) (Prerequisite: 204-304A or permission of instructor.) Theory and recent research on child development within family and cultural contexts. Topics will vary but they will concern social, cognitive, and/or perceptual development. The goal of the course is to present a coherent view of the child within social contexts.

Section 01 Limited to Psychology students
Section 02 Limited to non-Psychology students (CAPPED)

Professor Mendelson

204-422B NEUROCHEMICAL BASIS OF BEHAVIOUR. (3) (2 lectures, 1 conference) (Prerequisite: 204-308A or 204-342B or 552-201 or 552-202 or 552-209 or 552-210, 552-211D or permission of instructor.)

204-427B SENSORIMOTOR BEHAVIOUR. (3) (2 lectures) (Prerequisite: 204-308A or permission of instructor.)

204-431A THE ENVIRONMENT AND THE DEVELOPING BRAIN. (3) (2 ½ hour lectures) (Prerequisites: 204-212 or 204-311A or 204-308A or 204-304A) The effects of normal and abnormal environmental conditions on the development of brain and behaviour. The role of early "neural plasticity" in normal development and the detrimental effects of abnormal conditions will be considered. Topics covered include: basic neuro-embryology, prenatal malnutrition, fetal alcohol syndrome, maternal smoking, chemical toxins, traumatic brain damage.

Section 01 Limited to Psychology students
Section 02 Limited to non-Psychology students (CAPPED)

Professor Ditto

204-435B CORRELATIONAL TECHNIQUES. (3) (3 lectures) (Prerequisites: 204-204 and 204-305 or equivalent.) Exploration of the data for meaningful relations using techniques such as multiple regression, factor analysis and discriminant function analysis.

Professor Ramsey

204-436A HUMAN SEXUALITY AND ITS PROBLEMS. (3) (Prerequisites: either 204-337A or 204-418A or permission of the instructor.) This course will deal with variations in sexual behaviour and focus on topics typically referred to as gender identity, sexual orientation, sexual dysfunction and sexual deviation. Current research and theories attempting to understand these phenomena will be emphasized.

Section 01 Limited to Psychology students
Section 02 Limited to non-Psychology students (CAPPED)

Professor Wilkinson

204-437B READING ABILITY AND DISABILITY. (3) (Prerequisites: 204-213B and 204-340A)

204-438A THE CHILD WITNESS. (3) (Prerequisites: 204-213B and 204-304A)

204-450D RESEARCH PROJECT AND SEMINAR. (6 credits) (Prerequisites: 204-204, 204-305 or 204-435B, and permission of instructor. Password required) (Only for Major or special students in U3 who intend to proceed to graduate school.) Under supervision of an advisor approved by the Department, students design and carry out a research project. Students report their research in seminars throughout the year and in a final written report. Note: Students will be admitted on the basis of a written application on forms available from the Department (Room N7/9). Applications must be submitted by August 20.
204-451A HUMAN FACTORS RESEARCH AND TECHNIQUES. (3) (2 lectures; 1 lab) (Prerequisites: 204-204, 204-211, 204-212, 204-213, 204-215 and 204-305 or permission of instructor.) The application of psychology to the analysis and design of systems and products to increase efficiency and reduce the probability and risk of human error. Topics include: workload and vigilance, control-display relationships, task analysis, and workstation design.

Professor Donderi

204-470A MEMORY AND BRAIN. (3) (3 hour lectures) (Prerequisites: 204-308A and 204-318B or 552-311A or 177-306A) Memory and amnesia will be studied with an emphasis on the neural mechanisms of information storage in the brain. Topics include: Human memory, developmental plasticity, synaptic plasticity, memory modulators, emotion and memory, short- and long-term memory, sleep, and aging.

Professor Shapiro


The relevance of course material to applied issues in the domains of education, sports, and management is highlighted.

Section 01 Limited to Psychology students
Section 02 Limited to non-Psychology students (CAPPED)

Professor Koestner

204-472B SCIENTIFIC THINKING AND REASONING. (3) (2 lectures, 1 conference) (Prerequisites: U3 students only; 177-210A or at least 2 courses in the Faculty of Science at the 200 level.) (Open to Arts and Science students.) How do scientists think and reason? Are there strategies scientists use to make discoveries? Are there cognitive principles underlying science? Using research on the cognitive processes that scientists use, we will explore issues such as: hypothesis generation, conduct of experiments, linking theory to data, representing data, making errors, and women in science.

