

57.5 Program Requirements

The M.Sc. program comprises a minimum of 45 credits as follows:

Required Courses (12 credits)

- 540-602 (3) Physiology, Histopathology and Clinical Otolaryngology 1
 540-612 (3) Physiology, Histopathology and Clinical Otolaryngology 2
 540-603 (3) Advanced Scientific Principles of Otolaryngology 1
 540-613 (3) Advanced Scientific Principles of Otolaryngology 2

Complementary Course (3 credits)

- 513-607 (3) Principles of Inferential Statistics in Medicine or equivalent

Thesis Component – Required (30 credits)

- 540-690 (3) Thesis 1
 540-691 (3) Thesis 2
 540-692 (6) Thesis 3
 540-693 (6) Thesis 4
 540-694 (12) Thesis 5

When appropriate, courses 540-602, 540-612, 540-603 or 540-613 may be replaced by other basic-science or clinical (500-level or higher) courses of relevance to Otolaryngology, as recommended or approved by the Department.

Students aiming to acquire an interdisciplinary background will be expected to take additional elective courses, at the undergraduate level if necessary.

57.6 Graduate Courses

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

540-602A,B,C PHYSIOLOGY, HISTOPATHOLOGY AND CLINICAL OTOLARYNGOLOGY 1. (3) (6 hours/week) University and hospital rounds and seminars presenting various topics in Clinical Otolaryngology.
Dr. S. Frenkiel and Staff

540-603A,B,C ADVANCED SCIENTIFIC PRINCIPLES OF OTOLARYNGOLOGY 1. (3) (1.5 hours/week) Lectures in advanced basic-science topics of relevance to the otolaryngologist.
Dr. S. Frenkiel and Staff

540-612A,B,C PHYSIOLOGY, HISTOPATHOLOGY AND CLINICAL OTOLARYNGOLOGY 2. (3) (6 hours/week) University and hospital rounds and seminars presenting various additional topics in Clinical Otolaryngology.
Dr. S. Frenkiel and Staff.

540-613A,B,C ADVANCED SCIENTIFIC PRINCIPLES OF OTOLARYNGOLOGY 2. (3) (1.5 hours/week) Lectures in additional basic-science topics of relevance to the otolaryngologist.
Dr. S. Frenkiel and Staff

540-690 THESIS 1. (3) A literature search and research proposal under supervision of the research supervisor that leads to a written proposal.

540-691 THESIS 2. (3) Supervised training and research in connection with the Master's thesis.

540-692 THESIS 3. (3) Independent research in connection with the Master's thesis.

540-693 THESIS 4. (6) A seminar and written report to be presented to an ad hoc committee describing appropriate progress at the end of the first year of training.

540-694 THESIS 5. (12) Independent study in connection with the Master's thesis. Presentation of results at a departmental seminar, or at a scientific meeting. Completion and final acceptance of the M.Sc. Thesis by the Department and Faculty of Graduate Studies.

513-607A,C,L PRINCIPLES OF INFERENCE IN STATISTICS IN MEDICINE. (3) Introduction to basic principles of statistical inference.

58 Parasitology

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Director — Marilyn E. Scott

58.1 Staff

Professors

Gaétan M. Faubert; B.Sc.(Sher.), M.Sc.(Montr.), Ph.D.(McG.)
 Roger Prichard; B.Sc., Ph.D.(N.S.W.) (*CP Professor of Biotechnology*)

Associate Professors

Robin N. Beech; B.Sc.(Nott.), Ph.D.(Edin.)
 Kris Chadee; B.Sc.(Winn.), M.Sc.(Man.), Ph.D.(McG.)
 Elias Georges; B.Sc., Ph.D.(McG.)
 Marilyn E. Scott; B.Sc.(U.N.B.), Ph.D.(McG.)

Assistant Professor

Paula Ribeiro; B.Sc., Ph.D.(York)

Associate Members

Mark A. Curtis; B.Sc., M.Sc., Ph.D.(McG.) (*Natural Resource Sciences, Wildlife Biology*)
 Gregory J. Matlashewski; B.Sc.(C'dia), Ph.D.(Ott.) (*Medicine, Microbiology & Immunology*)
 Manfred E. Rau; B.Sc.(Purdue), M.Sc., Ph.D.(McG.) (*Natural Resource Sciences, Entomology*)
 Mary Stevenson; B.A.(Hood), M.Sc., Ph.D.(Catholic U. of Amer.), (*Medicine, Experimental Medicine*)
 Brian Ward; M.D.(McG.), M.Sc.(Oxon), F.R.C.P.(C) (*Medicine, Experimental Medicine*)

Lecturer

James M. Smith, B.Sc.(N.E. London Polytechnic), Ph.D.(McG.)

58.2 Programs Offered

M.Sc. and Ph.D. degrees in Parasitology, and Graduate Certificate in Biotechnology.

The Institute of Parasitology teaches and researches the phenomenon of parasitism of man and livestock. Current research involvement includes the biology, biochemistry, pharmacology, control, ecology, epidemiology, immunology, molecular biology, neurobiology, and population and molecular genetics of parasitic organisms, viruses and cancer cells.

The Institute is housed in its own building adjacent to the Macdonald Campus Library, and has well equipped laboratories. The Institute has its own animal rooms and has access to large animal facilities at Macdonald farm. The Institute is affiliated to the McGill Centre for Tropical Diseases at the Montreal General Hospital.

Staff at the Institute of Parasitology also coordinate a 15-credit Graduate Certificate in Biotechnology.

58.3 Admission Requirements

Candidates for either the M.Sc. or the Ph.D. degree should possess a Bachelor's degree in the biological or medical sciences with a cumulative grade point average of 3.2/4.0. Previous experience in parasitology is not essential.

Candidates for the Graduate Certificate in Biotechnology must possess a Bachelor's degree or equivalent with a cumulative grade point average of 3.0/4.0 or 3.2/4.0 in the last two full-time years of university study and prerequisites or equivalents. Prerequisites or equivalents: Students are required to have sufficient

background in Biochemistry, Cellular Biology and Molecular Biology, equivalent to at least a 200-level course at McGill University.

58.4 Application Procedures

Applications for Admission and all supporting documents must be sent directly to:

Student Affairs Office (Graduate Studies)
Macdonald Campus of McGill University
21,111 Lakeshore
Sainte-Anne-de-Bellevue, QC H9X 3V9
Canada

Telephone: (514) 398-7925

Fax: (514) 398-7968

E-mail: GRAD@macdonald.mcgill.ca

Applications will be considered upon receipt of a signed and completed application form, \$60 application fee, all official transcripts, two signed original letters of reference on official letterhead of originating institution, and (if required) proof of competency in oral and written English by appropriate exams.

Deadlines – For **international students**, complete applications with supporting documents must reach the Student Affairs Office (Graduate Studies) at Macdonald Campus at least **eight months** prior to the intended start of program. May 1 for January (winter); September 1 for May (summer); January 1 for September (fall). For **domestic students**, complete applications with supporting documents must reach the office no later than **three months** in advance of intended start of program.

Application Fee (non-refundable) – A fee of \$60 Canadian must accompany each application (including McGill students), *otherwise it cannot be considered*. This sum must be remitted using one of the following methods:

1. **Certified** personal cheque in Cdn.\$ drawn on a Canadian bank;
2. **Certified** personal cheque in U.S.\$ drawn on a U.S. bank;
3. Canadian Money order in Cdn.\$;
4. U.S. Money Order in U.S.\$;
5. Bank draft in Cdn.\$ drawn on a Canadian bank;
6. Bank draft in U.S.\$ drawn on a U.S. bank, negotiable in Canada;
7. Credit card (by completing the appropriate section of the application form).

Transcripts – Two official copies of all transcripts are required for admission. Transcripts written in a language other than English or French must be accompanied by a certified translation. An explanation of the grading system used by the applicant's university is essential. It is the applicant's responsibility to arrange for transcripts to be sent. DOCUMENTS SUBMITTED WILL NOT BE RETURNED.

It is desirable to submit a list of the titles of courses taken in the major subject, since transcripts often give code numbers only. Applicants must be graduates of a university of recognized reputation and hold a Bachelor's degree equivalent to a McGill Honours degree in a subject closely related to the one selected for graduate work. This implies that about one-third of all undergraduate courses should have been devoted to the subject itself and another third to cognate subjects.

The minimum cumulative grade point average (CGPA) is 3.0/4.0 (second-class upper) or 3.2/4.0 during the last two full-time years of university study. High grades are expected in courses considered by the academic unit to be preparatory to the graduate program.

Letters of Recommendation – Two letters of recommendation on letterhead or bearing the university seal and with original signatures from two instructors familiar with the applicant's work, preferably in the applicant's area of specialization, are required. It is the applicant's responsibility to arrange for these letters to be sent.

Competency in English – Non-Canadian applicants whose mother tongue is not English and who have not completed an undergraduate degree using the English language are required to

submit documented proof of competency in oral and written English, by appropriate exams, e.g. TOEFL (minimum score 550) or IELTS (minimum 6.5). The MCHE is not considered equivalent. Results must be submitted as part of the application. The University code is 0935 (McGill University, Montreal); department code is 31 (graduate schools), Biological Sciences - Agriculture.

Graduate Record Exam (GRE) – The GRE is not required, but it is highly recommended.

Financial aid is very limited and highly competitive. It is suggested that students give serious consideration to their financial planning before submitting an application.

Acceptance to all programs depends on a staff member agreeing to serve as the student's supervisor and the student obtaining financial support. Normally, a student will not be accepted unless adequate financial support can be provided by the student and/or the student's supervisor. Academic units cannot guarantee financial support via teaching assistantships or other funds.

Qualifying Students – Some applicants whose academic degrees and standing entitle them to serious consideration for admission to graduate studies, but who are considered inadequately prepared in the subject selected may be admitted to a *Qualifying Program* if they have met the Faculty of Graduate Studies and Research minimum CGPA of 3.0/4.0. The course(s) to be taken in a *Qualifying Program* will be prescribed by the academic unit concerned. *Qualifying students* are registered in the Faculty of Graduate Studies and Research, **but not as candidates for a degree**. Only one qualifying year is permitted. **Successful completion of a qualifying program does not guarantee admission to a degree program.**

58.5 Program Requirements

M.Sc. Degree

Candidates are required to write a research proposal in the second term of their registration to fulfill the requirements of 391-600D. While in the Institute, all students are required to register and participate in the seminar courses 391-606 and 391-607. Seminar speakers include students, professors and invited guests. Although emphasis in the graduate program is on research, satisfactory completion of two compulsory 3-credit graduate courses (391-635 and 391-655) is required in the first year of study. Other course work in related subjects may be required, depending upon the candidates' background and research orientation. In total, a minimum of 14 credits of course work is required and a thesis (courses 391-687, 688, 689). The minimum requirement of the M.Sc. degree is 46 credits.

