The Faculty of Science section is divided into two parts, for access to the first part click on the link at the bottom of the page to return to the Front Page of the Calendar.

11.12 Geography (183)

Burnside Hall, Room 705
805 Sherbrooke Street West
Montreal, QC H3A 2K6

Telephone: (514) 398-4111
Fax: (514) 398-7437
Website: http://www.geog.mcgill.ca

Chair — T.R. Moore

Emeritus Professor
B.J. Garnier; M.A.(Cantab.)

Professors
P.G. Brown; B.A.(Haverford), M.A., Ph.D.(Col.) *(joint appt. with McGill School of Environment and Natural Resource Sciences)*
T.R. Moore; B.Sc.(Swansea), Ph.D.(Aberd.)
N.T. Roulet; B.Sc., M.Sc.(Trent), Ph.D.(McM.)

Associate Professors
G.L. Chmura; B.Sc.(Mass.), M.Sc.(R.I.), Ph.D.(L.S.U.)
1ILN-LSO ndLenNTrNULTY OSIENTrrL gNS TY OdgNaeNuTnINt ngN
OePNomaLemLAN1TNOsTaPNP,SMamOnaTecNmT, gLNPLgm aSnaTegNnIOnN
O LNTrNgSLmaOMNaenL LgnNnTNt ngNgn,PLengNOSSLO NaeNnILN
ULTY OSIENLen ENaeNnILNGOm,MnENTrNt ngNgLmnaTeANiOeENomaLemLN
gn,PLengNmITTgLNnTNnOlLNgTdLNTrNnILgLNmT, gLgANtMMNvAtANS Ty
Y OdgNaeNULTY OSIEN3aemM,PaeYNB uOeNoEgnLdg0NO LNMagnLPNaeN
nILNGOm,MnENTrNt ngNLen EcNuLYaeeaeYNTeN

Geography is the study of physical environments and human habitats. It deals with people and places. It covers issues such as global warming and climate change, regional economic disparities, urban transportation, native land claims and permafrost problems. Both a physical and a social science, it provides a unique opportunity to obtain a broad exposure to modes of analysing the many environmental and locational problems of contemporary society.

The World Commission on Environment and Development has identified the evidence and possible consequences of currently widespread land use practices which cannot be sustained. Geography is an integrative discipline concerned with the relations between culture systems and resource bases. Students interested in understanding, or working towards the resolution of, the environmental "crisis" should select courses which deal with (1) the dynamics of natural systems (courses in the physical geography of terrestrial, atmospheric and hydrological systems); (2) the dynamics of human systems (courses in cultural, social, economic, political and urban geography); (3) the context of development and land use changes; and (4) practical skills such as Geographical Information Systems, cartography, remote sensing, image analysis and resource management.

Students may pursue programs focusing on urban systems, the geography of economic development, people and their natural environment, the geography of living systems. The interdisciplinary Minor in Environment is also available to students in Arts or Science. Students planning to enter a program in Geography should telephone (514) 398-4111 for an appointment with an adviser and should consult the *Department of Geography Undergraduate Handbook,* which is available from the departmental office.

B.Sc. HONOURS PROGRAM IN GEOGRAPHY (67 credits)
[MARS Program Code 2-450000]

183-311B CANADA – A GEO-ECONOMIC PERSPECTIVE. (3) (3 hours) (Prerequisite 183-216 or permission of the instructor.)

183-315A URBAN TRANSPORTATION GEOGRAPHY. (3) (3hours) (Prerequisite 183-217 or permission of instructor.)

183-316B POLITICAL GEOGRAPHY. (3) (3hours)

183-321B CLIMATIC ENVIRONMENTS. (3) (3hours) (Prerequisite: 183-203 or 195-210 or permission of the instructor.) Scope of climatology, physical, dynamic and applied. The Earth/atmosphere system, radiation and energy balances, governing meteorological processes. Movement and circulation of the atmosphere on a local and global scale. Resulting weather systems.

183-322B ENVIRONMENTAL HYDROLOGY. (3) (3hours) (Prerequisite: 183-203 or equivalent) Quantitative, experimental study of the principles governing the movement of water at or near the Earth's surface and how the research relates to the chemistry and biology of ecosystems.

- **183-323B GEOGRAPHY OF EUROPE'S NORTH.** (3) (3hours)

183-331A URBAN SOCIAL GEOGRAPHY. (3) (3 hours) (Prerequisite: 183-216 or 217 or permission of instructor.)

183-350A ECOLOGICAL BIOGEOGRAPHY. (3) (3hours) (Prerequisite: 183-302 or 177-205) The study of the patterns of distribution of organisms in space and time with emphasis on plant communities. Ecological, geographical, historical and anthropological factors affecting these distribution patterns will be discussed. Particular consideration is given to methods for description and classification of plant communities.

183-351A QUANTITATIVE METHODS IN GEOGRAPHY. (3) (3hours) (Prerequisite: Mathematics 189-203 or permission of instructor.) (Note: Credit for other statistics courses may preclude credit for this course and conversely. See "Course Overlap" on pag e351.) Multiple regression and correlation, logit models, discrete choice models, gravity models, facility location algorithms, survey design, population projection.

- **183-370A PROTECTED AREAS.** (3) (3 hours) (Prerequisite: 177-208 or 183-203 or 344-205.)

