

198-551A QUANTUM THEORY. (3) (3 hours lectures) (Honours students, or permission of the instructor.) General formulation, scattering theory, WKB approximation, time-dependent perturbation theory and applications, angular momentum, relativistic wave equations.

Professor Gale

198-557A NUCLEAR PHYSICS. (3) (3 hours lectures) (Honours students, or permission of the instructor.) General nuclear properties, nucleon-nucleon interaction and scattering theory, radioactivity, nuclear models, nuclear reactions.

Professor Mark

198-558A SOLID STATE PHYSICS. (3) (3 hours lectures) (Honours students, or permission of the instructor.) Properties of crystals, lattice vibrations and thermal properties of insulators, free electron model and band structure, semi-conductors, metals, optical properties.

Professor D.H. Ryan

198-559A ADVANCED STATISTICAL MECHANICS. (3) (3 hours lectures) (Honours students, or permission of the instructor.) Self averaging and central-limit theorem; thermodynamic fluctuations; ensemble theory; surface roughening; broken symmetry and Goldstone's theorem; phase transitions; mean-field, Landau and Ornstein-Zernicke theory; Monte Carlo method; molecular dynamics; scaling; renormalization group; epsilon expansion; non-equilibrium theory.

Professor Grant

198-562B ELECTROMAGNETIC THEORY. (3) (3 hours lectures) (Honours students, or permission of the instructor.) Electrostatics, dielectrics, magnetostatics, timevarying fields, relativity, radiating systems, fields of moving charges.

Professor De Takacsy

198-567B PARTICLE PHYSICS. (3) (3 hours lectures) (Honours students, or permission of the instructor.) Survey of elementary particles; hadrons, leptons and hadrons' constituents (quarks). Invariance principles and conservation laws. Detectors and accelerators. Phenomenology of strong, electromagnetic and weak interactions.

Professor Stairs

11.25 Physiology (552)

McIntyre Medical Sciences Building, Room 1021
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Montreal, QC H3G 1Y6
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Website: <http://www.physio.mcgill.ca>

Chair — Alvin Shrier

Emeritus Professor

G. Melvill Jones; B.A., M.A., M.B., B.Ch., M.D.(Cantab.)

Professors

Catherine Bushnell; B.A.(Maryland), Ph.D.(American U.) (*Harold Griffith Professor of Anaesthesia*) (joint appt. with Dentistry)

Thomas M.S. Chang; B.Sc., M.D., C.M., Ph.D.(McG.), F.R.C.P.(C) Monroe W. Cohen; B.Sc., Ph.D.(McG.)

Ellis J. Cooper; B.Eng.(Sir G.Wms.), M.Sc.(Surrey), Ph.D.(McM.)

Mony M. Frojmovic; B.Sc., Ph.D.(McG.)

Leon Glass; B.S.(Brooklyn), Ph.D.(Chic.)

Phil Gold; C.C., B.Sc., M.Sc., Ph.D., M.D., C.M.(McG.),

F.R.C.P.(C.), F.R.S.C. (*joint appt. with Medicine*)

David Goltzman; B.Sc., M.D., C.M.(McG.) (*Antoine G. Massabki Professor of Medicine*) (joint appt. with Medicine)

John Hanrahan; Ph.D.(U.B.C.)

James L. Henry; B.Sc.(Tor.), M.Sc., Ph.D.(W.Ont.)

Robert E. Kearney; B.Eng., M.Eng., Ph.D.(McG.) (*joint appt. with Biomedical Engineering*)

Kresmir Krnjivic; O.C., B.Sc., Ph.D., M.B., Ch.B.(Edin.), F.R.S.C. (*joint appt. with Anaesthesia Research*)

Wayne S. Lapp; M.S.A.(Tor.), Ph.D.(McG.)

Mortimer Levy; B.Sc., M.D., C.M.(McG.), F.R.C.P.(C) (*joint appt. with Medicine*)

Michael Mackey; B.A., Ph.D.(Wash.)

Jacapo P. Mortola; M.D.(Milan)

Premysl Ponka; M.D., Ph.D.(Prague)

Alvin Shrier; B.Sc.(C' dia), Ph.D.(Dal.) (*Hosmer Professor of Physiology*)

Douglas G.D. Watt; M.D., Ph.D.(McG.)