Ph.D. Degree

In the first year of the doctoral program, the candidates must successfully complete a written thesis proposal and make an oral presentation on their proposed research to fulfill 391-700D. Satisfactory completion of graduate courses 391-635 and 391-655 is required. While in the Institute, all students are required to participate in the seminar courses (391-606, 391-607).

Graduate Certificate in Biotechnology

For the Graduate Certificate in Biotechnology, students are required to complete 15 credits of courses offered within the Faculties of Agricultural and Environmental Sciences, Medicine, and Science.

Required Courses (9 credits)

394-505A/B (3) Selected Topics in Biotechnology
394-620A/B (3) Biotechnology Lab Techniques
394-621A/B (3) Biotechnology Management

Complementary Courses (6 credits)

Two courses chosen from the following:

General Topics

177-451A Molecular Biology: Cell Cycle
177-468B Topics in Human Genome
177-524A Topics in Molecular Biology

342-622B	Selected Topics in Molecular Biology
394-501A/B	Bioinformatics
394-691E/G	Biotechnology Practicum
516-602B	Advanced Techniques in Molecular Genetics

Environment and Food

333-535A	Food Biotechnology
356-500A/B	Techniques in Plant Molecular Genetics
367-600A	Plant Microbe Interactions

Health

391-635A/B	Cell Biology and Infection
391-675A/B	Membrane Proteins in Human Diseases
516-610B	Biochemical Methods in Medical Research
528-466B	Viral Pathogenesis and Immunity
552-518A	Artificial Cells and Immobilization Biotechnology

58.6 Courses

□ Denotes limited enrolment.

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

The following advanced undergraduate courses are available for graduate students in Parasitology.

177-345A PARASITISM AND SYMBIOSIS. (3) (2 lectures and one lab per week) (Prerequisite: 177-204A or permission of instructor.) The biology of parasites and host-parasite interactions are examined from the cellular, organismal and population perspective. Evolution of symbiosis in relation to life cycle patterns of major taxonomic groups is examined. Modern strategies for parasite control are discussed. **Dr. Smith**

333-211A BIOCHEMISTRY I. (3) (3 lectures per week) (Prerequisite: 333-230A) Biochemistry of carbohydrates, lipids, proteins, nucleic acids, enzymes and coenzymes. Introduction of intermediary metabolism. **Professors Georges and Ribeiro**

344-202B CELLULAR BIOLOGY. (3) (4 lectures per week) Organization and function of intracellular organelles in eukaryotic cells. Protein synthesis and control of protein transport within the cell. Cell division and DNA replication. Energy metabolism and electron transport. Signal transduction and transmembrane signalling. Differentiation of cells and cancer. Function and components of the immune system. **Professor Beech**

360-306A MATHEMATICAL METHODS IN ECOLOGY. (3) (3 lectures per week) An introduction to mathematical and graphical tools for use in ecology. Representation and interpretation of data and associated statistics in graphs and tables; theoretical modelling in plant and animal ecology, including difference and differential equation models. Introduction to stability analysis and probability theory. Emphasis will be placed on graphical techniques. **Professor Scott**

375-410B WILDLIFE ECOLOGY. (3) (3 lectures per week, and assignments) (Prerequisite: 344-205B or equivalent.) Ecological processes and theories in animal populations. Interrelationships among biological processes, biotic and abiotic factors, and life history strategies. Topics include population dynamics, optimization strategies, predation, habitat selection, risks and decision making, and social behavior. Application of problem-solving approach to wildlife ecology through individual and group work. **Professor Scott**

391-400B EUKARYOTIC CELLS AND VIRUSES. (3) (4 lectures per week) (Prerequisite: 356-204A) The basic principles of molecular biology and the underlying molecular basis for various methodologies in molecular biology are covered. The molecular genetic basis for viral infections and tumorigenesis will be covered as examples of the use of molecular genetic approaches to address biological problems. **Professor Zadworny**

391-410B ENVIRONMENT AND INFECTION. (3) (2 lectures per week) (Prerequisites: 177-111A, 344-120A, or equivalents) Infectious pathogens of humans and animals and their impact on the global environment are considered. The central tenet is that infectious

pathogens are environmental risk factors. The course considers their impact on the human condition and juxtaposes the impact of control and treatment measures and environmental change. **Dr. Smith**

391-438A IMMUNOLOGY. (3) (2 lectures per week) (Prerequisite: 344-202B or permission of instructor.) An in-depth analysis of the principles of cellular and molecular immunology. The emphasis of the course is on host defense against infection and on diseases caused by abnormal immune responses. **Professor Chadee**

Courses for Higher Degrees

202-505A,B SELECTED TOPICS IN BIOTECHNOLOGY. (3) (one 3-hour lecture per week) Current methods used in the biotechnology industry and research, as applied to medical, biological, environmental, agricultural and food sciences aspects of biotechnology, will be described and discussed. This multidisciplinary course will include lectures from outstanding biotechnology researchers from industry and McGill professors, and visits to leading centres of biotechnology in the region. **Professor Prichard**

391-600D THESIS PROPOSAL FOR M.SC. CANDIDATES. (4) **Supervisor and Staff**

391-606A,B PARASITOLOGY SEMINAR. (2) A seminar series in which students present seminars covering topics in parasitology, in areas relevant to their research interests. Students register for the course in their second term of residency. Attendance and participation are compulsory for M.Sc. and Ph.D. students. **Professor Scott**

391-607A,B PARASITOLOGY RESEARCH SEMINAR. (2) This is a required course for M.Sc. and Ph.D. students. A seminar course in which students registered at the Institute of Parasitology present seminars on the results of their thesis research. Students register for the course in the final term prior to thesis submission. **Professor Scott**

391-635A,B CELL BIOLOGY AND INFECTION. (3) (Prerequisite: students with some background in molecular biology.) Research articles will be the primary source of information. This course will cover new principles in cell biology. In particular, the mechanisms by which gene expression is regulated through signal transduction pathways initiated at the cell surface will be presented. **Professor Chadee**

391-655A,B HOST-PARASITE INTERACTIONS. (3) Lectures, tutorials and laboratory demonstrations of the principal factors which affect levels of parasite infection and treatment of infections in humans and animals. The integration and management of the host-parasite relationship in terms of transmission, population dynamics, environmental management, behaviour, immune responses, pathology, and pharmacology to decrease parasitic disease. **Dr. Smith**

391-665A,B SPECIAL TOPICS IN PARASITOLOGY. (3) This course designation will be used for special courses that staff, or visiting professors, may wish to provide when student interest warrants. Examples might include a laboratory techniques course, a mathematical modelling course or a special pharmacology seminar series. **Staff**

391-675A,B MEMBRANE PROTEINS IN HUMAN DISEASES. (3) (Prerequisite: 333-211A or equivalent.) The molecular mechanism of membrane proteins and their role in human diseases. Specific examples of how parasites and mammalian cells use these membrane proteins to manipulate their environment will be reviewed in detail. **Professor Georges**

391-687A,B THESIS RESEARCH I. (10) **Staff**

391-688A,B THESIS RESEARCH II. (10) **Staff**

391-689A,B THESIS RESEARCH III. (12) **Staff**

391-700D THESIS PROPOSAL FOR PH.D. CANDIDATES. **Supervisor and Staff**

391-710A,B PARASITOLOGY PH.D. SEMINAR I. (2)

391-711A,B PARASITOLOGY PH.D. SEMINAR II. (2) A seminar series in which students present seminars covering topics in para-

sitology in areas relevant to their research interests. Attendance and participation are compulsory. **Professor Scott**

□ **394-501A/B BIOINFORMATICS.** (3) (2 lectures and 1 laboratory per week) This course introduces the application of computer software for analysis of biological sequence information. An emphasis is placed on the biological theory behind analytical techniques, the algorithms used and methods of developing a statistical framework for various types of analysis. **Professor Beech**

394-620A,B BIOTECHNOLOGY LABORATORY TECHNIQUES. (3) (one 8-hour lab per week) Practical training in contemporary methods of molecular and cellular biology. Intended for students with background in molecular biology, biochemistry, or a related area, who are already familiar with the theoretical principles of recombinant DNA technologies. Topics include: polymerase chain reaction (PCR), methods for gene cloning and mutagenesis, eukaryotic and prokaryotic gene expression systems, protein purification and methods of eukaryotic cell culture. **Professor Ribeiro**

394-621A,B BIOTECHNOLOGY MANAGEMENT. (3) (one 3-hour lecture per week) Topics relevant to the management of research in industry are presented by experts working in industry. This course highlights the differences existing between research done in an academic environment and research done within industry. **Professor Faubert**

394-691E,G BIOTECHNOLOGY PRACTICUM. (3) (Prerequisite: 394-620A/B) The cooperating employer and the instructor (or designate) will develop an individualized practicum experience program of at least 12 weeks duration for each student. **Professor Buckland**

59 Pathology

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E-mail: mhoffm4@po-box.mcgill.ca
Website: <http://www.mcgill.ca/pathology>

Chair — R.P. Michel

Director of Graduate Program — E. Zorychta

59.1 Staff

Emeritus Professors

S. Moore; M.B., Ch.B. (Belf.), F.R.C.P.(C)
R.H. More; M.Sc.(McG.), M.D.(Tor.), F.R.C.P.(C)

Professors

M.N. Burnier Jr.; M.D., M.Sc., Ph.D.(Brazil)
A.C. Cuello; B.Sc., M.D.(Buenos Aires), M.A., D.Sc.(Oxon.) (*joint appt with Pharmacology*)
A. Ferenczy; B.A., B.Sc., M.D.(Montr.)
R.D.C. Forbes; M.D.(Queen's), F.R.C.P.(C)
R. Fraser; B.Sc., M.D., C.M.(McG.), M.Sc.(Glas.), F.R.C.P.(C)
A. Fuks; B.Sc., M.D., C.M.(McG.)
Q.A. Hamid; M.D.(Mosul), Ph.D.(Lond.) (*joint appt with Medicine*)
I. Hüttner; M.D.(Buda.), Ph.D.(McG.), F.R.C.P.(C)
R.P. Michel; B.Sc., M.D., C.M.(McG.), F.R.C.P.(C) (*Strathcona Professor of Pathology*)
G. Prud'homme; B.Sc., M.D.(Ott.), F.R.C.P.(C)
J.B. Richardson; B.Sc., M.D., C.M., Ph.D.(McG.), F.R.C.P.(C)

Associate Professors

L. Alpert; M.D., Ph.D.(Tufts)
J. Arseneau; M.D.(Laval), F.R.C.P.(C)
M. Auger; M.D., C.M.(McG.), F.R.C.P.(C)
L. Bégin; M.D.(Sher.), F.R.C.P.(C)
M.L. Brisson; B.A.(Paris), B.Sc., M.D.(Montr.)