183-372A RUNNING WATER ENVIRONMENTS. (3) (3hours) (Prerequisites: 183-203 and 183-272, or 170-200 and 170-202) The course focuses on the physical habitat conditions found in streams, rivers, estuaries and deltas. Based on the laws governing flow of water and sediment transport, it emphasizes differences among these environments, in terms of channel form, flow patterns, substrate composition and mode of evolution. Flooding, damming, channelisation, forestry impacts.

183-381A EVOLUTION OF GEOGRAPHY. (3) (3hours)

- **183-398T FIELD STUDIES IN HUMAN GEOGRAPHY.** (3) (3hours) (Prerequisite: Any introductory human geography course; or by permission of the instructor.)

- **183-404B ENVIRONMENTAL MANAGEMENT.** (3) (3 hours) (Prerequisite: 183-302 or permission of instructor.)

- **183-407B CONTEMPORARY ISSUES IN GEOGRAPHY.** (3) (3 hours)

183-408A GEOGRAPHY OF DEVELOPMENT. (3) (3hours) (Prerequisite: 183-216 or permission of instructor.)

183-410B GEOGRAPHY OF UNDERDEVELOPMENT: CURRENT PROBLEMS. (3) (3 hours) (Prerequisite: 183-216 or permission of instructor.)

183-424A PLACE, PEOPLE & CULTURE: EUROPE. (3) (3 hours) (Prerequisite: 6 credits from any of History, Art History, Anthropology, Philosophy, Political Science, Sociology or permission of instructor) (Change in credit weight and hours from 6 to 3 awaiting University approval.)

- **183-470C WETLANDS.** (3) (3 hours and field trips) (Prerequisites: one from 183-305, 183-322, 372-210, 336-217; and one from 183-350, 177-208/308, 367-460, 367-358)

183-490A,B,G,T INDEPENDENT STUDIES IN GEOGRAPHY. (3) (Open /NK

● **183-502A GEOGRAPHY OF NORTHERN DEVELOPMENT.** (3) (3 hours) (Prerequisite: 183-301 or 436, or permission of instructor.)

● **183-504A INDUSTRIAL RESTRUCTURING – THE GEOGRAPHIC IMPLICATIONS.** (3) (Prerequisites: 183-311 or permission of instructor.)

183-505B GLOBAL BIOGEOCHEMISTRY. (3) (2 hours and research) (Prerequisite: 183-305 and permission of instructor.) An examination of the storage, transfers and cycling of major elements and substances, with an emphasis on the global scale and the linkages between the atmosphere, hydrosphere, lithosphere and biosphere.

183-506B PERSPECTIVES ON GEOGRAPHIC INFORMATION ANALYSIS. (3) (2hours and laboratory) (Prerequisite: 183-201 and 306 and permission of instructor.) Examination of a range of applications in automated processing of spatial data. Discussion will focus on both theoretical and practical aspects of Geographic Information Systems. Topics such as resource data base structure, methods of spatial interpolation and data quality and errors are covered. The application of Geographic Information Systems such as GRASS and digital image processing routines are used to answer questions in geographical research. Individual student projects will be emphasized.

183-508A RESOURCES, PEOPLE AND POWER. (3) (3 hours) (Prerequisite: 183-408 or 183-410 or permission of instructor.)

183-510B H

Complementary Courses (15 credits)

U3 Required Courses (18 credits)

U3 Complementary Courses (6 credits)

11.14 Management Minor Program

The Minor in Management allows Science students to include courses in their undergraduate program that will help prepare them for a career in management. The Minor in Technological Entrepreneurship described in section 11.29 is available to Science students.

Enrolment in this program is restricted. At the time of application, a CGPA greater than 2.50 is required and at least one course toward the Minor program must have been completed with a grade of C or better.

Application procedures will be announced in September. Please consult the Student Affairs Office Website, http://www.mcgill.ca/artscisao.

Students who are not formally registered for the Minor but who nevertheless complete all its requirements may apply to have the Minor approved during their last term.

Students who were registered in 1996-97 or earlier should consult the Minor adviser in the Student Affairs Office regarding their program requirements.

Students registered in the Minor in Management may not take additional courses outside the Faculties of Arts and of Science.

To obtain the Minor in Management, all courses must be completed with a grade of C or better.

MINOR PROGRAM IN MANAGEMENT (24 credits)

Required Courses (9 credits)

11.15 Mathematics and Statistics (189)

Burnside Hall, Room 1005
805 Sherbrooke Street West
Montreal, QC H3A 2K6

Telephone: (514) 398-3800
Fax: (514) 398-3899
Website: http://www.math.mcgill.ca

Chair — Kohur GowriSankaran

Emeritus Professors
Michael Barr; A.B., Ph.D.(Penn.) *(Peter Redpath Emeritus Professor of Pure Mathematics)*
Jal R. Choksi; B.A.(Cantab.), Ph.D.(Manc.)
Joachim Lambek; M.Sc., Ph.D.(McG.), F.R.S.C. *(Peter Redpath Emeritus Professor of Pure Mathematics)*
Arak M. Mathai; M.Sc.(Kerala), M.A., Ph.D.(Tor.)
William O.J. Moser; B.Sc.(Manit.), M.A.(Minn.), Ph.D.(Tor.)
V. Seshadri; B.Sc., M.Sc.(Madras), Ph.D.(Oklahoma)
John C. Taylor; B.Sc.(Acad.), M.A.(Queen's), Ph.D.(McM.)