Associate Professors

Riaz Farookhi; B.Sc., M.Sc.(M.I.T.), Ph.D.(Tufts)

Mladen Glavinovic; B.Sc.(Zagreb), M.Sc.(Tor.), Ph.D.(McG.) (*joint appt. with Anaesthesia Research*)

Michael Guevara; B.Sc., M.Eng., Ph.D.(McG.)

Sheldon Magder; M.D.(Tor.) (*joint appt. with Medicine*)

John Orłowski; B.Sc.(McG.), M.Sc., Ph.D.(Queen's)

Teresa Trippenbach; M.D., Ph.D.(Warsaw)

Ann Wechsler; B.A.(Tor.), M.Sc., Ph.D.(McG.)

Peter Weldon; B.Sc., Ph.D.(McG.)

John White; B.Sc., M.Sc.(Car.), Ph.D.(Harv.)

Assistant Professors

Kathleen Cullen; B.Sc.(Brown), Ph.D.(Chicago)

Rajender Sipehia; B.Sc.(Punjab), Ph.D.(C' dia)

Ursula Stochaj; Ph.D.(Cologne)

Lecturer

Jennifer Day; B.Eng., M.Eng.(McG.),

Associate Members

Anaesthesia: Steven Blackman;

Dentistry: James Lund;

Medicine: Albert Aguayo, Jason Bates, Andrey Cybulsky,

Samuel O. Freedman, Abraham Fuks, Claude Gagnon,

Raymonde Gagnon, Harry Goldsmith, Geoffrey Hendy,

Gitte Jensen, Max Katz, Peter Macklem, James Martin,

Shree Mulay, Mariana Newkirk, Barry Posner, Shafaat

Rabbani, Ian Shrier, J. Enrique Silva, Alan Sniderman,

Mary Stevenson, Simon Wing, Hans Zingg;

Neurology & Neurosurgery: Massimo Avoli, Charles Bourque,

Sal T. Carbonetto, Pierre Drapeau, Daniel Guitton,

Michael Rasminsky;

Otolaryngology: Bernard Segal;

Pediatrics: Immanuela Moss;

Physical & Occupational Therapy: Christina Hui-Chan;

Psychiatry: Bernardo Dubrovsky, Christina Gianoulakis; Univ. of Montreal, Medicine: Alex Grassino

Adjunct Professors

Edgar Delvin, Montreal

John Milton, Chicago

Serge Rossignol, Montreal

Malmur R.I. Sairam, Montreal

Physiology has its roots in many of the basic sciences including biology, chemistry, mathematics, and physics. Physiology overlaps with other biomedical sciences such as anatomy, biochemistry, pathology and pharmacology, and with psychology and biomedical engineering, and is one of the prime contributors of basic scientific knowledge to the clinical medical sciences.

Members of the Department of Physiology at McGill are engaged in studies dealing with molecules, single cells, or entire systems in a variety of vertebrates, including man. A wide range of interest and expertise is represented, including cardiovascular, respiratory, gastrointestinal and renal physiology, the physiology of exercise, neurophysiology, endocrinology, immunology, biophysics and biomathematics. Some faculty members have formal or informal links with the departments of mathematics, physics, electrical engineering, chemistry and clinical departments (medicine, surgery, pediatrics, neurology, obstetrics, psychiatry, anesthesia), reflecting and reinforcing the close ties between physiology and other disciplines.

Graduates at the B.Sc. level have found rewarding careers in teaching, in secondary schools and CEGEPs, government service, and laboratory technical assistance, such as in pharmaceutical houses, hospitals, and institutions of higher learning. Moreover, physiology provides an excellent background for medicine, dentistry or other postgraduate work, in such fields as physiology, experimental medicine, pharmacology, biochemistry or physiological psychology.

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.

Note: An information session is held for U1 students in the spring of every year, to provide details on the different Departmental programs.

Returning students are asked to consult with their adviser in order to fill out MARS worksheets.