Professor Dunbar

204-473B SOCIAL COGNITION AND THE SELF. (3) (2 lectures) (Prerequisites: 204-215 and 204-331 or 204-333 or 204-354) Not open to students who have taken 204-411B) This course examines the social psychological literature emphasizing a) social cognition - how people think about and make sense of their social experiences; and b) self theory - how people create and maintain a sense of identity. These frameworks will be applied to social psychological topics including close relationships, attitudes and self-esteem.

Section 01 Limited to Psychology students
Section 02 Limited to non-Psychology students (CAPPED)

Professor Baldwin

204-480D FOUNDATIONS OF MODERN PSYCHOLOGY. (6) (2 lectures) (For Honours students only.) Critical examination of the assumptions, concepts, ethics, empirical methods, and integrative ideas of modern psychology. Lectures, student presentations, and discussions.

Professor Baldwin (A term)
Professor Pettito (B term)

204-481D HONOURS THESIS RESEARCH. (6) (9 hours. Research) (U3 Honours students only.) Please see regulations concerning Project Courses, section 2.6.1 on page 333 in the Faculty Degree Requirements section.) Under the supervision of an advisor approved by the Department, students design and carry out a research project and report their results in the form of an undergraduate thesis.

Staff

204-491D ADVANCED STUDY IN BEHAVIOURAL DISORDERS. (6) (1-2 hours lecture or tutorial per week plus a field experience requirement.) (Prerequisites: 204-337A and 204-338B and permission of instructor. Password required.) Critical examination of topics in abnormal and clinical psychology. Emphasis will be on analysis of theoretical positions and empirical findings as they relate to both etiology and treatment. Note: Students will be admitted on the basis of a written application on forms available from the Department (Room N7/9). Applications must be submitted by August 20.

Professor Zacchia

204-492A/493B SEMINARS IN SPECIAL TOPICS. (3 credits each) (Restricted to U3 students. Password required.) (Please see regulations concerning Project Courses, section 2.6.2 on page 339 in the Faculty Degree Requirements section.) These seminars are offered by special arrangement between interested Psychology staff and students. A student may not register in more than one of these seminars in an academic year. Note: A written proposal detailing the plans for the seminar must be approved by the Department Curriculum Committee before the student is permitted to register for this course. This proposal must be received by the Department Curriculum Committee well before the beginning of the term for which the seminar is proposed. Consult the Departmental Handbook for additional information.

Staff

204-495B PSYCHOLOGY RESEARCH PROJECT. (3) (Prerequisites: 30 credits of the Psychology program including 204-305A/B or equivalent statistics course and CGPA above 3.0. Password required.) (Not open to students registered in 204-360D, 204-481D or 204-450D.) (Please see regulations concerning Project Courses, section 2.6.2 on page 339 in the Faculty Degree Requirements section.) Under the supervision of Psychology faculty, students carry out a research project and write a paper describing their results and relating it to the relevant literature. Registration is by special arrangement with Psychology staff, and project proposals must be approved by the Department before registration. For more information see the Psychology Department Handbook. A. Baker (Coordinator)

204-501B AUDITORY PERCEPTION. (3) (2 lectures) (Prerequisites: 204-212A or equivalent, or permission of instructor.)

204-505A THE PSYCHOLOGY OF PAIN. (3) (2 lectures; 1 conference) (Prerequisites: 204-308A or equivalent course in physiological psychology or physiology.)

204-510A STATISTICAL ANALYSIS OF TESTS. (3) (3 lectures) (Prerequisites: 204-305 or 204-435B, 204-406 or permission of instructor.)

204-511B INFANT COMPETENCE. (3) (1, 3 hour seminar) (Prerequisites: 204-351 or 352 or 353 or 380D or 450D and permission of instructor.) Basic research on the nature of infant competence – both the development of mental representations/operations and expressive/communicative ability – will be examined. Implications for clinical assessment and intervention including information processing procedures as an alternative to conventional tests and treatment procedures for developmental delays will be covered.