Professors
William J. Anderson; B.Eng., Ph.D.(McG.)
William G. Brown; M.A.(Col.), B.A., Ph.D.(Tor.)
Marta C. Bunge; M.A., Ph.D.(Penn.)
Henri Darmon; B.Sc.(McG.), Ph.D.(Harv.)
Stephen W. Drury; M.A., Ph.D.(Cantab.)
Kohur GowriSankaran; B.A., M.A.(Madras), Ph.D.(Bombay)
Jacques C. Hurtubise; B.Sc.(Montr.), Ph.D.(Oxon.)
Niky Kamran; B.Sc., M.Sc.(Brussels), Ph.D.(Wat.)
Olga Kharlampovich; M.A.(Ural State), Ph.D.(Leningrad), Dr.of Sc.(Steklov Institute)
Michael Makkai; M.A., Ph.D.(Bud.)
Sherwin A. Maslowe; B.Sc.(Wayne State), M.Sc., Ph.D.(Calif.)
Charles Roth; M.Sc.(McG.), Ph.D.(Hebrew
Karl Peter Russell; Vor.Dip.(Hamburg), Ph.D.(Calif.
Georg Schmidt; B.Sc.(Natal), M.Sc.(S.A.), Ph.D.(Stan.)
George P.H. Styan; M.A., Ph.D.(Col.)
Kwok Kuen Tam; M.A., Ph.D.(Tor.)
Luc Vinet; B.Sc., M.Sc., Ph.D.(Montr.), Doctorat 3e

MINOR PROGRAM IN STATISTICS (24 credits)
[MARS Program Code 6-630200]
(Program revision awaiting University approval)

The Minor may be taken in conjunction with any primary program in the Faculty of Science. Students should declare their intention to follow the Minor in Statistics at the beginning of the penultimate year and must obtain approval for the selection of courses to fulfil the requirements for the Minor from the Departmental Chief Adviser (or delegate).

All courses counted towards the Minor must be passed with a grade of C or better. Generally no more than six credits of overlap are permitted between the Minor and the primary program. However, with an approved choice of substantial courses the overlap restriction may be relaxed to nine credits for students whose primary program requires 60 credits or more and to 12 credits when the primary program requires 7 2credits or more.

Required Courses (15 credits)

189-222	(3)	Calculus III
189-223*	(3)	Linear Algebra
189-323	(3)	Probability Theory
or 189-356	(3)	Probability
189-324	(3)	Statistics
or 189-357	(3)	Statistics
189-423	(3)	Regression and Analysis of Variance

Complementary Courses (9 credits)

No more than 6 credits may be taken outside the Department of Mathematics and Statistics.

Further credits (if needed) may be freely chosen from the required and complementary courses for Majors and Honours students in Mathematics, with the obvious exception of courses that involve duplication of material.

FACULTY PROGRAMS

Programs linking mathematics and other disciplines are available. With careful selection of courses in U1, it is possible to transfer to a Major program in Mathematics in U2. Except where otherwise noted these Faculty Programs lead to a B.Sc. degree. Students interested in any of these Faculty Programs should consult the Department of Mathematics and Statistics for an adviser.

FACULTY PROGRAM IN BIOLOGY AND MATHEMATICS See page 368 in the Biology section for complete program information.

FACULTY PROGRAM IN CHEMISTRY AND MATHEMATICS See page 377 in the Chemistry section for complete program information.

FACULTY PROGRAM IN MATHEMATICS AND COMPUTER SCIENCE (54 credits) [MARS Program Code 4-632500]
27 credits in Mathematics and 27 credits in Computer Science

Required Courses (48 credits)

Complementary Courses (6 credits)

FACULTY PROGRAM IN MATHEMATICS, STATISTICS AND COMPUTER SCIENCE (54 credits)
[MARS Program Code 4-635100]

Required Courses (30 credits)

Complementary Courses (24 credits)

FACULTY PROGRAM IN MATHEMATICS, CHEMISTRY AND PHYSICS (56 credits) [MARS Program Code 4-631200]

Required Courses (47 credits)
180-201 (3) Modern Inorganic Chemistry I
or 180-281 (3) Inorganic Chemistry I
180-204 (3) Physical Chem./Biol. Sci. I
or 180-213 (3) Physical Chemistry I
180-212 (4) Organic Chemistry I
180-214 (3) Physical Chem./Biol. Sci. II
180-222 (4) Organic Chemistry II
189-222 (3) Calculus III
189-223 (3) Linear Algebra
189-314 (3) Advanced Calculus
189-315 (3) Ordinary Differential Equations
189-319 (3) Partial Differential Equations
198-230 (3) Dynamics of Simple Systems
198-232 (3) Heat and Waves
198-241 (3) Signal Processing
198-340 (3) Electricity and Magnetism
308-202 (3) Introduction to Computing 1

Complementary Courses (9 credits)
3 credits in Physics, 200 level or higher
6 credits in Mathematics, Chemistry or Physics, chosen in consultation with the adviser.

MAJOR PROGRAM IN MATHEMATICS (54 credits)
[MARS Program Code 1-630000]
(Program revisions awaiting University approval)

Students entering the Major program are normally expected to have completed 189-133, 189-140 and 189-141 or their equivalents. Otherwise they will be required to make up any deficiencies in these courses over and above the 54credits of required courses.

Major students who have done well in 189-242 and 189-235 are urged to consider, in consultation with their adviser and the instructors concerned, entering the Honours stream by registering for 189-251 and 189-255.