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)

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
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

Complementary Courses (24 credits)

6 credits selected from:

177-201B (3) Cell Biology and Metabolism
or 507-212B (3) Molecular Mechanisms of Cell Function
177-373A (3) Biostatistical Analysis
or 177-309A (3) Mathematical Models in Biology

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)

552-209A (3) Mammalian Physiology I
552-210B (3) Mammalian Physiology II
552-212D (2) Introductory Physiology Lab
177-200A (3) Molecular Biology
177-202A,B (3) Basic Genetics
180-222A,B (4) Organic Chemistry II

U2 and U3 Required Courses (15 credits)

552-311A (3) Intermediate Physiology I
552-312B (3) Intermediate Physiology II
552-313B (3) Intermediate Physiology III
177-301A,B (3) Cell and Molecular Laboratory
507-311A (3) Metabolic Biochemistry

Complementary Courses (30-31 credits)

12-13 credits selected from:

177-201B (3) Cell Biology and Metabolism
or 507-212B (3) Molecular Mechanisms of Cell Function
177-373A (3) Biostatistical Analysis
or 177-309A (3) Mathematical Models in Biology

180-203A (3) A Survey of Physical Chemistry
or 180-204A,B (3) Physical Chem./Biol. Sci. I
504-214A (3) Systemic Human Anatomy
or 504-261A (4) Introduction to Dynamic Histology
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)

552-212D (2) Introductory Physiology Lab
189-222A,B (3) Calculus III
189-247A,B (3) Linear Algebra
177-200A (3) Molecular Biology
177-309A (3) Mathematical Models in Biology

U1 Complementary Courses (15 credits)

9 credits selected from:

552-209A (3) Mammalian Physiology I
and 552-210B (3) Mammalian Physiology II
or 552-201A (3) Human Physiology: Control Systems
and 552-202B (3) Human Physiology: Body Functions
177-201B (3) Cell Biology and Metabolism
or 507-212B (3) Molecular Mechanisms of Cell Function

6 credits selected from:

189-248A (3) Advanced Calculus I
or 189-314A,B (3) Advanced Calculus
189-325A,B (3) Ordinary Differential Equations
or 189-315A,B (3) Ordinary Differential Equations

U2 Required Courses (21 credits)

552-311A (3) Intermediate Physiology I
552-312B (3) Intermediate Physiology II
552-313B (3) Intermediate Physiology III
189-242A (3) Analysis I
189-243B (3) Real Analysis
189-323A (3) Probability Theory
189-324B (3) Statistics

U2 Complementary Courses (3 credits)

198-413A (3) The Physical Basis of Physiology
or 189-437A (3) Mathematical Methods in Biology

U3 Required Courses (3 credits)

189-319B (3) Partial Differential Equations

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:

189-316B (3) Functions of a Complex Variable
or 189-249B (3) Advanced Calculus II
189-317A,B (3) Numerical Analysis
189-322B (3) Dynamical Systems, Fractals and Chaos
189-447B (3) Stochastic Processes

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)

552-212D* (2) Introductory Physiology Lab
198-230A (3) Dynamics of Simple Systems
198-232B (3) Heat and Waves
198-241B (3) Signal Processing
198-259D (3) Lab in Mechanics, Heat & Optics
189-222A,B (3) Calculus III

U1 Complementary Courses (12 credits)

552-209A (3) Mammalian Physiology I
and 552-210B* (3) Mammalian Physiology II
or 552-201A (3) Human Physiology: Control Systems
and 552-202B (3) Human Physiology: Body Functions
189-223A (3) Linear Algebra

- 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
 189-315A (3) Ordinary Differential Equations
 or 189-325B (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
 6 credits to be approved by Physiology and Physics

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 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

- 177-373A (3) Biostatistical Analysis
 or 177-309A (3) Mathematical Models in Biology
 180-203A (3) A Survey of Physical Chemistry
 or 180-204A,B (3) Physical Chem./Biol. Sci. I
 6 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) (FYS – 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) (FYS - 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 552-201A.) (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.) 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 underlying our current understanding of topics in immunology, kidney function and respiration explored beyond the introductory level. **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 the physiology of the cardiovascular system; blood physiology including hemostasis and thrombosis; transport of fluids and cells; general cell kinetics and regulation, and gastrointestinal physiology. **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, radioimmunoassay, 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. (6) (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; 177-309A or 189-315A,B.) (Offered in even numbered years.)

□ **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 physi-

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). Emphases on molecular mechanisms regulating clot formation, fibrinolysis, and cell adhesion/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 pathophysiology 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 507-503B.) 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. **Professors 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 Orłowski 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.)
Patricia Boksa; B.Sc., Ph.D.(McG.)
Bernardo Dubrovsky; M.D.(Buenos Aires)
Alain Gratton; 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)
Dominique 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 177-201B or permission of instructor.) (Not open to students who have taken 576-301B.) The phenomenology and epidemiology of the use and abuse of alcohol, nicotine, opiates, stimulants, sedatives and psychotomimetic agents are discussed in relation to current theoretical and experimental issues. The perspective is multidisciplinary and the intention is to develop an understanding the nature of the issues surrounding drug dependence. **Professor Gill**

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 allometric brain growth and recent evolutionary theories of brain organization as they relate to normal and abnormal behavior will be emphasized.