B. Case; B.Sc., M.D., C.M., M.Sc.(McG.), Dipl. Occ. Hyg., F.R.C.P.(C)

M.F. Chen; M.B., B.S.(Monash), F.R.C.P.(C)
A.M.V. Duncan; B.Sc.(Queen's), Ph.D.(Edin.)
A. Giaid; D.V.M.S.(Baghdad), Ph.D.(Lond.)
R.H. Latt; D.V.M.(Guelph)
L.A. Oliva; M.D.(St. Domingue), F.R.C.P.(C)
R. Onerheim; M.D.(Alta.), F.R.C.P.(C)
L. Rochon; M.D.(Sher.), F.R.C.P.(C)
S. Tange; B.A., M.D.(Minn.)
M. Trudel; B.Sc., M.D.(Ott.), F.R.C.P.(C)
J. Vioria; M.D.(Philip.), F.R.C.P.(C)
K. Watters; B.Sc., M.D., C.M.(McG.), F.R.C.P.(C)
E.A. Zorychta; B.Sc.(St.F.X.), M.Sc., Ph.D.(McG.)

Assistant Professors

S. Albrecht; M.D.(Sher.), F.R.C.P.(C)
Y. Ayroud; M.D.(Montr.), F.R.C.P.(C)
C. Bernard; M.D.(Sherb.)
P.J. Chauvin; M.Sc.(W.Ont.), D.D.S.(McG.)
D. Demczuk; B.Sc., M.Sc., Ph.D.(McG.)
J. Emond; B.A., M.Sc., M.D.(Montr.)
F. Halwani; M.D.(Iran), Ph.D.(McG.), F.R.C.P.(C)
E. Lamoureux; B.Sc., M.D.(Montr.), F.R.C.P.(C)
C. Logan; M.B.B.S.(W.I.), F.R.C.P.(C)
E. MacNamara; M.B., Ch.B.(Trinity), F.R.C.P.(C)
V.A. Marcus; M.D., C.M.(McG.), F.R.C.P.(C)
A.R. Mehio; M.D.(Leb.)
C. Pothel; M.D.(Haiti), F.R.C.P.(C)
I. Roy; B.Sc., M.D., C.M.(McG.), F.R.C.P.(C)
K. Sircar; M.D., C.M.(McG.), F.R.C.P.(C)
G.J. Snipes Jr.; B.Sc.(Emory), M.D., Ph.D.(Vanderbilt) (*joint appt with Neurology & Neurosurgery*)
H. Srolovitz; B.Sc.(Pitt.), M.D.(Basle)
J. St. Cyr; M.D., C.M.(McG.), F.R.C.P.(C)

Adjunct Professors

T. Seemayer, University of Nebraska Medical Centre
P.D. Winocour, BioChem Therapeutic Inc.

59.2 Programs Offered

M.Sc. and Ph.D. degrees in Pathology.

The Pathology Department offers research training in a wide variety of areas such as atherosclerosis, immunology and transplantation, neoplasia, cell biology, pulmonary vascular and airways disease, pulmonary edema, neurodegenerative disorders, and smooth muscle pathophysiology.

Modern techniques and equipment include light, fluorescence and electron microscopy (both transmission and scanning), cell culture, advanced immunological, pharmacological, biochemical and physiological techniques, as well as morphometry and computers.

59.3 Admission Requirements

Applicants must have a B.Sc. or the equivalent degree with an extensive background in the physical and biological sciences. An academic record equivalent to or better than a CGPA of 3.2 out of 4 at McGill is required for at least the two final full-time years of undergraduate training with a minimum CGPA of 3.0 overall.

Non-Canadian students may be required to take the GRE and TOEFL examinations in order to properly evaluate their suitability. Students are normally accepted into the M.Sc. program, and those candidates showing exceptional ability may be permitted to transfer into the Ph.D. program after one year of training.

Applicants who already possess an additional degree (M.Sc., M.D.) and have some research experience may be allowed to register in the Ph.D. program directly.

Prospective students are encouraged to contact the Teaching Office, Department of Pathology, for application forms and a departmental brochure containing the research interests of the academic staff.

59.4 Application Procedures

Applications will be considered upon receipt of:

1. application;
2. transcripts;
3. letters of reference;
4. \$60 application fee;
5. test results (GRE, TOEFL).

All information is to be submitted directly to the Pathology Teaching Office.

All applications will be evaluated by the Graduate Students Committee. Candidates found suitable must then be accepted by a research director, and adequate funding must be obtained for both personal support and research expenses.

59.5 Program Requirements

All students must take Pathology 546-300B plus a course in statistics if they have not completed these requirements before admission.

Candidates with insufficient background in one of the biomedical sciences will be required to take specific courses to remedy the deficiency. These and additional courses which are relevant to the student's area of research will be chosen in consultation with the research director and Graduate Students Committee.

M.Sc. Program Requirements

The program consists of 45 credits, 30 credits obtained by laboratory work and submission of a thesis (546-690, 546-691, 546-692), with the remaining 15 course credits to be distributed as follows: 546-613 or 546-614, 546-620, 546-622, plus 2 courses from the following: 546-607, 546-650, 546-651, 546-652. A graduate course in another department may be substituted for one of the Pathology graduate courses upon approval by the research director and Graduate Students Committee.

Ph.D. Program Requirements

Ph.D. candidates are required to complete courses 546-613, 546-614, 546-620, 546-622, 546-701, plus 3 of the following: 546-607, 546-650, 546-651, 546-652 and any additional courses considered necessary by the research director or the Graduate Students Committee.

Candidates will be evaluated primarily on their ability to conduct independent research and submit a thesis, which must be defended orally.

59.6 Courses

- Denotes not offered in 2000-01.

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

Advanced Undergraduate

546-300B HUMAN DISEASE. (3) Integrated study of human disease, with emphasis on the major disorders prevalent in North America. Cell injury, inflammation, healing, infection, immune responses, lifestyle and aging, neoplasia, disorders of organ systems. **Professor Zorychta**

Graduate Courses

The following courses are given in a variable sequence depending on the interests and requirements of graduate students enrolled in the Department.

- **546-607B CYTOKINES IN HEALTH AND DISEASE.** (3)
- 546-613A,B; -614A,B RESEARCH TOPICS IN PATHOLOGY.** (3)
Professor Zorychta
- 546-620A,B RESEARCH SEMINAR I.** (3)
Professor Zorychta and Staff
- 546-622A,B RESEARCH SEMINAR 2.** (3)
Professor Zorychta and Staff

546-650A,B IMMUNOPATHOLOGY. (3) A combination of lectures and seminars covering a wide range of topics related to immunopathology. **Professor Prud'homme**

- **546-651A PATHOBIOLOGY OF THE ARTERIAL WALL.** (3)
- **546-652A,B MOLECULAR BIOLOGY OF DISEASE.** (3)
- 546-690A,B,C M.Sc. RESEARCH PROJECT I.** (9)
- 546-691A,B,C M.Sc. RESEARCH PROJECT II.** (9)
- 546-692A,B,C M.Sc. RESEARCH PROJECT III.** (12)
- 546-701D COMPREHENSIVE EXAMINATION FOR PH.D. CANDIDATES.**

60 Pharmacology and Therapeutics

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Chair — T.B.A.

Vice-Chair — R. Capek

Chair, Graduate Committee — B. Collier

60.1 Staff

Professors

J. Aranda; M.D.(Manila Central), Ph.D.(McG.)
R. Capek; M.D., Ph.D.(Prague)
B. Collier; Ph.D.(Leeds)
P.B.S. Clarke; M.A.(Cantab.), Ph.D.(Lond.)
A.C. Cuello; M.D.(Buenos Aires), D.Sc.(Oxon)
C. de Montigny; M.D., Ph.D.(Montr.), F.R.C.P.(C)
B. Hales; M.Sc.(Phila. Coll. Pharm.), Ph.D.(McG.)
P.J. McLeod; M.D.(Man.), F.R.C.P.(C)
J.B. Richardson; M.D., C.M., Ph.D.(McG.)
B. Robaire; B.A.(UCLA), Ph.D.(McG.)
T.L. Sourkes; M.Sc.(McG.), Ph.D.(C'nell)
A. Tenenhouse; M.D., C.M., Ph.D.(McG.)
D.R. Varma; M.D.(L'now), Ph.D.(McG.)

Associate Professors

G. Almazan; Ph.D.(McG.)
B. Esplin; M.D.(Warsaw)
H.S. Katz; M.Sc., Ph.D., D.D.S.(McG.)
D. Maysinger; M.Sc.(Zagreb), M.Sc.(Radiop), Ph.D.(S. Calif.)
S. Nattel; M.D. C.M.(McG.)
A.L. Padjen; M.D., Ph.D.(Zagreb)
A. Ribeiro-da-Silva; M.D., Ph.D.(Oporto)
H. Saragovi; Ph.D.(Miami)
B.I. Sasyniuk; Ph.D.(Man.)
M. Szyf; M.Sc., Ph.D.(Hebrew Univ.)
J. Trasler; M.D., C.M., Ph.D.(McG.)
E. Zorychta; Ph.D.(McG.)