Guidelines for Selection of Courses in the Major Program

The following informal guidelines should be discussed with the student's adviser. Where appropriate, Honours courses may be substituted for equivalent Major courses. Students planning to pursue graduate studies are encouraged to make such substitutions.

Students interested in computer science are advised to choose courses from the following 189-317, 189-318, 189-327, 189-328, 189-343, 189-407, 189-417 and to complete the Computer Science Minor.

Students interested in probability and statistics are advised to take 189-324, 189-407, 189-423, 189-447, 189-523, 189-525.

Students interested in applied mathematics should take 189-317, 189-319, 189-324, 189-326, 189-327, 189-407, 189-417.

Students considering a career in secondary school teaching are advised to take 189-318, 189-328, 189-338, 189-339, 189-346, 189-348.

Students interested in careers in business, industry or government are advised to select courses from the following list: 189-317, 189-319, 189-327, 189-329, 189-407, 189-417, 189-423, 189-447, 189-523, 189-525.

Required Courses (27 credits)
189-222 (3) Calculus III
189-235 (3) Algebra I
189-236 (3) Linear Algebra I
189-242 (3) Analysis I
189-243 (3) Real Analysis
189-314 (3) Advanced Calculus
189-315 (3) Ordinary Differential Equations
189-316 (3) Functions of a Complex Variable
or 189-249 (3) Advanced Calculus
189-323 (3) Probability Theory

Complementary Courses (27 credits)
21 credits selected from the following list, with at least 6 credits selected from:
189-317 (3) Numerical Analysis
189-324 (3) Statistics
189-343 (3) Discrete Mathematics & Applied Algebra
the remainder of the 21 credits to be selected from:
189-318 (3) Mathematical Logic
189-319 (3) Partial Differential Equations
189-320 (3) Differential Geometry
189-326 (3) Nonlinear Dynamics and Chaos
189-327 (3) Matrix Numerical Analysis
189-328 (3) Computability & Mathematical Linguistics
189-329 (3) Theory of Interest
189-338 (3) History and Philosophy of Mathematics
189-339 (3) Topics in the Foundations of Mathematics
189-346 (3) Number Theory
189-348 (3) Topics in Geometry
189-407 (3) Dynamic Programming
189-417 (3) Mathematical Programming
189-423 (3) Regression and Analysis of Variance
189-447 (3) Stochastic Processes
189-523 (4) Generalized Linear Models
189-525 (4) Sampling Theory and Applications
6 additional credits in Mathematics or related disciplines selected in consultation with the adviser.

JOINT MAJOR PROGRAM IN MATHEMATICS AND COMPUTER SCIENCE (72 credits)
[MARS Program Code 1-632500]

Required courses (48 credits)
189-222 (3) Calculus III
189-235 (3) Algebra I
189-236 (3) Linear Algebra I
189-242 (3) Analysis I
189-315 (3) Ordinary Differential Equations
189-317 (3) Numerical Analysis
189-318 (3) Mathematical Logic
189-323 (3) Probability Theory
308-206 (3) Intro to Software Systems
308-250* (3) Introduction to Computer Science
308-251 (3) Data Structures and Algorithms
308-273 (3) Intro. to Computer Systems
308-302 (3) Programming Languages and Paradigms
308-310 (3) Comp. Systems and Organization
308-330 (3) Theoretical Aspects of Computer Science
308-360 (3) Algorithm Design Techniques

* Students with no basic knowledge of any high level programming language (e.g. Fortran, Basic, Pascal, C, C++, Java) may take 308-202 and have it count as a complementary course in Computer Science.

Complementary Courses (24 credits)
12 credits from the set of courses recommended for a Major or Honours Program in Mathematics, excluding 189-240 and 189-340.
12 credits from the set of courses recommended for a Major or Honours Program in Computer Science.

JOINT MAJOR PROGRAM IN PHYSIOLOGY AND MATHEMATICS See page 421 in the Physiology section for complete program information.

HONOURS PROGRAMS

The minimum requirement for entry into the Honours program is that the student has completed with high standing the following courses: 189-133, 189-140, 189-141, or their equivalents. In addition, a student who has not completed the equivalent of 189-222 must take it in the first term without receiving credits towards the credits required in the Honours program.

Students who transfer to Honours in Mathematics from other programs will have credits for previous courses assigned, as appropriate, by the Department.

To remain in an Honours program and to be awarded the Honours degree, the student must maintain a 3.00 GPA in the required and complementary Mathematics courses of the program, as well as an overall CGPA of 3.00.

HONOURS PROGRAM IN MATHEMATICS (60 credits)
[MARS Program Code 2-630000]
(Program revision awaiting Unversity approval)

Required Courses (45 credits)
189-235 (3) Algebra I
189-242 (3) Analysis I
189-248 (3) Advanced Calculus I
189-251 (3) Algebra II
189-255 (3) Analysis II
189-325 (3) Ordinary Differential Equations
189-354 (3) Analysis III
189-355 (3) Analysis IV
189-356 (3) Probability
189-357 (3) Statistics
189-370 (3) Algebra III
189-371 (3) Algebra IV
189-380 (3) Differential Geometry
189-375 (3) Differential Equations
or 189-574 (4) Ordinary Differential Equations
189-466 (3) Complex Analysis

Complementary Courses (15 credits)
15 credits to be selected from the following:
308-250* (3) Introduction to Computer Science
308-251 (3) Data Structures and Algorithms
*308-250 may be preceded by 308-202

further Honours Mathematics courses, of which 189-470 is encouraged;

non-Honours Mathematics courses (other than 189-242, 189-235), for which no Honours equivalent exists (these count for half of their credits);

certain Honours level courses in other departments; with credit weight determined by the Department of Mathematics and Statistics.