Professor Dubrovsky

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.A.J. Marley

Emeritus Professors

Albert S. Bregman; B.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 E. 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. Binik; B.A.(N.Y.U.), B.H.L.(Jewish Theological
Seminary), M.A., Ph.D.(Penn.)
Maggie Bruck; B.A.(Wheaton), M.A., Ph.D.(McG.)
Keith B.J. Franklin; B.A., M.A.(Auck.), Ph.D.(Lond.)
Fred H. Genesee; 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.A.Sc., Ph.D.(Tor.)
Michael Petrides; B.Sc., M.Sc.(Lond.), Ph.D.(Cantab.)
Robert O. Pihl; B.A.(Lawrence), 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.(U.B.C.), 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.(Notre 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.(Ct.)
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. Gropen; 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. Coderre;
Douglas Hospital: Howard Steiger;
Family Medicine: Vilma Patel;
Montreal Neurological Institute: Barbara Jones, Marilyn Jones-
Gotman, Brenda Milner, Robert Zatorre;
Psychiatry: Frances Abbott; Sharon Welner

Vision Research Unit (Ophthalmology): 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. Maccougall; 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. Steinert; B.A.(Hebrew), Ph.D.(Montr.)
Camilo Zacchia; B.A.(McG.), M.S.(Florida State), Ph.D.(McG.)
Philip R. Zelazo; B.A.(Amer.Int'l.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, psychology 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 behaviour 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 behaviour, 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 psychology that are relevant to different aspects of human life. Experimentation, laboratory techniques, observational procedures, measurement, and statistical methods are important tools of the psychologist.

Psychology has many interdisciplinary aspects. The study of psychological problems often involves knowledge drawn from other disciplines such as biology, physiology, linguistics, sociology, philosophy, and mathematics. For this reason a student with varied interests can frequently find a place for these in psychology.

Psychology is a young science so that explanations of the processes underlying observed phenomena are often theoretical and speculative. The major objectives of psychological study are to reduce the discrepancy between theory and fact and to provide better answers about why humans think and behave as they do.

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 questions 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 psychology, such as medicine, education, social work, human communication 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 universities, research institutes, hospitals, community agencies, government departments, large corporations, or may act as self-employed consultants. At the graduate level, psychology has many specialized branches including social psychology, physiological 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 Adviser, 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 N2/2D of the Stewart Biology 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 N7/9, 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 1
- 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

- 204-471 (3) Human Motivation
 204-473 (3) Social Cognition and the Self
 204-534 (3) Community Psychology
 204-535 (3) Advanced Topics in Social Psychology

Developmental

- 204-304 (3) Child Development
 204-343 (3) Language Acquisition in Children
 204-414 (3) Social Development
 204-416 (3) Advanced Topics in Child Development
 204-438 (3) The Child Witness
 204-511 (3) Infant Competence
 204-561 (3) Methods in Developmental Psycholinguistics

Research and Measurement

- 204-336 (3) Measurement of Psych. Processes
 204-400 (3) Contemporary Psychology Theory
 204-403 (3) Modern Psychology in Historical Perspective
 204-406 (3) Psychological Tests and Measurements
 204-435 (3) Correlational Techniques
 204-451 (3) Human Factors Research and Techniques
 204-450 (6) Research Project and Seminar
 204-492 (3) Seminar in Special Topics
 204-493 (3) Seminar in Special Topics
 204-495 (3) Psychology Research Project
 204-510 (3) Statistical Analysis of Tests
 204-531 (3) Structural Equation Models

B.Sc. FACULTY PROGRAM IN PSYCHOLOGY (54 credits)

[MARS Program Code 4-810000]

NOTE: Students in the Faculty of Science who select Arts courses must have a total of at least 54 credits in Science courses among the 90 credits for the B.Sc. degree. Students are expected to have whatever prerequisites are described in this Calendar.

A Faculty Program in Psychology is a sequence of courses which represents a lesser degree of specialization than a Major or an Honours program. A minimum grade of C is required in all 54 program credits.

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.