Assistant Professor

Y. de Koninck; Ph.D.(McG.)

Associate Members

G. Batist; M.D., C.M.(McG.)
S. Gauthier; M.D.(Montr.)
M. Aloui - Jamali; Ph.D.(Sorbonne)
Y. Patel; M.D.(Otago) Ph.D.(Monash) F.R.A.C.P., F.R.C.P.(C)
R. Prichard; B.Sc., Ph.D.(N.S.W.)
R. Quirion; M.Sc., Ph.D.(Sher.)

Adjunct Professors

P. Albert; Ph.D.(Harv.)
S. Chemtob; M.D., Ph.D.(Montr.), F.R.C.P.(C)
Sr. A. Ford-Hutchinson; M.Sc.(Warw.), Ph.D.(Lond.)

L. Garofalo; Ph.D.(McG.)
K. Metters; Ph.D.(London)
G.S. Robertson; Ph.D.(Dal.)

60.2 Programs Offered

The Department of Pharmacology and Therapeutics offers training leading to M.Sc. (thesis), M.Sc. Applied (non-thesis) and Ph.D. degrees.

Pharmacology is a multi-disciplinary science which deals with all aspects of drugs and their interactions with living organisms. Thus, pharmacologists study the physical and chemical properties of drugs, their biochemical and physiological effects, mechanisms of action, pharmacokinetics and therapeutic and other uses. The Department offers broad exposure and training in both basic and clinical research in areas of specialty ranging from neuropharmacology, reproductive, endocrine, receptor, cardiovascular, cancer, developmental, autonomic, clinical and biochemical pharmacology, molecular biology, to toxicology.

The present 38 full and affiliate members of the Department have research laboratories located in the McIntyre Medical Sciences Building and in a variety of hospitals, institutes and industry including the Douglas Hospital Research Center, Allan Memorial Institute, Montreal Children's Hospital, Montreal General Hospital, Montreal Heart Institute, Lady Davis Research Institute and Merck Frosst Canada Inc. The participation of researchers from both industry and government ensures the relevance of the Department's applications-oriented training programs.

60.3 Admission Requirements

Candidates are required to hold a B.Sc. degree in a discipline relevant to the proposed field of study; those with the M.D., D.D.S. or D.V.M. degrees are also eligible to apply. A background in the health sciences is recommended, but programs in biology, chemistry, mathematics, and physical sciences may be acceptable.

Admission is based on a student's academic record, letters of assessment, and, whenever possible, interviews with staff members. Non-Canadian students are required to take the Graduate Record Examination Aptitude Test (GRE) and the Test of English as a Foreign Language (TOEFL) or the equivalents.

Inquiries relating to all aspects of graduate study should be directed to the Graduate Coordinator, Department of Pharmacology and Therapeutics as early as possible in each academic year.

60.4 Application Procedures

Applications will be considered upon receipt of:

1. Completed preliminary or official McGill University application form.
2. Curriculum vitae including a statement of research interests.
3. Two copies of official transcripts sent directly from all universities attended.
4. Two confidential letters of recommendation from professors or research-related employers (at least one should be from an academic known to the international scientific community).
5. Application fee (\$60 Canadian or U.S. Funds, in money order, certified personal cheque, bank draft, or credit cards) to be enclosed with the official application form.
6. Official GRE and TOEFL scores (not required of applicants from Canada).

Applications should be submitted directly to the Graduate Coordinator, Mrs. Pam Moore, in the Department of Pharmacology.

Deadlines:

May 1st for September term.

October 1st for January term.

Deadlines are eight months earlier for international students.

60.5 Program Requirements

The objective of the M.Sc. (thesis) and Ph.D. degree training programs is to provide in-depth independent research experience in a specific area of pharmacology.

M.Sc. (Thesis) (45 credits)

In addition to a M.Sc. Thesis, the specific requirements are as follows:

- 1) Complete 549-601D/E Comprehensive Examination (9 credits)
- 2) Plus 549-712B Statistics for Pharmacologists (3 credits)
- 3) *549-562A General Pharmacology I and 549-563B General Pharmacology II or their equivalent (6 credits)
*Students who have taken 549-562A and 549-563B as part of their undergraduate degree must register for 549-697A/B thesis preparation I (6 credits)
- 4) Two 700-level graduate courses in Pharmacology (3 credits each)

The M.Sc. program consists of 45 credits, a minimum of 18 credits are required in addition to thesis preparation courses 549-696, 549-698 and 549-699 (3, 9 and 12 credits respectively).

Ph.D. (Thesis)

Students enrolled in the Ph.D. program must successfully complete or be exempted from the same courses as for the M.Sc. degree, plus one additional 700-level graduate course (for total of 3), in addition to a Ph.D. thesis.

M.Sc. (Applied) degree (pending the availability of resources)

The objective of the M.Sc. Applied program is to provide a broad exposure and training in Pharmacology, with two terms of courses and two of research, one of which may be completed during the summer.

The course requirements (45 credits) are as follows: 549-562A and 549-563B, General Pharmacology I and II, or their equivalents; 549-712B, Statistics for Pharmacologists; 549-603A, Drug Discovery and Development; one 700 level Pharmacology graduate course; 549-604, Advanced independent research project in pharmacology; 549-605, Advanced independent research project in applied pharmacology, plus three complementary courses to be chosen from options in Epidemiology, Experimental Medicine, Biotechnology, Bioethics, Biochemistry, Physiology, Microbiology and Immunology, Pathology, and Economics.

60.6 Courses for Higher Degrees

The following courses are designed primarily for graduate students in the Department, but may be attended by others under special circumstances. These courses are given in a rotational sequence and students may register according to their specific requirements and interests.

- Denotes not offered in 2000-01.

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

549-601D,E COMPREHENSIVE EXAM. (9) Registration for this is required for all students in the M.Sc. (Thesis) and Ph.D. degree programs.

● **549-603A DRUG DISCOVERY AND DEVELOPMENT.** (6)

● **549-604A,B ADVANCED INDEPENDENT RESEARCH PROJECT IN PHARMACOLOGY.** (9)

● **549-605A,B ADVANCED INDEPENDENT RESEARCH PROJECT IN APPLIED PHARMACOLOGY.** (9)

549-696A,B,C THESIS PREPARATION. (3)

549-697A,B,C THESIS PREPARATION I. (6)

549-698A,B,C THESIS PREPARATION II. (9)

549-699A,B,C THESIS PREPARATION III. (12)

● **549-702A,B BIOCHEMICAL PHARMACOLOGY.** (3)

● **549-703A,B NEUROPHARMACOLOGY.** (3)

● **549-704A,B DRUG DISTRIBUTION, METABOLISM AND EXCRETION.** (3)

549-705A,B CARDIOVASCULAR REGULATION AND DRUG ACTION.

(3) Homeostatic regulation of cardiovascular function and its modification by drugs.

- **549-706A,B CHEMICAL MEDIATORS AND AUTONOMIC DRUGS.** (3)

- **549-707A,B MOLECULAR PHARMACOLOGY.** (3)

549-712B STATISTICS FOR PHARMACOLOGISTS. (3) Basic theoretical and practical aspects of statistics for pharmacologists.

- **549-713A,B DEVELOPMENTAL PHARMACOLOGY.** (3)

- **549-714A,B ENDOCRINE PHARMACOLOGY.** (3)

61 Philosophy

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Chair — R.P. Buckley

61.1 Staff

Emeritus Professors

R. Klibansky; M.A.(Oxon.), D.Phil.(Heidel.), F.R.Hist. F.R.S.C.
(*John Frothingham Emeritus Professor of Logic and Metaphysics*)

A.T. McKinnon; M.A.(Tor.), Ph.D.(Edin.), B.D.(McG.), F.R.S.C.,
R.D., D.H.L.(St. Olaf) (*William C. Macdonald Emeritus Professor of Moral Philosophy*)

D. Norton; M.A.(Claremont), Ph.D.(Calif.), F.R.S.C.

C. Taylor; M.A., D.Phil.(Oxon.), F.R.S.C.

Professors

M.A. Bunge; Ph.D.(LaPlata), F.R.S.C. (*John Frothingham Professor of Logic and Metaphysics*)

G. DiGiovanni; B.A., M.A., S.T.B., Ph.D.(Tor.)

S. McCall; B.A.(McG.), B.Phil., D.Phil.(Oxon.)

Associate Professors

R.P. Buckley; Ph.D.(Louvain)

D. Davies; B.A. (Oxon.), M.A.(Manit.), Ph.D.(W.Ont.)

M. Deslauriers; B.A.(McG.), M.A., Ph.D.(Tor.)

M. Hallett; B.Sc., Ph.D.(Lond.)

A. Laywine; B.A.(Ott.), M.A.(Montr.), Ph.D.(Chic.)

E. Lewis; B.A.(C'nell), Ph.D.(Chic.)

J. McGilvray; B.A.(Carleton College), Ph.D.(Yale)

S. Menn; M.A., Ph.D.(Chic.), M.A., Ph.D.(Johns H.)

S. Stroud; A.B.(Harv.), Ph.D.(Prin.)

Assistant Professor

E. Carson; M.A.(McG.), Ph.D.(Harv.)

Adjunct Professors

S. Davis; (Simon Fraser)

I. Gold; (Monash)

J. Tully; B.A.(Br.Col.), Ph.D.(Cantab.)

Auxiliary Professor

K. Arvanitakis (Can. Institute of Psychoanalysis)

Associate Members

R. Hayes (Religious Studies); L. Kaplan (Jewish Studies);

A. Patten (Political Science)

Visiting Professor (Fall 2000)

G.A. Cohen; (Chicele Professor of Social and Political Theory, University of Oxford).

61.2 Programs Offered

The Department offers courses of study leading to the Ph.D. in Philosophy. It also offers, in conjunction with the Biomedical Ethics Unit, a course of study leading to the M.A. degree in Bioethics.

61.3 Admission Requirements

Students with an Honours B.A. degree in philosophy, or the equivalent, are normally admitted to the Ph.D. program directly at the Ph.D.I level. The Department considers an Honours B.A. degree to include:

- 1) A general knowledge of the history of Western philosophy: Greek, Medieval, Modern.
- 2) A systematic knowledge of the main philosophical disciplines in their contemporary as well as historical contexts: logic, ethics, epistemology, and metaphysics.
- 3) An ability to present, in written form, clear and substantial reconstructions and analyses of the materials normally studied in the areas mentioned in (1) and (2).