HONOURS PROGRAM IN APPLIED MATHEMATICS
(68 credits) [MARS Program Code 2-630300]
(Program revisions awaiting University approval)

Aside from seeking to develop a sound basis in Applied Mathematics, one of the objectives of the program is to kindle the students' interest in possible areas of application. The extra-mural courses are included to ensure that the student has some appreciation of the scope of Applied Mathematics and is familiar with at least one of the diversity of areas in which applications can be found.

Required Courses (39 credits)
189-235 (3) Algebra I
189-242 (3) Analysis I
189-248 (3) Advanced Calculus I
189-251 (3) Algebra II
189-255 (3) Analysis II
189-325 (3) Ordinary Differential Equations
189-356 (3) Probability
189-357 (3) Statistics
189-375 (3) Differential Equations
189-387 (3) Numerical Analysis
189-466 (3) Complex Analysis
or 189-249 (3) Advanced Calculus II
308-251 (3) Data Structures and Algorithms
308-250* (3) Introduction to Computer Science
*308-250 may be preceded by 308-202

Complementary Courses (29 credits)
at least 6 credits selected from:
189-354 (3) Analysis III
189-355 (3) Analysis IV
189-370 (3) Algebra III
189-371 (3) Algebra IV
189-380 (3) Differential Geometry

at least 9 credits selected from:
189-376 (3) Chaos and Nonlinear Dynamics
189-397 (3) Matrix Numerical Analysis
189-470 (3) Honours Project
189-487 (3) Mathematical Programming
189-523 (4) Generalized Linear Models
189-525 (4) Sampling Theory and Applications
189-555 (4) Fluid Dynamics
189-556 (4) Mathematical Statistics I
189-557 (4) Mathematical Statistics II
189-560 (4) Optimization
189-561 (4) I StatihQ,8khsis

12 credits of extra-mural courses:
chosen in consultation with the student's adviser from approved courses in other departments. A list of such courses is available from the Department of Mathematics and Statistics. Student initiative is encouraged in suggesting other courses that fulfil the intentions of this section as described above. Such suggestions must receive departmental approval. They must be in a field related to Applied Mathematics such as Atmospheric and Oceanic Science, Biology, Biochemistry, Chemistry, Computer Science, Earth and Planetary Science, Economics, Engineering, Management, Physics, Physiology and Psychology. At least 6 credits must be chosen from a single department other than Computer Science.

HONOURS PROGRAM IN PROBABILITY AND STATISTICS
(63 credits) [MARS Program Code 2-630400]
(Program revisions awaiting University approval)

All Honours students are encouraged to take 189-325, 189-387, 189-423 and 189-447.

Students primarily interested in probability should include courses 189-325, 189-375 and 189-447 in their program.

Students primarily interested in statistics should include 189-423, 189-447, 189-523,189-524 and 189-525 in their program.

Required Courses (46 credits)

Complementary Courses (17 credits)

and the following, for which **half credit only** may be counted:
189-423 (3) Regression and Analysis of Variance
189-447 (3) Stochastic Processes

JOINT HONOURS PROGRAM IN MATHEMATICS AND COMPUTER SCIENCE (72 credits)
[MARS Program Code 3-632500]

Students must consult an Honours adviser in both departments.

Required Courses (39 credits)
189-235 (3) Algebra I
189-242 (3) Analysis I
189-248 (3) Advanced Calculus I
189-251 (3) Algebra II
189-255 (3) Analysis II
308-206 (3) Intro to Software Systems
308-250* (3) Introduction to Computer Science
308-251 (3) Data Structures and Algorithms
308-273 (3) Intro. to Computer Systems
308-302 (3) Programming Languages and Paradigms
308-310 (3) Comp. Systems and Organization
308-330 (3) Theoretical Aspects of Computer Science
308-506 (3) Advanced Analysis of Algorithms
* Students with no basic knowledge of any high level programming language (e.g. Fortran, Basic, Pascal, C, C++, Java) are advised to take 308-202 before 308-250. In this case 308-202 counts as an elective.

Complementary Courses (33 credits)
21 credits in Mathematics,
at least 12 credits selected from:
189-354 (3) Analysis III
189-355 (3) Analysis IV
189-356* (3) Probability
189-370 (3) Algebra III
189-371 (3) Algebra IV
189-387 (3) Numberical Analysis

The remaining credits selected from honours courses given by the Department of Mathematics and Statistics.

*Students with appropriate background in probability may substitute 189-587 for 189-356 and must then also register for 189-355.

12 credits in Computer Science, selected from:
308-303 (4) Advanced Programming Techniques
308-304 (3) Object-oriented Design
308-305 (3) Computer System Architecture
308-335 (3) Software Engineering Methods

400-level and 500-level Computer Science courses with the exception of 308-431 and 308-506.

JOINT HONOURS PROGRAM IN MATHEMATICS AND PHYSICS See page 416 in the Physics section for complete program information.

INTERNSHIP PROGRAMS – INTERNSHIP YEAR FOR ENGINEERING AND SCIENCE (IYES)

The following programs are also available with an Internship component. For more information, please see section 2.8 in the Faculty of Engineering section.