Complementary Courses (42 credits)

- 12 credits of Psychology courses:
 select 6 credits from each of two of the six areas of specialization
 12 credits of Psychology courses, selected from:
 courses at the 300 level or above, at least 6 of which must be at the 400 level or higher
 18 credits, 9 of which must be at the 300 level or higher, selected from:
 any departments within the University other than Psychology, consistent with regulations of the Faculty of Science.

B.Sc. MAJOR PROGRAM IN PSYCHOLOGY (54 credits)

[MARS Program Code 1-810000]

Students majoring in Psychology must obtain a minimum grade of C in all 54 credits of the program. A grade lower than C may be made up by taking another equivalent course (if there is one), by successfully repeating the course, or by successfully writing a supplemental examination (if there is one).

A course can be considered to fulfill only one requirement. For example, if 204-413B is taken to satisfy part of the requirement for 9 complementary credits in psychology at the 400 level, it may not also be counted towards the completion of 6 credits in the Cognitive Psychology area 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

Complementary Courses (39 credits)

- 18 credits of Psychology courses:
 select 6 credits from each of three 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.

- Denotes courses not offered in 1999-2000.

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.

Professor Donderi

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 statistical analysis of research data; frequency distributions; graphic representation; measures of central tendency and variability; elementary sampling theory and tests of significance.

**Professor Amsel (A)
Professor Ostry (B)**

204-211B LEARNING AND MOTIVATION. (3) (2 lectures) (Prerequisite: 204-100A or equivalent.) An introduction to contemporary research on learning and motivation from a behavioural, biological and evolutionary perspective. Topics include: internal and external influences on behaviour, 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 A. Baker

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)*

Section 03 Limited to non-Psychology students (CAPPED)

Professor Wilkinson

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 Gropen

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 Taylor

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

Section 02 Limited to Psychology Minor students (CAPPED)

Section 03 Limited to non-Psychology students (CAPPED)

Professor Petrides

● **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 PHYSIOLOGICAL PSYCHOLOGY II: MOTIVATION AND LEARNING. (3) (2 lectures, 1 conference) (Prerequisite: 204-308A or 204-311A or 504-321A or 177-306A or 552-201A or 552-209A.) Physiological bases of motivation including feeding and drinking, sexual and parental behaviour. Physiological processes in reinforcement and learning.

Professor White

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 biases of current theories is first established. This is followed by a review of current theories and finally current controversies are explored including new forms of racism and affirmative action.

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 Taylor

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.

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 Zuroff

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.

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 Lydon

● **204-334A COMPUTER SIMULATION - PSYCH. PROCESS.** (3) (3 hour lecture) (Prerequisites: 204-212, 204-213 and 308-202A,B; or permission of instructor.) (Limited enrolment.)

● **204-335A FORMAL MODELS OF PSYCH. PROCESSES.** (3) (3 hour lecture) (Prerequisites: A basic understanding of mathematics, e.g. the contents of 189-112A,B, and of computer science, e.g. the contents of 308-202A,B or permission of instructor.)

● **204-336B MEASUREMENT OF PSYCH. PROCESSES.** (3) (3 lectures) (Prerequisites: 204-204 and Introductory Calculus)

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.

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 Pihl

204-338B 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.

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 Pihl

204-340A THE PSYCHOLOGY OF LANGUAGE. (3) (2 1½ 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.

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

● **204-341B 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.

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 Sherwin

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.

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 Pettito

204-351A RESEARCH METHODS IN SOCIAL PSYCHOLOGY. (3) (1 hour lecture, 6 hour lab and/or field work) (Prerequisite: 204-215A. Pre- or Co-requisite: 204-305. U2 level and above, and permission of instructor. Password required.) Designed to introduce students to the issues, strategies, and applications of various research methodologies in social psychology. Through demonstrations, exercises, and pilot studies, students will gain experience with lab and field methods using both correlational and experimental procedures. Classic and contemporary approaches will be examined. **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.

Staff

204-352B LABORATORY IN COGNITIVE PSYCHOLOGY. (3) (1 hour lecture, weekly lab) (Prerequisite: 204-213 and permission of instructor. Password required.) This course will introduce students to the experimental techniques that are used in Cognitive Psychology. Different cognitive methodologies will be taught: reaction time, techniques for investigating recognition and recall, analyzing verbal protocols, and comparing subject performance to that of computer models. **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 Dunbar

● **204-353A LABORATORY IN HUMAN PERCEPTION.** (3) (1 hour lecture plus 3 hour lab) (Prerequisites: 204-212, U2 level or above, and permission of instructor. Password required.)