To demonstrate their competence in these areas applicants must submit transcripts of academic work, three letters of recommendation from persons with whom they have studied, and at least one substantial example (approximately 15-20 typewritten pages) of their written philosophical work. In addition, applicants from North America whose first language is English are required to submit scores of the Graduate Record Examination.

Students who hold an M.A. degree from another institution should apply for admission at the Ph.D. II level; such students will normally be required to complete two years of course work.

Students applying to the Bioethics Specialty program must write an M.A. thesis proposal. All applications to this program must also receive the approval of the Director of the Specialty program. Students who apply for this program should note that they must participate in a practicum which continues beyond the end of their second term of classes.

61.4 Application Procedures

Ph.D.: Applications and **all** documents **must** be submitted by January 15.

Applications will be considered upon receipt of:

1. duly completed application form,
2. two (2) official transcripts of all post-secondary studies,
3. three (3) original letters of reference,
4. \$60 application fee,
5. test results (GRE, TOEFL),
6. writing sample,
7. statement of purpose.

All information is to be submitted to the Department of Philosophy.

M.A. specialization in Bioethics: Applications are made initially through the Biomedical Ethics Unit in the Faculty of Medicine, which administers the program and teaches the core courses.

Applicants must be accepted first by the Department of Philosophy and then by the Bioethics Graduate Studies Advisory Committee.

For information, please contact the Chair, Master's Specialization in Bioethics, Biomedical Ethics Unit, 3690 Peel Street, Montreal, QC, H3A 1W9. Telephone: (514) 398-6980. Fax: (514) 398-8349. E-mail: Glass_K@falaw.lan.mcgill.ca

61.5 Program Requirements

The course work for the first four terms of the Ph.D. program will include two pro-seminars, in two of the following three areas: Value theory; Metaphysics and Epistemology; History of Philosophy. Each seminar will be led by two members of staff, and the grade for the seminar will be determined jointly by them. Each academic year, the Chair will invite joint proposals from staff for topics for the following year's pro-seminar and will, if necessary, choose among proposals, ensuring that the topics offered in successive years do not fall within the same area as defined above. The Chair will also consult with graduate students in Ph.D. I concerning the topic of

the pro-seminar for the following year. The pro-seminar will normally be offered in the fall semester.

The course work taken towards completion of the requirements for the Ph.D. program must satisfy certain distribution requirements. Students must take at least two graduate courses in each of the following three areas: Value Theory; Metaphysics and Epistemology; History of Philosophy. Pro-seminars (6 credits each) may be counted in partial satisfaction of these requirements. The Graduate Director, in consultation with the student's advisory committee, will determine for which area(s) a given course may be counted. Students are entitled to appeal such decisions to the Department as a whole. No student may count a given course towards the satisfaction of the distribution requirements for more than one area.

By the end of the Ph.D. II year, a student must submit a research paper (the "candidacy paper" [3 credits]), which may be worked up from a paper written to fulfill the requirements of a graduate course, to a Thesis Advancement Committee consisting of at least two members of the staff of the Department. The membership of this committee will be determined by the Graduate Director in consultation with the student; it is anticipated that members of this committee would, in principle, direct the student's thesis. This committee assigns a grade to the student's paper and reviews her or his graduate performance; on the basis of its assessment and review, it recommends to the Department as a whole either to permit the student to continue with the Ph.D. program and undertake a thesis or to decline to permit the student to continue. Two necessary conditions for a positive recommendation are that the student (a) receive a grade of at least B+ on the candidacy paper, and (b) have at least a 3.5 GPA (on the undergraduate Grade Point scale) in the course work required for the program. The Department as a whole, taking into account the Thesis Advancement Committee's recommendation and the student's overall academic record in the program, decides whether to permit the student to continue.

Students who do not receive a positive recommendation but who satisfy Graduate Faculty requirements (no courses below a B-minus and completion of 45 credits) will be recommended to the Graduate Faculty by the Department to transfer from the Ph.D. program to the M.A. program.

M.A. specialization in Bioethics: The curriculum is composed of required courses (for 6 credits) offered in the Biomedical Ethics Unit, bioethics courses (3 credit minimum) offered by Philosophy and any graduate courses required or accepted by Philosophy for the granting of a Master's degree, for a total of 18 to 21 credits. A minimum of 45 credits is required including the thesis. For further information refer to the Bioethics entry.

61.6 Courses for Higher Degrees

Subject to modification. Please consult the up-to-date list in the Departmental Office before registering.

- Denotes not offered in 2000-01.

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

107-210A INTRODUCTION TO DEDUCTIVE LOGIC. (3) An introduction to propositional and predicate logic; formalization of arguments, truth tables, systems of deduction, elementary meta results, and related topics. **Professor Carson**

107-310B INTERMEDIATE LOGIC. (3) A second course in logic which will usually cover in detail the basic meta-results concerning first-order logic (sometimes known as the 'limitative results'), such as the Gödel-(Henkin) Completeness Theorem, Church's Theorem, the Gödel Incompleteness Theorems and Tarski's Theorem. Other topics will sometimes be covered instead, such as Intuitionistic or Modal Logic. **Professor Hallett**

107-506B SEMINAR: PHILOSOPHY OF MIND. (3) (Prerequisite: 107-305) (Open only to students as indicated above and to Cognitive Science Minors.) An advanced course devoted to specific topics in the philosophy of mind. **Professor McGilvray**

● **107-507A,B SEMINAR: COGNITIVE SCIENCE.** (3) (Prerequisites: 107-305, 415 or written permission of the instructor.)

107-510A,B SEMINAR: ADVANCED LOGIC II. (3) (Prerequisite: 107-310 or written permission of the instructor.)

Professor Hallett

107-511A,B SEMINAR: PHILOSOPHY OF LOGIC AND MATHEMATICS. (3) **TBA**

● **107-515A,B SEMINAR: PHILOSOPHY OF LANGUAGE.** (3) (Prerequisite: 107-415 or written permission of the instructor.)

107-519A SEMINAR: EPISTEMOLOGY. (3) (Prerequisite: 107-420 or written permission of the instructor.) An advanced course devoted to a topic in the theory of knowledge. **Professor Bunge**

● **107-521B SEMINAR: METAPHYSICS.** (3) (Prerequisite: 107-421 or written permission of the instructor.)

107-534A SEMINAR; ETHICS. (3) (Prerequisite: 107-334 or written permission of the instructor.) **TBA**

● **107-541A,B SEMINAR: PHILOSOPHY OF SCIENCE.** (3) (Prerequisite: 107-441 or other requirements specified by the instructor.)

107-543A,B SEMINAR: MEDICAL ETHICS. (3) (Prerequisite: 107-343 or written permission of the instructor.) An advanced course devoted to a particular philosophical problem as it arises in the context of medical practice or the application of medical technology. **TBA**

107-544A SEMINAR: POLITICAL THEORY. (3) (Prerequisite: written consent of Department) This course will discuss recent controversies regarding freedom, equality, and justice. What is the relationship between the economic market and freedom? Is equality a defensible goal, or should egalitarians aim, instead, at making the worst off as well off as possible? Is justice purely a matter for the state to enforce, or does a just society also require just choices by citizens among options permitted by law? Topic for 2000-01: Political Philosophy. **Professor Cohen**

107-548A,B SEMINAR: PHILOSOPHY OF LAW. (3) (Prerequisite: 107-348 or written permission of the instructor.) An advanced course devoted to a particular topic in the philosophy of law. Subject varies from year to year. **Staff**

107-551A,B SEMINAR: ANCIENT PHILOSOPHY. (3) (Prerequisite: at least one course in ancient philosophy and the specific requirements of individual instructors.) Topic for 2000-01: TBA.

Professors Deslauriers and Menn

● **107-556A,B SEMINAR: MEDIEVAL PHILOSOPHY.** (3) (Prerequisite: 107-345 or 357 or written permission of the instructor.)

● **107-560A,B SEMINAR: SEVENTEENTH CENTURY PHILOSOPHY.** (3) (Prerequisite: 107-360 or written permission of the instructor.)

107-561A SEMINAR: EIGHTEENTH-CENTURY PHILOSOPHY. (3) (Prerequisite: 107-361 or written permission of the instructor.) An advanced course on eighteenth-Century philosopher or philosophical issue. **Professor di Giovanni**

107-567B SEMINAR: NINETEENTH-CENTURY PHILOSOPHY. (3) (Prerequisite: 107-366 or 367 or written permissions of the instructor.) An advanced course on nineteenth-century philosophy or philosophical issue. **Professor di Giovanni**

107-570B SEMINAR: CONTEMPORARY ANALYTIC PHILOSOPHY. (3) (Prerequisite: 107-370 or 415 or written permission of the instructor.) An advanced course on some major analytic philosopher, or some issue of central importance in the analytic tradition. Subject varies from year. **Professor Davies**

107-575A SEMINAR: CONTEMPORARY EUROPEAN PHILOSOPHY. (3) (Prerequisite: 107-475 or written permission of the instructor.) An advanced course on contemporary European philosopher or some important issue in the Continental tradition. Topic for 2000-01: TBA. **Professor Buckley**

● **107-581A,B SEMINAR: PROBLEMS OF PHILOSOPHY.** (3)

107-590A,B SEMINAR: SPECIAL TOPICS IN PHILOSOPHY. (3) (Prerequisites: one course in philosophy.) Psychoanalysis: a critical examination. Depending on the interests of the class, areas exam-

ined would include: psychoanalytic epistemology, psychoanalysis and the pre-socratics, psychoanalysis and tragedy, reasons versus causes in psychoanalysis, hermeneutics, psychoanalytic truth, self-deception, irrationality, paradox, creativity, internal object world and its relation to external objects.

Professor Arvanitakis

Department of Philosophy Graduate Seminars

Not all offered every year. Please consult the Department for current listing.