Professor Zelazo

204-526A ADVANCES IN VISUAL PERCEPTION. (3) (2 lectures) We examine in detail the structure of the visual system, and its function as reflected in the perceptual abilities and behaviour of the organism. Parallels are also drawn with other sensory systems to demonstrate general principles of sensory coding.

Professors Mullen and Kingdom

204-530A APPLIED TOPICS IN DEAFNESS. (3) (Prerequisite: 204-340 or 204-341 or equivalent. Co-requisite: 204-343 and permission of instructor.) (Undergraduate enrolment limited.) Covers fundamental topics in deafness (sensory, perceptual, cognitive, social, linguistic, education and health issues) from an applied psychological perspective. Lectures and seminar presentations plus field work involving ASL/LSO.

Professor MacDougall

204-531B STRUCTURAL EQUATION MODELS. (3) (one 2-hour lecture plus one lab) (Prerequisites: 204-435B, 204-651B, or equivalent, or permission of instructor.)

204-532A COGNITIVE SCIENCE. (3) (Prerequisites: Admission to the Cognitive Science Minor or permission of instructor. Students should ideally have some cognitive science background in at least two disciplines.)

204-533A INTERNATIONAL HEALTH PSYCHOLOGY. (3) (Prerequisites: 204-305 and 204-215 or 204-429 or 204-304 or 151-227 and permission of instructor) (Limited enrolment) The focus will be on health and illness in developing countries, in particular, on health problems (malnutrition, alcohol abuse, mental illness, family plan-
ning, and HIV) where psychosocial factors play a large role in the problem and the solution. Attempted solutions based on community participation, health education, non-governmental and international agencies will be discussed. **Professor Aboud**

**204-534A COMMUNITY PSYCHOLOGY.** (3) (Prerequisites: 204-337 and 204-338 and permission of instructor) (Limited enrolment) (Open to Graduate students or U3 undergraduates in Psychology.) Community psychology aims to promote health in groups and communities rather than expending resources solely on relieving dysfunction in individuals. The course reviews the conceptual rationale for community psychology and explores examples of both successful and unsuccessful prevention programs. It also discusses crisis intervention, informal caregivers, self-help groups, and mental health education through the media. **Professor Koestner**

**204-535B ADVANCED TOPICS IN SOCIAL PSYCHOLOGY.** (3) (Prerequisites: 204-215, 204-333 and one additional course from the social and personality area of specialization, or 204-380D, and permission of instructor. Limited enrolment, password required.) Classic and contemporary readings in a specific content area within social psychology will be assigned in order to examine the sub-area in depth. The focus will vary depending upon the specialty area of the instructor. These areas include interpersonal relationships, intergroup relations, the self, and social cognition. **Professor Lydon**

11.28 Science for Teachers

Student Affairs Office
Dawson Hall, Room 115
853 Sherbrooke Street West
Montreal, QC, H3A 2T6
Telephone: (514) 398-4207
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Coordinator - Science — R. Harris
Coordinator - Education — B. Alters

The training and certification of school teachers has traditionally been the responsibility of the Faculty of Education and normally requires the completion of a Bachelor of Education. The program described in this section does not replace the existing teacher training programs but is intended as a very rigorous but rewarding alternative.

The Faculties of Education and of Science have introduced a program specifically aimed at forming teacher/scientists. The Concurrent B.Sc./B.Ed. Program is designed to provide students with the opportunity to obtain a Bachelor of Science degree and a Bachelor of Education degree after a minimum of 135 credits of study. The Science and Education components of the Concurrent program are rigidly structured and closely integrated so as to satisfy the academic requirements of both degrees.

Concurrency is an essential characteristic of this program: the Science and Education components cannot be taken separately and later combined. Normally students will be admitted to both components of the Concurrent Program simultaneously. Students who have completed more than 30 credits in a B.Sc. or a B.Ed. program, exclusive of the Freshman Year for out-of-province students, will not be allowed to opt into the Concurrent Program. Both components of the Concurrent Program must be taken simultaneously, and both degrees will be granted during the same convocation period. It will not be possible to receive one degree first, and the other subsequently.