Major in Mathematics
Honours in Mathematics
Honours in Applied Mathematics
Honours in Probability & Statistics
Joint Majors in Mathematics & Computer Science
Joint Honours in Mathematics & Computer Science

COURSE DESCRIPTIONS

All courses have limited enrolment.

Note: When this Calendar went to press final information was not yet available on which courses at the 400 and 500 levels would be given in 2001-02. Consult the Department of Mathematics and Statistics for up-to-date information on these courses.

The names of course instructors are listed on the Course Timetable available on ***info*McGill** via the Web http://www.mcgill.ca/students/courses/.

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

● Denotes courses not offered in 2001-02.

★ Denotes courses offered only in alternate years.

Note A: 189-133, 189-139, 189-140, 189-141, 189-150 and 189-151 are not open to students who have taken or are taking 189-130 or 189-131 (Mathematics for Management I and II, for descriptions see page 294), except by permission of the Department of Mathematics and Statistics.

189-112A,B FUNDAMENTALS OF MATHEMATICS. (3) (Not open to students who have taken CEGEP course 201-101.) (Open only to those students who are deficient in a pre-calculus background.) Equations and inequalities, graphs, relations and functions, exponential and logarithmic functions, trigonometric functions and their use, mathematical induction, binomial theorem, complex numbers.

189-133A,B VECTORS, MATRICES AND GEOMETRY. (3) (Prerequisite: a course in functions.) (Not open to students who have taken 189-221 or CEGEP objective 00UQ or equivalent. See also Note A.) Systems of linear equations, matrices, inverses, determinants; geometric vectors in three dimensions, dot product, cross product, lines and planes; introduction to vector spaces, linear dependence and independence, bases; quadratic loci in two and three dimensions.

189-139A,B CALCULUS. (4) (3 hours lecture; 2 hours tutorial) (Prerequisite: a course in functions.) (Not open to students who have taken 189-120 or CEGEP objective 00UN or equivalent. This course is intended for students with no previous knowledge of Calculus; it is not open to students who have had one term of College level Calculus. See also Note A.) (Students continue in 189-141.) Review of functions and graphs. Limits, continuity, derivative. Differentiation of elementary functions. Antidifferentiation. Applications. Password required.
Note: Each Tutorial section is enrolment limited.

189-140A,B CALCULUS I. (3) (3 hours lecture, 1hour tutorial) (Prerequisite: High School Calculus.) (Not open to students who have taken 189-120, 189-122, 189-139 or CEGEP objective 00UN or equivalent. See also Note A.) Review of functions and graphs. Limits, continuity, derivative. Differentiation of elementary functions. Antidifferentiation. Applications.
Note: Each Tutorial section is enrolment limited.

189-141A,B CALCULUS II. (4) (3hours lecture; 2hours tutorial) (Not open to students who have taken 189-121 or CEGEP objective 00UP or equivalent. See Note A.) (Prerequisites: 189-139 or 189-140 or 189-150) The definite integral. Techniques of integration. Applications. Introduction to sequences and series.
Note: Each Tutorial section is enrolment limited.

189-150A CALCULUS A. (4) (3hours lecture, 2hours tutorial) (Students with no prior exposure to vector geometry are advised to take 189-133 concurrently. Intended for students with high school calculus who have not received six advanced placement credits.) (Not open to students who have taken CEGEP objective 00UN or equivalent. See also Note A.) (189-150 and 189-151 cover the material of 189-139, 189-140, 189-141, 189-222.) Functions, limits and continuity, differentiation, L'Hospital's rule, applications, Taylor polynomials, parametric curves, functions of several variables.
Note: Each Tutorial section is enrolment limited.

189-151B CALCULUS B. (4) (3 hours lecture; 2 hours tutorial) (Prerequisite: 189-150.) (Not open to students who have taken CEGEP objective 00UP or equivalent. See also Note A.) Integration, methods and applications, infinite sequences and series, power series, arc length and curvature, multiple integration.
Note: Each Tutorial section is enrolment limited.

● **189-199A CHAOS, FRACTALS AND COMPLEXITY.** (3) (FYS - for first year students only, maximum 25)

189-203A,B PRINCIPLES OF STATISTICS I. (3) (No calculus prerequisites.) (This course is intended for students in all disciplines and is not open to students in Mathematics programs; or to students who have taken or are taking 189-324.) (Note: Credit for other statistics courses may preclude credit for this course and conversely. See "Course Overlap" on page351 .) Examples of statistical data and the use of graphical means to summarize the data. Basic distributions arising in the natural and behavioural sciences. The logical meaning of a test of significance and a confidence interval. Tests of significance and confidence intervals in the one and two sample setting (means, variances and proportions).

189-204B PRINCIPLES OF STATISTICS II. (3) (Prerequisite: 189-203 or equivalent. No calculus prerequisites.) (This course is intended for students in all disciplines and is not open to students in Mathematics programs; or to students who have taken or are taking 189-324.) (Note: Credit for other statistics courses may preclude credit for this course and conversely. See "Course Overlap" on page 351.) The concept of degrees of freedom and the analysis of variability. Planning of experiments. Experimental designs. Polynomial and multiple regressions. Statistical computer packages (no previous computing experience is needed). General statistical procedures requiring few assumptions about the probability model.

● **189-211B PRACTICAL METHODS OF MATHEMATICS.** (3) (Prerequisite: 189-111 or CEGEP 101 or consent of instructor.) (Not open to students in the Faculty of Science, students in Mathematics or Computer Science programs or students who have taken or are taking any of 189-240, 189-343, 189-363 or any statistics course.)