- **107-601A,B SEMINAR IN THE HISTORY OF PHILOSOPHY I.** (3)
 - **107-602A,B SEMINAR IN THE HISTORY OF PHILOSOPHY II.** (3)
 - **107-603A,B SEMINAR IN METAPHYSICS AND EPISTEMOLOGY I.** (3)
 - **107-605A,B SEMINAR IN VALUE THEORY I.** (3)
 - **107-606A,B SEMINAR IN VALUE THEORY II.** (3)
- 107-607A PRO-SEMINAR I AND 107-608B PRO-SEMINAR II.** (6) A series of seminars on selected topics designed for professional training to graduate students. Topics will be selected from the general area of Value Theory.
- **107-640A,B SEMINAR IN FOUNDATIONS OF SCIENCE, I.** (3)
 - **107-641A,B SEMINAR IN FOUNDATIONS OF SCIENCE, II.** (3)
- 107-682A PRO-SEMINAR III AND 107-683B PRO-SEMINAR IV.** (6 credits each) A series of seminars on selected topics designed to provide professional training to graduate students. Topics will be selected from the general area of Metaphysics/Epistemology.
- 107-685A,B FUNDAMENTALS OF LOGIC.** (3) A course in intermediate logic for graduate students in Philosophy, covering such topics as axiomatic systems, formal semantics, consistency, completeness, the limitative results, intuitionistic logic, formal theories of truth, aspects of the development of logic.
- 107-690A,B CANDIDACY PAPER.** (3)
- 107-693A M.A. THESIS RESEARCH I.** (5) Submission of thesis topic and detailed bibliography.
- 107-694B M.A. THESIS RESEARCH II.** (5) Detailed thesis proposal.
- 107-695A M.A. THESIS RESEARCH III.** (14) Completion of thesis.
- 107-696A GRADUATE SEMINAR I.** (1) Attendance at graduate students' presentations.
- 107-697B GRADUATE SEMINAR II.** (1) Attendance at graduate students' presentations.
- 107-698A GRADUATE SEMINAR III.** (1) Presentation of the thesis and attendance at other thesis presentations.
- 107-705A GUIDED RESEARCH IN ETHICS.** (3)
- 107-706B GUIDED RESEARCH IN ETHICS.** (3)
- 107-710A GUIDED RESEARCH IN LOGIC.** (3)
- 107-711B GUIDED RESEARCH IN LOGIC.** (3)
- 107-720A GUIDED RESEARCH IN PHILOSOPHY OF SCIENCE.** (3)
- 107-721B GUIDED RESEARCH IN PHILOSOPHY OF SCIENCE.** (3)
- 107-730A GUIDED RESEARCH IN PHILOSOPHY OF RELIGION.** (3)
- 107-731B GUIDED RESEARCH IN PHILOSOPHY OF RELIGION.** (3)
- 107-740A GUIDED RESEARCH IN ANCIENT PHILOSOPHY.** (3)
- 107-741B GUIDED RESEARCH IN ANCIENT PHILOSOPHY.** (3)
- 107-750A GUIDED RESEARCH IN MEDIEVAL PHILOSOPHY.** (3)
- 107-751B GUIDED RESEARCH IN MEDIEVAL PHILOSOPHY.** (3)
- 107-760A GUIDED RESEARCH IN HISTORY OF PHILOSOPHY.** (3)
- 107-761B GUIDED RESEARCH IN HISTORY OF PHILOSOPHY.** (3)
- 107-770A GUIDED RESEARCH IN PHILOSOPHY OF POLITICS.** (3)
- 107-771B GUIDED RESEARCH IN PHILOSOPHY OF POLITICS.** (3)
- 107-780A GUIDED RESEARCH IN EPISTEMOLOGY AND METAPHYSICS.** (3)
- 107-781B GUIDED RESEARCH IN EPISTEMOLOGY AND METAPHYSICS.** (3)

Several courses primarily philosophical in content are available in other departments. Note in particular the offerings in Classics, Jewish Studies, Islamic Institute, and Political Science.

62 Physical and Occupational Therapy

School of Physical and Occupational Therapy
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Director — R.W. Dykes

Associate Director, Graduate Program — A. Majnemer

62.1 Staff

Professors

H. Barbeau; B.Sc.(P.T.), M.Sc., Ph.D.(Laval)
E. Gisel; B.A.(Zur.), B.S., M.S., Ph.D.(Temple)
C.W.Y. Hui-Chan; B.Phys.Ther., M.Sc., Ph.D.(McG.) (*leave of absence*)
S. Wood-Dauphinee; B.Sc.(P.T.), Dip.Ed., M.Sc.A., Ph.D.(McG.)

Associate Professors

E.P. Aston-McCrimmon; B.Sc.(P.&O.T.), M.Sc.A.(McG.)
R. Dykes; B.A.(UCLA), Ph.D.(Johns H.)
N. Korner-Bitensky; B.Sc.(O.T.), M.Sc.(Rehab), Ph.D.(Rehab) (McG.) (part-time)
A. Majnemer; B.Sc.(O.T.), M.Sc., Ph.D.(McG.)
N. Mayo; B.Sc.(P.T.) (Queen's), M.Sc., Ph.D.(McG.)
P.A. McKinley; B.A., M.A., Ph.D.(UCLA)
D. St-Pierre; B.Sc.(P.T.) (McG.), M.Sc., Ph.D.(Montr.)
D.O. Thomas-Edding; B.Sc.(P.&O.T.), Dip.Ed.P.T., M.Sc.A.(McG.), Ph.D.(Tor.)
P. Wells; Dip.Ed.(Tor.), B.Sc.(P.T.), M.Sc.A.(McG.)

Assistant Professors

S. De Serres; B.Eng., M.Eng.(Ecole Polytech.), Ph.D.(Alta.)
J. Fung; B.Sc.(P.T.) (H.K. Polytechnic U.), Ph.D.(Rehab.) (McG.)
I. Gelinas; B.Sc.(Ergo) (Montr.), M.Sc.(O.T.) (Virginia), Ph.D.(Rehab. Sci.)(McG.)
B. Nedelec; B.Sc.(O.T.), Ph.D.(Alta.)
N. Paquet; P.T. (Laval), Ph.D. (Rehab.)(McG.)
L. Snider; B.Sc.(O.T.) (McG.), M.A.(Br.Col.), Ph.D.(Tor.)

62.2 Programs Offered

Master of Science; Master of Science, Applied; and a Doctorate in Rehabilitation Science

62.3 Admission Requirements

Master of Science in Rehabilitation Science

1. A B.Sc. degree or equivalent in physical or occupational therapy or related fields from a university of recognized reputation.
2. Evidence of a high academic achievement equivalent to a B standing, or a McGill CGPA of 3.0 (70-74%).
3. Prerequisite courses may be required in statistics, anatomy, physiology, psychology, sociology, neurophysiology or other areas, depending on the student's anticipated specialization.
4. Non-Canadian applicants to the Faculty of Graduate Studies and Research whose mother tongue is not English and who have not completed an undergraduate degree using the English language are required to submit documented proof of competency in oral and written English, by appropriate exams, e.g. TOEFL. (Test of English as a Foreign Language) with a minimum score of 250 on the computer-based test (School requirement), or the equivalent in other tests.

5. The GRE Test is mandatory for the following applicants:
 those who do not have a B.Sc. or equivalent from a Canadian University;
 those who have been out of university for 5 years or more;
 those whose GPA is below 3.0.

Only the General Test is mandatory. For consideration, students must obtain a minimum score of 550 in each category. For enquiries about Graduate Records Examination, please contact GRE - Educational Testing Service, Princeton, NJ 08540, (609) 683-2002. Applicants are responsible for ensuring that their scores are sent to the School of Physical and Occupational Therapy.

Master of Science, Applied in Rehabilitation Science

1. to 5. as above, plus
 6. Two years of clinical experience is required.

Doctorate in Rehabilitation Science

1. An M.Sc. degree in a rehabilitation-related discipline from a university of recognized reputation.
2. Evidence of a high academic achievement equivalent to a B⁺ standing, or a McGill CGPA of 3.3 (75-79%) is required.
3. Proof of proficiency in English.
4. GRE Test with a minimum score of 600 in each category. The GRE Test is mandatory for the following applicants:
 those who do not have a B.Sc. or equivalent from a Canadian University;
 those who have been out of university for 5 years or more;
 those whose GPA is below 3.0.

If a graduate student accepted into the M.Sc. program demonstrates superior performance in the first year, the Graduate Committee, in consultation with the thesis supervisor, may recommend waiving the M.Sc. thesis requirement, and allow the student to proceed directly to the Ph.D. program.

62.4 Application Procedures

Application forms for admission to the Faculty of Graduate Studies and Research, for the degree of M.Sc., M.Sc.A., or Ph.D. in Rehabilitation Science, may be requested directly from the School.

Once completed, the application form and required documents should be returned to the Associate Director, Graduate Program, School of Physical and Occupational Therapy.

Applications will be considered upon receipt of:

1. application;
2. transcripts;
3. letters of reference;
4. \$60 application fee;
5. test results (GRE, TOEFL).

Deadline: February 15.

62.5 Program Requirements

Elective Courses (for all programs)

In addition to courses offered by the School of Physical and Occupational Therapy, students may choose courses given in other units. A complete list of suitable electives can be obtained from the Graduate Program Coordinator.

MASTER OF SCIENCE IN REHABILITATION SCIENCE (45 credits)

The program requires a minimum of three terms of full-time residence study. It is not uncommon for a student to take two or more years to complete the degree.

Required Courses (10 credits)

- | | | |
|------------|-----|---|
| 582-610A,B | (3) | Research Methodology |
| 582-614A | (3) | Selected Topics in Rehabilitation Science |
| 582-616D | (1) | Seminars in Rehabilitation Science |
| 582-631A,B | (3) | Research Proposal |

A research proposal is to be submitted in written form and defended in front of a supervisory committee. Research proposals should be completed by the beginning of the second full-time year.

Elective Courses (6 credits)

Courses which pertain to the student's area of specialization.

Thesis Component – Required (29 credits)

- | | | |
|--------------|------|------------------|
| 582-696A,B,C | (2) | Thesis Research |
| 582-697A,B,C | (6) | Thesis Research |
| 582-698A,B,C | (9) | Thesis Research |
| 582-699A,B,C | (12) | Thesis Research. |

The student carries out a research study in an approved subject area under the guidance of an internal supervisor (from within the School) or an external supervisor (from outside the School).

All four of these courses must be registered for within the first three terms of full-time study. The course 582-699A,B,C is carried as IP "in progress" until completion of thesis.

MASTER OF SCIENCE, APPLIED IN REHABILITATION SCIENCE (45 credits)

For Master's programs structured as Course, Project or Non-thesis options, residence requirements are fulfilled when students complete all course requirements in their respective programs and pay the fees accordingly. This would normally be completed in four terms.