● **204-354B INTERPERSONAL RELATIONSHIPS.** (3) (Prerequisite: 204-215A and 204-204, 204-333 highly recommended.)

204-380D HONOURS RESEARCH PROJECT AND SEMINAR. (6) (3 hour seminar) (For U2 honours students only. Password required.) Students prepare reports on various experimental areas. They also carry out research under the direction of staff members.

Students present reports on progress and write a final research report.

Professors Ostry and Sherwin

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

204-403A 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 Pleszewski

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) (Prerequisites: 204-337A and 204-211 or permission of instructor.) An introduction to the theory, research and practice of cognitive behaviour therapy. The experimental approach to understanding human behaviour is used to follow basic principles of learning and their clinical application. Certain psychiatric disorders such as alcoholism and depression are highlighted to illustrate how a behaviour therapist conceptualizes problems and formulates treatments.

Professor Bradley

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 Zatorre

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) (Prerequisite: 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.)

204-429B HEALTH PSYCHOLOGY. (3) (2 lectures, 1 conference)

(Prerequisite: 204-337A or, in the case of advanced undergraduates, permission of instructor.) A survey of health psychology including a review of psychological factors involved in the development of physical illness. Assessment and intervention strategies for problems such as cardiovascular disease, cancer, diabetes, and headaches.

Section 01 Limited to Psychology students

Section 02 Limited to non-Psychology students (CAPPED)

Professor Ditto

204-431A THE ENVIRONMENT AND THE DEVELOPING BRAIN. (3)

(two 1½ hour lectures) (Prerequisite: 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 Wilkinson

204-435B CORRELATIONAL TECHNIQUES. (3) (3 lectures) (Prerequisites: 204-204 and 204-305 or equivalent.) (Credit for other statistics courses may preclude credit for this course and conversely. See "Course Overlap" on page 339.) The analysis of relations among a number of variables that are particularly common in social, developmental, clinical and organizational psychology. Exploration of the data for meaningful relations using techniques such as multiple regression, factor analysis and discriminant function analysis.

Professor Ramsay

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 Binik

● **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.

Professors O'Driscoll and White

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

204-471B HUMAN MOTIVATION. (3) (3 hour lectures) (Prerequisite: 204-215) The course focuses on integrating current goal-based and need-based theories of human motivation. Particular attention will be given to Cziksentmihalyi's (1990) Theory of Optimal Experience and Deci and Ryan's (1991) Self-Determination Theory. 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 Petitto (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 339](#) 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) A 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 Departmental 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 204-380D, 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 204-316 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/LSQ.

Professor MacDougall

● **204-531B STRUCTURAL EQUATION MODELS.** (3) (one 2-hour lecture plus one lab) (Prerequisite: 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) (Prerequisite: 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 speciality area of the instructor. These areas include interpersonal relationships, intergroup relations, the self, and social cognition. **Professor Lydon**

● **204-540A COMPUTATIONAL MODELLING OF REASONING.** (3) (3 hours) (Prerequisite: one course in cognitive psychology)

● **204-561B METHODS IN DEVELOPMENTAL PSYCHOLINGUISTICS.** (3) (3 hour lectures) (Prerequisites: 204-340A, 204-343B and 204-305 or permission of instructor.)

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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Email: bscbed@physics.mcgill.ca

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 appro-

priate 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
- biology and geography
- chemistry and physics
- mathematics and chemistry
- mathematics and physics.

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 practicum components 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
423-400	(3)	Philosophical Foundations
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

Biology List A
Chemistry List A

Complementary Science courses (9 credits)

Biology List B
Geoscience List

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)

Biology List C
Geography List B
Geoscience List

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

Required Science courses (62 credits)

177-210	(3)	Perspectives of Science
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Mathematics List B
Chemistry List A
Physics List A

Complementary Science courses (3 credits)

Geoscience List

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

Required Science courses (47 credits)

177-210	(3)	Perspectives of Science
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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
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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

Biology 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
or 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 180-160	(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 following, subject to 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 III
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
or 186-220	(3)	Principles of Geochemistry
or 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

- 198-436 (3) Modern Physics
 - 198-439 (3) Laboratory in Modern Physics
- * Both of 198-342 and 198-434 are required for the Mathematics and Physics option.

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