189-222A,B CALCULUS III. (3) (Prerequisite: 189-141. Familiarity with vector geometry or Corequisite: 189-133) (Not open to students who have taken CEGEP course 201-303 or 189-150, 189-151 or 189-227.) Taylor series, Taylor's theorem in one and several variables. Review of vector geometry. Partial differentiation, directional derivative. Extreme of functions of 2 or 3 variables. Parametric curves and arc length. Polar and spherical coordinates. Multiple integrals.

189-223A,B LINEAR ALGEBRA. (3) (Prerequisite: 189-133 or equivalent.) (Not open to students in Mathematics programs nor to students who have taken or are taking 189-236, 189-247 or 189-251. It is open to students in Faculty Programs.) Review of matrix algebra, determinants and systems of linear equations. Vector spaces, linear operators and their matrix representations, orthogonality. Eigenvalues and eigenvectors, diagonalization of Hermitian matrices. Applications.

189-235A ALGEBRA I. (3) (3 hours lecture; 1 hour tutorial) (Prerequisite: 189-133 or equivalent.) Sets and relations. Rings and fields. Integers, rationals, real and complex numbers; modular arithmetic. Polynomials over a field. Divisibility theory for integers and polynomials. Linear equations over a field. Introduction to vector spaces.

189-236B LINEAR A

and developable surfaces. Geodesic curves on surfaces of revolution. The Gauss-Codazzi equations, rigidity.

189-323A,B PROBABILITY THEORY. (3) (Prerequisites: 189-141 or equivalent. Intended for students in Science, Engineering and related disciplines, who have had differential and integral calculus.) (Not open to students who have taken or are taking 189-356.) Sample space, events. Conditional probability, independence. Bayes' theorem with applications. Random variables, univariate distributions. Mathematical expectation, moment generating function. The binominal, Poisson, exponential, normal and other distributions. Joint distributions, transformation of variables. The weak law of large numbers. Sampling distributions, chi-squared, student-t, F variables. The central limit theorem.

189-324A,B STATISTICS. (3) (Prerequisite: 189-323 or equivalent.) (Not open to students who have taken or are taking 189-357.) (Note: Credit for other statistics courses may preclude credit for this course and conversely. See "Course Overlap" on pag e351.) The notion of a random sample. Sampling distributions, with reference to those related to the normal; chi-squared, F and t (review). Point estimation. Hypothesis testing, the notion of power function. Likelihood-ratio tests. Contingency tables, goodness-of-fit. Some nonparametric procedures. Regression and the method of least squares, analysis of variance, one-way and two-way classifications.

189-325A,B ORDINARY DIFFERENTIAL EQNS. (3) (Prerequisite: 189-222. Intended for Honours Mathematics, Physics and Engineering programs.) (Not open to students who have taken 189-261, 189-315.) First and second order equations, linear equations, series solutions, Frobenius method, introduction to numerical methods and to linear systems, Laplace transforms, applications.

189-566B ADVANCED COMPLEX ANALYSIS.

George Kukolj; B.Sc., Ph.D.(McG.)
Peter Lau; Ph.D.(Ottawa)
Clement Rioux; B.Sc., M.Sc.(Laval), Ph.D.(Guelph)
Rafick-P. Sekaly; B.A.(Stanislas), B.Sc., M.Sc.(Montr.), Ph.D.(Lausanne)

Affiliated Centre:
Centre for Host Resistance, Montreal General Hospital, 1650 Cedar Avenue, Montreal, QC H3G 1A4.
Telephone: (514) 398-8038. Director: E. Skamane

Microbiology is the study of microorganisms such as bacteria, viruses, unicellular eukaryotes, and parasites. Microorganisms play an important role in human and animal disease, food production (bread, cheese, wine), decay and spoilage, contamination and purification of water and soil. Microbiologists study these tiny, self-replicating machines to understand the basic principles of life: growth, metabolism, cell division, control of gene expression, response to environmental stimuli. Microbiologists are also concerned with controlling or harnessing microorganisms for the benefit of people, by isolating antibiotics or producing vaccines to protect against disease, and by developing and perfecting microorganisms for industrial uses.

Immunology is the study of the molecular and cellular basis of host resistance and immunity to external agents such as pathogenic microorganisms. Immunologists study the mechanisms by which the body recognizes foreign antigens, generates appropriate antibodies to an enormously diverse spectrum of antigens, and sequesters and kills invading microorganisms. Their discoveries lead to vaccination against disease, transfusions and organ transplants, allergies, cancer, autoimmune diseases and immune-deficiency diseases such as AIDS. Antibodies may soon be used in conjunction with antibiotics or chemical agents as specific "magic bullets" to diagnose disease and attack microbes and cancers.

The disciplines of microbiology and immunology are natural

MAJOR PROGRAM IN MICROBIOLOGY AND IMMUNOLOGY (67 credits)

The Major Program is designed for students who want to acquire a substantial background in microbiology and immunology and related disciplines (chemistry, biology, biochemistry) which will prepare them for professional schools, graduate education, or entry into jobs in industry or research institutes.