Required Courses (13 credits)

- | | | |
|--------------|-----|---|
| 582-602A,B | (3) | Educational Methodology (or equivalent) |
| 582-603A,B,C | (3) | Directed Practicum |
| 582-610A,B | (3) | Research Methodology |
| 582-614A,B | (3) | Selected Topics in Rehabilitation Science |
| 582-616D | (1) | Seminars in Rehabilitation Science |

Complementary Course (3 credits)

one 3-credit course in Statistics

Elective Courses (15 credits)

courses at the 500 and 600 level, related to the student's area of specialization; one or two 300 and 400-level courses may also be included upon approval of the Associate Director.

Project Component – Required (14 credits)

- | | | |
|---------|-----|---------------------|
| 582-661 | (6) | Research Project I |
| 582-662 | (8) | Research Project II |

DOCTORATE IN REHABILITATION SCIENCE

Doctoral students will be required to pursue at least three years of full-time residence study in the graduate program of the School of Physical and Occupational Therapy.

The curriculum will be divided as follows:

Required Courses (15 credits)

- | | | |
|-------------|-----|---|
| 582-602A,B* | (3) | Educational Methodology (or equivalent) |
| 582-610A,B* | (3) | Research Methodology |
| 582-614A* | (3) | Selected Topics in Rehabilitation Science |
| 582-620A | (3) | Measurement in Rehabilitation I |
| 582-630B | (3) | Measurement in Rehabilitation II |

Of the five required courses, at least two* will already have been completed by students with an M.Sc. in Rehabilitation Science from McGill.

Elective Courses (6 credits)

Courses which pertain to the student's area of specialization; chosen by the student in consultation with his/her supervisor and upon approval of the Associate Director of the Graduate Program.

Comprehensive Examination

582-701D Ph.D. Comprehensive Examination

The student must successfully pass a written comprehensive examination by the end of the second academic year. The format will be three questions to be answered in essay style over a five-day period. An additional requirement may include an oral component.

Thesis Component - Required

The student carries out a research study in an approved subject area under the guidance of an internal supervisor (from within the School) or an external supervisor (from outside the School).

Research Proposal

A research proposal is to be submitted in written form and defended in front of a supervisory committee. Research proposals should be completed during the second full-time year, following the comprehensive examination.

62.6 Courses

- Denotes not offered in 2000-01.

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

582-508A,B PLASTICITY IN REHABILITATION. (3) (Prerequisite: 582-455B or equivalent.) A seminar course designed to provide students with a review of current research on plasticity in the central and peripheral nervous systems. Particular emphasis is placed on the mechanisms involved in the recovery of function after injury.
Professor R. Dykes

582-602A,B EDUCATIONAL METHODOLOGY. (3) Process of learning, methods of communication and teaching strategies for classrooms and clinical settings. (Equivalent Education 449-689)

582-603A,B,C DIRECTED PRACTICUM. (3) A tutorial with directed practical experience in a clinical setting related to the student's clinical specialization, including curriculum development, and emphasizing current thought in rehabilitation. **Graduate Faculty**

- **582-604A CURRENT TOPICS IN PEDIATRICS.** (3) (Prerequisite: 582-233A, or permission from the instructors.)

582-610A,B RESEARCH METHODOLOGY. (3) (Prerequisite: 204-305B or 513-607A, or 416-675A and 416-676B, or equivalent.) An advanced lecture and seminar course. The philosophy of scientific inquiry, principles of research design, and application of statistical techniques are discussed with special consideration given to research studies in health care and rehabilitation.
Professor N. Mayo

582-614A,B SELECTED TOPICS IN REHABILITATION SCIENCE. (3) A weekly lecture and seminar course taught by staff, designed to provide an overview of current research issues in rehabilitation.
Professor S. Wood-Dauphinee and Graduate Staff

582-616D SEMINARS IN REHABILITATION SCIENCE. (1) A weekly seminar course given by invited speakers in different areas of research related to rehabilitation science. Students are expected to participate by reading pertinent literature prior to seminars and asking questions at each seminar. Attendance is compulsory, and the course is graded pass/fail based on participation.
Professor A. Majnemer, Graduate Staff and Invited Speakers

582-620A,B MEASUREMENT IN REHABILITATION I. (3) (Prerequisite: 582-220B and permission from the instructor.) Theoretical and practical basis for utilization of electronic equipment for quantitative measurement in rehabilitation research. Ambulatory assistive devices, electronic plates and instrumentation to assess normal and pathological human movement will be used to demonstrate the application of theory and techniques for quantitative analysis of human performance. Recording, reduction and analysis of electromyographic, kinetic and kinematic data included.
Professor H. Barbeau and Graduate Staff

- **582-622A,B PATHOKINESIOLOGY.** (3) (Prerequisites: 582-620A and 582-630B)

582-630B MEASUREMENT IN REHABILITATION II. (3) (Prerequisite: 513-607 or 204-305 or equivalent.) Theoretical and practical basis for measurement in rehabilitation research. Introduction to measurement theory, scale development and related statistics, approaches and instruments used to assess outcomes in patients

with musculoskeletal, neurological, cardiovascular, respiratory, psychiatric or psychologic conditions.

Professors S. Wood-Dauphinee and N. Korner-Bitensky

582-631 RESEARCH PROPOSAL. (3) The course covers issues involved in the development of a research protocol. The presentation of a written thesis proposal is required by the end of the course. This document will serve as the basis for an oral presentation to the student's Supervisory Committee which will also review the written proposal.
Professor N. Mayo

582-661 RESEARCH PROJECT I. (6)

582-662 RESEARCH PROJECT II. (8)

582-701D PH.D. COMPREHENSIVE EXAMINATION.

63 Physical Education

Department of Physical Education
Sir Arthur Currie Memorial Gymnasium
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Montreal, Quebec H2W 1S4

Telephone: (514) 398-4184

Fax: (514) 398-4186

Website: http://www.education.mcgill.ca/phys_ed/default.html

Chair — H  l  ne Perrault

M.A. Program Director — Dr. H. Perrault

Telephone: (514) 398-4184 (ext. 0578)

63.1 Staff*Professors*

David Montgomery; B.Sc.(Guelph), M.Sc., Ph.D.(Purdue)
H  l  ne Perrault; B.Sc.(C'  dia), M.Sc., Ph.D.(Montr.)
Greg Reid; B.Ed.(P.E.)(McG.), M.S.(Calif.), Ph.D.(Penn. State)
A. Edward Wall; B.Ed., M.A.(McG.), Ph.D.(Alta.)

Associate Professors

Margaret J. Downey, B.Ed., M.A., Ph.D.(McG)
Graham I. Neil; B.Ed.(P.E.), M.A.(McG.), Ph.D.(Ore.)
Ren   A. Turcotte; H.B.P.H.E.(Lauren.), M.Sc., Ph.D.(Alta.)

Assistant Professors

David J. Pearsall; B.A., BPHE, M.Sc., Ph.D.(Queen's)

63.2 Programs Offered

The Physical Education Department offers thesis and non-thesis options leading to a Master of Arts. There are two main areas of concentration in each option of the M.A. program: Applied Sport Science and Applied Behavioral Science.

The Applied Sport Science option includes exercise physiology and biomechanics; the Applied Behavioural Science option includes adapted physical activity, psychology of sport and motor behaviour as well as pedagogy. The program usually involves two years of study.

The M.A. with thesis route provides the opportunity to acquire critical skills and knowledge related to systematic research in an area of specialization.

The M.A. course-based (non-thesis) route provides the opportunity for those interested in professional practice to acquire advanced knowledge in an area of specialization as well as some breadth.

Prospective applicants to the Ph.D. (*ad hoc*) program should contact the Department at (514) 398-4184.

63.3 Admission Requirements

1. An undergraduate degree with a Major in Physical Education or its equivalent from a recognized university is required.
2. A minimum academic standing equivalent to a C.G.P.A. of 3.0 out of 4.0.

63.4 Application Procedure

Applications will be considered upon receipt of:

1. application form,
2. official transcripts from previous undergraduate /graduate programs of study,
3. two letters of reference,
4. \$60.00 application fee.

The deadlines for Canadians to submit applications are:

- Fall session – March 1
- Winter session – November 1

For International students, applications must be submitted at least 6 months prior to the official deadline indicated above.

All documentation is to be submitted directly to the Graduate Program Director in the Department of Physical Education.

63.5 Program Requirements

M.A. PHYSICAL EDUCATION – THESIS OPTION (45 credits)

Required Courses (6 credits)

- 416-676 (3) Intermediate Statistics II or equivalent
- 434-605 (3) Research Methods

Complementary Courses (6 credits)

6 credits, two courses from either the Applied Sport Science or the Applied Behavioural Science list.

Thesis Component – Required (24 credits)

- 434-691 (6) Thesis Research I
- 434-692 (6) Thesis Research II
- 434-693 (6) Thesis Research III
- 434-694 (6) Thesis Research IV

Elective Courses (9 credits)

9 credits of courses chosen in consultation with an advisor.

M.A. PHYSICAL EDUCATION – NON-THESIS OPTION (45 credits)

Project Component – Required (15 credits)

- 434-608 (15) Special Project

Complementary Courses (18 credits)

6 credits, two of the following:

- 416-575 (3) Educational Measurement
- 434-605 (3) Research Methods
- 431-630 (3) Qualitative & Ethnographic Studies
- or 411-692 (3) Qualitative Research Methods

12 credits, four courses from either the Applied Sport Science or the Applied Behavioural Science list.

Elective Courses (12 credits)

12 credits of courses chosen in consultation with an advisor.

APPLIED SPORT SCIENCE COURSE LIST

- 434-553 (3) Physiological Assessment in Sport
- 434-566 (3) Biomechanical Assessment in Sport
- 434-652 (3) Cardiorespiratory Exercise Physiology
- 434-662 (3) Metabolic & Neuromuscular Responses to Exercise
- 434-663 (3) Application of Exercise Physiology to Sport
- 434-667 (3) Sport Science – Seminar
- 434-668 (3) Data Acquisition in Sport Science

APPLIED BEHAVIORAL SCIENCES COURSE LIST

- 434-504* (3) Health & Lifestyle Education
- 434-505* (3) Sport & Physical Education in Society
- 434-550 (3) Analyzing Instructional Behaviors
- 434-607* (3) Curriculum Innovation and Change
- 434-650 (3) Teaching in Physical Education
- 434-654 (3) Sport Psychology
- 434-655 (3) Program Development in Adapted Physical Activity
- 434-664 (3) Motor Learning
- 434-665 (3) Motor Performance of Disabled Persons

* All courses on this list are available for both M.A. thesis and non-thesis options with the exception of 434-504, 434-505 and 434-607 which are only available for the non-thesis option.