Students in the Concurrent Program may apply to transfer to either a conventional B.Sc. or a conventional B.Ed program. To do so, they must submit a Faculty Transfer Application to the appropriate Student Affairs Office. The decision will be based on their grades in the relevant component of the Concurrent Program. Students who do transfer to a conventional program may not transfer back to the Concurrent Program.

Students who receive an F or J in an Education Field Experience course are placed in unsatisfactory standing. Although they may complete their semester, they are required to withdraw from the Concurrent Program. However, they may apply to transfer to a conventional B.Sc. program as outlined above.

To be admitted, candidates must satisfy the admission requirements of both faculties.

Students who wish to be registered in the Concurrent Program must contact one of the coordinators through the Student Affairs Office of either faculty.

**CONCURRENT B.SC./B.ED.PROGRAM (135 credits)**

The two components of the Concurrent Program are the B.Ed. General Secondary Two-Subject Option Program and one of the B.Sc. Major Programs in Two Subjects for Teachers. These two components are described in what follows, including an identification of the elements that are counted towards the requirements of both degrees. These provisions are exceptional and apply exclusively to the Concurrent Program.

The following two-subject combinations have been approved for the Concurrent Program:

- biology and chemistry
- mathematics and chemistry
- mathematics and physics
- psychology and French
- social studies and geography
- two science subjects
- two social science subjects
- two languages
- two languages and math
- two languages and chemistry
- two languages and physics
- two languages and social studies
- two languages and two science subjects
- two science subjects and one social science
- two science subjects and one language
- two science subjects and two languages

**BACHELOR OF EDUCATION GENERAL SECONDARY TWO-SUBJECT OPTION PROGRAM (120 credits)**

The aim of the B.Ed. in Secondary Education is to prepare teachers for the secondary school level through a program of academic studies in two subject areas and professional studies centred on school-based practicums supported by courses in pedagogy, curriculum and educational foundations. In the case of the Concurrent Program the two academic subjects must correspond to one of the five combinations listed above.

A full description of the B.Ed. Secondary Program can be found in the Faculty of Education section 6.1.4 on page 188. In summary, it consists of the following:

- **Academic components (57 credits):** in the present case these courses will be selected from the lists of required and complementary courses in the B.Sc. component of the Concurrent Program, and will count towards both degrees.
- **Professional components (57 credits):** these include professional seminars, field experiences, foundation courses, pedagogy courses, and pedagogical support courses. The following 18 credits can be included as electives in the B.Sc. component of the Concurrent Program, and will count towards both degrees: 411-405, 414-309, 416-300, 423-400, 455-402, and 455-410.
- **Electives (6 credits).**

**BACHELOR OF SCIENCE, MAJOR PROGRAM IN TWO SUBJECTS FOR TEACHERS (90 credits)**

These B.Sc. programs are designed specifically as the Science component of the Concurrent B.Sc./B.Ed. Program. Five combinations of two science subjects are approved for the Concurrent Program. These combinations are chosen to reflect compulsory subjects taught in secondary schools and common pairings of subjects taught by secondary school teachers. They also honour the requirement of the Ministère de l'éducation to train teachers in two subjects, with the possibility of a third subject which supports or is related to the other two, since mathematics is a necessary support for physics and chemistry.

The general structure of these B.Sc. programs is as follows:

- **Required and complementary courses (64-66 credits).** The details of these major programs are given below. Note that 57 of
these credits can be counted towards the academic component of the B.Ed. program, but only for students in the Concurrent Program.

Elective courses (24-26 credits). These are electives from the B.Sc. perspective, but they must be suitably chosen if the student wishes to complete the Concurrent Program with the minimum of 135 credits. The following Education courses can count towards both the B.Sc. and the B.Ed. components of the Concurrent Program.

- 411-405 (3) Policy issues in Quebec Education
- 414-309 (3) Exceptional Children
- 416-300 (3) Educational Psychology
- or 415-398 (3) Philosophy of Catholic Education
- 455-402 (3) Media, Technology and Education
- 455-410 (3) Multi-cultural/Multi-racial Class
- or 423-464 (3) Intercultural Education
- or 433-441 (3) First Nations and Inuit Education

**MAJOR PROGRAM IN BIOLOGY AND CHEMISTRY FOR TEACHERS** (65 credits)

**Required Science courses** (56 credits)
- 177-210 (3) Perspectives of Science
- 189-222 (3) Calculus III
- 189-203 (3) Principles of Statistics I

**Chemistry List A**

**Geoscience List**

**Complementary Science courses** (9 credits)

**MAJOR PROGRAM IN BIOLOGY AND GEOGRAPHY FOR TEACHERS** (66 credits)

**Required Science courses** (42 credits)
- 177-210 (3) Perspectives of Science
- 189-203 (3) Principles of Statistics I

**Biology List A**

**Geography List A**

**Complementary Science courses** (24 credits)

**MAJOR PROGRAM IN CHEMISTRY AND PHYSICS FOR TEACHERS** (65 credits)

**Required Science courses** (62 credits)
- 177-210 (3) Perspectives of Science

**Mathematics List B**

**Chemistry List A**

**Physics List A**

**Complementary Science courses** (3 credits)

**MAJOR PROGRAM IN MATHEMATICS AND CHEMISTRY FOR TEACHERS** (64-65 credits)

**Required Science courses** (47 credits)
- 177-210 (3) Perspectives of Science

**Mathematics List A**

**Chemistry List A**

**Complementary Science courses** (17-18 credits)

**Mathematics List C**

**Chemistry List B**

**MAJOR PROGRAM IN MATHEMATICS AND PHYSICS FOR TEACHERS** (66 credits)

**Required Science courses** (57 credits)
- 177-210 (3) Perspectives of Science

**Mathematics List A**

**Physics List A and List B**

**Complementary Science courses** (9 credits)

**Mathematics List C**

**COURSE LISTS USED IN THE VARIOUS OPTIONS**

**Biology List A:** (24 credits)
- 177-200 (3) Molecular Biology
- 177-201 (3) Cell Biology and Metabolism
- 177-202 (3) Basic Genetics
- 177-205 (3) Biology of Organisms
- 177-206 (3) Methods in Biology of Organisms
- 177-208 (3) Introduction to Ecology
- 177-301 (3) Cell and Molecular Laboratory
- 177-304 (3) Evolution

**Chemistry List B:** (6 credits)
- to be selected from the following:
  - 177-370 (3) Human Genetics Applied
  - 552-201 (3) Human Physiology: Control Systems
  - or 552-209 (3) Mammalian Physiology I

**Biology List C:** (6 credits)
- to be selected from the following:
  - 177-455 (3) Conservation Biology
  - 177-331 (3) Ecology / Behaviour Field Course
  - 177-334 (3) Applied Tropical Ecology
  - or 177-336 (3) Marine Aquaculture
  - or 177-337 (3) Ecology and Behaviour of Fishes

**Chemistry List A:** (23 credits)
- 180-150 (3) The World of Chemistry I
- or 180-151 (3) The World of Chemistry II
- or 180-170 (3) The World of Chemistry III
- 180-281 (3) Inorganic Chemistry I
- 180-381 (3) Chemistry of Transition Elements
- 180-212/222* (4) Organic Chemistry
- 180-257 (4) Analytical Chemistry
- 180-203/213* (3) Physical Chemistry
- 180-350 (3) Earth, Air, Fire, Water
- or 180-307 (3) Environmental Analysis

*students who have the CEGEP equivalent of any one of these courses must replace it with one course chosen from the block 180-273 through 180-404 in List B (for 180-203/213) or from the block 180-302 through 180-402 (for 180-212/222).