63.6 Courses

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

● Denotes courses not offered in 2000-01.

- 434-502A SPECIAL ISSUES. (3)
- 434-504A HEALTH & LIFESTYLE EDUCATION. (3)
- 434-505A SPORT AND PHYSICAL EDUCATION IN SOCIETY. (3)
- 434-550 ANALYZING INSTRUCTIONAL BEHAVIORS. (3)
- 434-553A PHYSIOLOGICAL ASSESSMENT IN SPORT. (3)

434-566B BIOMECHANICAL ASSESSMENT IN SPORT. (3) Various equipment and protocols will be used to evaluate the biomechanics of skilled movement patterns. Kinematic, kinetic, and electromyographic data will be collected, processed and interpreted to identify optimal performance features related to equipment design and individual technique. Each student will be required to complete a series of research projects and literature summaries.

434-605A RESEARCH METHODS. (3) The course will examine the nomenclature, structure, methods and areas of quantitative and qualitative research in Physical Education. Students will be required to evaluate research concepts and examine their relationship to statistical design. Activities will focus on data retrieval, research problems, proposals, data collection and report of findings.

- 434-607 CURRICULUM INNOVATION AND CHANGE. (3)
- 434-608 SPECIAL PROJECT. (15)

434-650B TEACHING IN PHYSICAL EDUCATION. (3) This course provides a theoretical background for research on teaching in physical education. Readings drawn from current research journals on teaching and guided seminars. Readings will include qualitative, single subject, and group design research in physical education pedagogy.

434-652A CARDIORESPIRATORY EXERCISE PHYSIOLOGY. (3) A comprehensive review of the basic physiological responses of the circulatory and respiratory systems to acute and chronic exercise and a brief discussion of regulatory mechanisms.

- 434-654 SPORT PSYCHOLOGY. (3)

434-655A PROGRAM DEVELOPMENT IN ADAPTED PHYSICAL ACTIVITY. (3) An examination of program development and evaluation in adapted physical activity along the segregated-integration continuum. Assessment techniques for persons who are disabled, pedagogical considerations and evaluation via single-subject designs. Existing curriculum models and the program development literature within selected special populations are studied.

- 434-662 METABOLIC AND NEUROMUSCULAR RESPONSES TO EXERCISE. (3)
- 434-663 APPLICATION OF EXERCISE PHYSIOLOGY TO SPORT. (3)

434-664B MOTOR LEARNING. (3) The analysis of conditions and factors related to human learning and performance or behavioral potential using the information processing model of behavior. Seminar format is used to discuss experimentation and theory that examine motor skill acquisition.

- 434-665 MOTOR PERFORMANCE OF DISABLED PERSONS. (3)
- 434-667 SPORT SCIENCE – SEMINAR. (3)
- 434-668 DATA ACQUISITION IN SPORTS SCIENCE. (3)

434-603D READING COURSE. (6)

434-616A,B READING COURSE. (3)

434-671A,B EXPERIMENTAL PROBLEMS. (3) Study in one area of: ergo-physiology or biomechanics or psychology of motor performance or motor performance for exceptional children. To provide an opportunity to conduct a research project and develop an aware-

ness of the problems involved in the area of concentration under departmental supervision.

434-672D EXPERIMENTAL PROBLEMS. (6) See 434-671. This course, however, is more intensive and comprehensive in nature.

434-691 THESIS RESEARCH I. (6) A comprehensive literature review in the general area of the thesis topic. Independent work under the supervision of the thesis advisor(s).

434-692 THESIS RESEARCH II. (6) Independent work under the supervision of the thesis advisor(s) culminating with a written proposal and oral seminar explaining the direction of the thesis research. The Department and Advisory Committee evaluate both the proposal and the presentation.

434-693 THESIS RESEARCH III. (6) Ongoing research pertaining to the thesis under the direction of the thesis advisor(s).

434-694 THESIS RESEARCH IV. (6) Independent work under the supervision of the thesis advisor(s). Final submission and approval of the thesis.

64 Physics

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Chair — J. Barrette

64.1 Staff

Emeritus Professors

M.P. Langleben; B.Sc., M.Sc., Ph.D.(McG.), F.R.S.C.

E.R. Pounder; B.Sc., Ph.D.(McG.), F.R.S.C.

R.T. Sharp; B.Sc., M.Sc., Ph.D.(McG.)

P.R. Wallace; B.A., M.A., Ph.D.(Tor.), F.R.S.C.

M.J. Zuckermann; M.A., D.Phil.(Oxon.), F.R.S.C.

Post-Retirement

A.P. Contogouris; B.A.(Nat. Tech. Athens), Ph.D.(C'nell)

W.B. Muir; B.Sc.(McG.), M.Sc.(W.Ont.), Ph.D.(Ott.)

Professors

J. Barrette; M.Sc., Ph.D.(Montr.)

C. Burgess; B.Sc.(Wat.), Ph.D.(Texas)

M. Cohen; B.Sc., Ph.D.(Lond.), A.R.C.S.; Faculty of Medicine

J.E. Crawford; B.A., M.A.(Tor.), Ph.D.(McG.)

S. Das Gupta; B.Sc., M.Sc.(Calc.), Ph.D.(McM.)

N.B. DeTakacsy; B.Sc., M.Sc.(Montr.), Ph.D.(McG.)

M. Grant; B.Sc.(P.E.I.), M.Sc., Ph.D.(Tor.)

R. Harris; B.A.(Oxon.), Ph.D.(Sus)

C.S. Lam; B.Sc.(McG.), Ph.D.(M.I.T.)

J.K.P. Lee; B.Eng., M.Sc., Ph.D.(McG.)

S. Lovejoy; B.Sc.(Cantab.), Ph.D.(McG.)

S.K. Mark; B.Sc., M.Sc., Ph.D.(McG.)

R.B. Moore; B.Eng., M.Sc., Ph.D.(McG.)

R. Myers; B.Sc.(Wat.), M.A., Ph.D.(Prin.)

P.M. Patel; B.Sc., M.Sc.(Manc.), Ph.D.(Harv.)

D.G. Ryan; B.Sc., M.Sc.(Queen's), Ph.D.(Birm.)

D.G. Stairs; B.Sc., M.Sc.(Queen's), Ph.D.(Harv.)

J.O. Strom-Olsen; B.A., M.S., Ph.D.(Cantab.)

M. Sutton; B.Sc., M.Sc., Ph.D.(Tor.)

J.M. Trischuk; B.Eng.(McG.), Ph.D.(Cal. Tech.)

Associate Professors

F. Corriveau; Ph.D.(Zür.)

C. Gale; B.Sc.(Ott.), M.Sc., Ph.D.(McG.)

P. Grutter; Diploma, Ph.D.(Basel)

H. Guo; B.Sc.(Sichuan), M.Sc., Ph.D.(Pitt.)

D. Hanna; B.Sc.(McG.), M.A., Ph.D.(Harv.)

V. Kaspi; B.Sc.(McG.), M.A., Ph.D.(Prin.)

K. Ragan; B.Sc.(Alta.), Ph.D.(Geneva)

D.H. Ryan; B.A., Ph.D.(Dub.)

Assistant Professor

J. Cline; B.Sc.(Calif.), M.Sc., Ph.D.(Cal. Tech.)

Lecturers

Z. Altounian, F. Buchinger

Associate Members

R. Davies (Atmospheric and Oceanic Sciences);

B.C. Eu (Chemistry); G. Fallone (Radiation Oncology);

M. Mackey (Physiology); E. Podgorsak (Radiation Oncology);

D. Ronis (Chemistry)

64.2 Programs Offered

M.Sc. and Ph.D.

FIELDS OF RESEARCH

High-Energy Physics

Theoretical: The McGill high energy theorists have interests in a wide range of problems pertaining to all fundamental interactions: strong, electromagnetic, weak and gravitational. The research program extends from studies closely connected with experimental data to purely theoretical questions. Ongoing projects involve: particle phenomenology, quantum chromodynamics, electroweak baryogenesis, group theory, astroparticle physics, quantum gravity, grand unification and string theory.

Experimental High Energy Physics The experimental high energy physics group is engaged in a number of experiments at the research frontiers of the field, both in subatomic physics and in high energy astrophysics. These include:

- BaBar: The group played a major role in constructing installation and commissioning of the drift chamber. The full detector has been operational and taking data since summer 1999. The physics interests of the group center on CP violation in B-meson decays to CP eigenstates and in the determination of CKM matrix elements V_{cb} and V_{ub} .
- STACEE: Members of the group are currently constructing and installing a major air Cherenkov detector for the study of high energy gamma rays emitted by astrophysical objects such as supernova remnants and active galactic nuclei. In 1999, a partially instrumented version of the detector (located at Sandia National Labs in Albuquerque, New Mexico) operated and successfully observed the Crab Nebula, providing a proof-of-principle of this novel technique. By the end of 2000, we expect to be operating the full-size detector and entering into a multi-year campaign of astrophysical observations.
- ZEUS: A group working at the world's first electron-proton collider (HERA, at DESY, Hamburg) studies lepton-quark interactions at high energy. The physics topics of interest to the group include deep inelastic scattering (proton structure, forward jet production and low-x physics) and flavour (strange, charm) production.

Thus, graduate students at the M.Sc. and Ph.D. levels are offered a strong program of research in a challenging and rapidly advancing field. Short term Master's projects are based mainly on instrumentation or data analysis conducted on Campus, while Ph.D. research may involve an extended stay at one of the world's major research laboratories.

Nuclear Physics

Theoretical: Transport equations for heavy ion collisions at intermediate energy; nuclear equation of state from heavy ion collisions; fragmentation at intermediate energy; electromagnetic probes in relativistic heavy ion collisions; effective lagrangians for hadronic systems at finite temperature; pion-nucleus interactions.