**Chemistry List B:** (8 or 9 credits)
- to be selected from the subject, to meet the requirement that at least one course must include a laboratory.
  - 180-273 (1) Chemical Kinetics
  - 180-345 (3) Molecular Properties & Structure I
  - 180-355 (3) Molecular Properties & Structure II
  - 180-365 (2) Statistical Mechanics
  - 180-363 (2) Physical Chemistry Lab.
  - 180-393 (2) Physical Chemistry Lab. II
  - 180-556 (3) Advanced Quantum Mechanics
  - 180-404 (3) Biophysical Chemistry
  - 180-367 (3) Instrumental Analysis I
  - 180-377 (3) Instrumental Analysis II
  - 180-567 (3) Chemometrics: Analysis of Chemical Data
  - 180-302 (3) Organic Chemistry II
  - 180-362 (2,3) Advanced Organic Chemistry Lab.
  - 180-402 (3) Advanced Bio-Organic Chemistry
  - 180-531 (3) Chemistry of Inorganic Materials
  - 180-455 (3) Polymer Chemistry
  - 180-591 (3) Advanced Coordination Chemistry
  - 180-543 (2) Chemistry of Pulp & Paper
  - 180-392 (3) Integrated Inorganic/Organic laboratory
  - 186-210 (3) Introduction to Mineralogy
  - 186-220 (3) Principles of Geochemistry
  - 186-580 (3) Aqueous Geochemistry
  - or 186-542 (3) Chemical Oceanography

**Geography List A:** (12 credits)
- 183-203 (3) Environmental Systems
- 183-216 (3) Geography of World Economy
- 183-272 (3) Landforms & Environmental Systems
- 183-201 (3) Geographical Information Systems I
Geography List B: (15 credits) to be selected from the following:

183-200 (3) Geographical Perspectives on World Environmental Problems
183-302 (3) Environmental Analysis and Management: Problems and Policy
183-305 (3) Soils and Environment
183-321 (3) Climatic Environments
183-322 (3) Environmental Hydrology
183-350 (3) Ecological Biogeography
183-372 (3) Running Water Environments
183-408 (3) Geography of Unequal Development
183-410 (3) Geography of Underdevelopment: Current Problems
183-306 (3) Geographical Information Systems II
or 183-308 (3) Remote Sensing
183-395 (3) Field studies - Physical Geography
or 183-398 (3) Field studies in Human Geography
or 183-494 (3) Field studies in Geography: Urban
or 183-496 (3) Regional Geographical Excursion: Barbados
or 183-497 (3) Field studies in Geography: Coastal Marsh Plant Ecology
or 183-499 (3) Subarctic field studies in Geography: Schefferville

Geoscience List: (3 credits) to be selected from the following:

186-200 (3) The Terrestrial Planets
186-201 (3) Understanding Planet Earth
186-320 (3) Elementary Earth Physics
195-210 (3) Introduction to Atmospheric Science
195-220 (3) Introduction to Oceanic Sciences
195-330 (3) Physical Meteorology

Mathematics List A: (21 credits)

189-222 (3) Calculus III
189-235 (3) Algebra I
189-236 (3) Linear Algebra I
189-314 (3) Advanced Calculus
189-315 (3) Ordinary Differential Equations
189-323 (3) Probability Theory
189-324 (3) Statistics

Mathematics List B: (15 credits)

189-203 (3) Principles of Statistics I
189-222 (3) Calculus III
189-223 (3) Linear Algebra
189-314 (3) Advanced Calculus
189-315 (3) Ordinary Differential Equations

Mathematics List C: (9 credits) to be selected from the following

189-242 (3) Analysis I
189-243 (3) Real Analysis
189-317 (3) Numerical Analysis
189-318 (3) Mathematical Logic
189-338 (3) History and Philosophy of Mathematics
189-348 (3) Topics in Geometry
308-202 (3) Introduction to Computing I
308-203 (3) Introduction to Computing II

Physics List A: (21 credits)

198-230 (3) Dynamics of Simple Systems
198-232 (3) Heat and Waves
198-241 (3) Signal Processing
198-259 (3) Lab in Mechanics, Heat & Optics
198-340 (3) Electricity and Magnetism
198-342 (3) Electromagnetic Waves
or 198-434 (3) Optics
198-446 (3) Quantum Physics

Physics List B: (12 credits)

198-240 (3) Computers for Physics
198-342* (3) Electromagnetic Waves
or 198-434* (3) Optics

* Both of 198-342 and 198-434 are required for the Mathematics and Physics option.