U1 Required Courses (25 credits)

U1, U2 or U3 Required Statistics Courses (3 credits)

U2 Required Courses (21 credits)

U3 Required Courses (9 credits)

Complementary Courses (9 credits)

HONOURS PROGRAM IN MICROBIOLOGY AND IMMUNOLOGY (73 required credits)

The Honours Program is designed to offer, in addition to the substantial background given by the Major Program, a significant research experience in a laboratory within the Department during the U3 year. Students are prepared for this independent research project by following an advanced laboratory course in U2. This Program is intended to prepare students for graduate study in microbiology and immunology or related fields, but could also be chosen by students intending to enter medical research after medical school, or intending to enter the job market in a laboratory research environment.

Students intending to apply to Honours must follow the Major program in U1 and U2 and must obtain a CGPA of at least 3.30 at the end of their U2 year. For graduation in Honours, students must pass all required courses with a C or better, and achieve a sessional GPA of at least 3.10 in the U3 year.

U1 Required Courses (25 credits)

U1, U2 or U3 Required Statistics Courses (3 credits)

U2 Required Courses (21 credits)

U3 Required Courses (21 credits)

Complementary Courses (3 credits)

INTERDEPARTMENTAL HONOURS PROGRAM IN IMMUNOLOGY

The Departments of Biochemistry, Microbiology and Immunology and Physiology offer an interdepartmental Honours program in Immunology. Students interested in immunology may choose between this Honours program and the Honours program of the Department of Microbiology and Immunology.

Details of this program may be found in section 11.13 or by consulting Professor Baines in the Department of Microbiology and Immunology, Room 404, telephone (514) 398-4443 or 3928 or mgbaines@microimm.mcgill.ca

COURSE DESCRIPTIONS

All courses have limited enrolment.

techniques. The objective is to provide a practical introduction to microbiological and immunological research and technology.

528-387B APPLIED MICROBIOLOGY AND IMMUNOLOGY. (3) (Prerequisite: 528-211A) The ability to select and manipulate genetic material has lead to unprecedented interest in the industrial applications of procaryotic and eucaryotic cells. Beginning in the 1970s the introduction of and subsequent refinements to recombinant DNA technology and hybridoma technology transformed the horizons of the biopharmaceutical world. This course will highlight the important events that link basic research to clinical/commercial application of new drugs and chemicals.

528-413B PARASITOLOGY. (3) (Prerequisite: 528-314B or equivalent – 504-261A is strongly recommended) A study of the biology, immunological aspects of host-parasite interactions, pathogenicity, epidemiology and molecular biological aspects of selected parasites of medical importance. Laboratory will consist of a lecture on techniques, demonstrations and practical work.

528-414A ADVANCED IMMUNOLOGY. (3) (3hour lecture) (Prerequisite: 528-314B) An advanced course serving as a logical extension of 528-314B. The course will integrate molecular, cellular and biochemical events involved in the ontogeny of the lymphoid system and its activation in the immune response. The course will provide the student with an up-to-date understanding of a rapidly moving field.

528-465A BACTERIAL PATHOGENESIS AND HOST DEFENCES. (3) (3 hours of lecture) (Prerequisites: 528-211A, 528-314B, 528-323A, or the permission of the instructor) Organized by the McGill Centre for the Study of Host Resistance. This course focuses on the interplay of the host and the pathogen. The cellular and molecular basis of the host defense mechanism against infections will be considered in relationship to the virulence factors and evasion strategies used by bacteria to cause disease.

528-466B V

211-211A,B TONAL THEORY AND ANALYSIS II. (3) (3 hours) (Prerequisite: 211-210. Corequisite: 212-231.

Unless otherwise indicated the following courses are prerequisites to 300-, 400- and 500- level theory courses: 211-211 or 213-240 AND 212-231 AND 212-171.

211-310A MID & LATE 19TH-C. THEORY & ANALYSIS. (3) (3 hours)

211-311B 20TH-CENTURY THEORY

11.20 Nursing (576)

For a complete listing of Nursing courses and their descriptions, consult the School of Nursing website (http://www.nursing.mcgill.ca) or refer to the Health Sciences Calendar.

The names of course instructors are listed on the Course Timetable available on ***info*McGill** via the Web http://www.mcgill.ca/students/courses/.

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

All courses have limited enrolment.

576-308A ISSUES IN WOMEN'S HEALTH. (3) (Prerequisite: Introductory Psychology or Sociology or permission of the instructor.) (Complementary course for the Women's Studies and Social Studies of Medicine Concentrations.) Exploration of a wide range of topics on the health of women. Topics include use of health care system, poverty, roles, immigration, body image, lesbian health, and violence against women. Additional topics vary by year. A Health Science elective open to students in the Faculties of Arts, Science, and Medicine.

576-309B WOMEN'S REPRODUCTIVE HEALTH. (3) (Prerequisite: Introductory Psychology or Sociology or permission of the instructor.) (Restriction: not open for credit to students who have taken 576-308 prior to September 1997.) (Complementary course for the Women's Studies and Social Studies of Medicine Concentrations.) Concepts of health and medicalization. Canadian and international perspectives. Topics include contraception, abortion, infertility, menstruation, menopause, new reproductive technologies, prenatal care, childbirth. Additional topics vary by year. A Health Science elective open to students in the Faculties of Arts, Science, and Medicine.

11.21 Nutrition (382)

Please see the School of Dietetics and Human Nutrition entry beginning on page 444 in the Faculty of Agricultural and Environmental Sciences section for further information about the School's other courses, programs and academic staff. This information includes a Minor Program in Human Nutrition which can be taken by Science students.

All courses have limited enrolment.

382-307A HUMAN NUTRITION. (3) (Prerequisites: 180-212 and 177-201 or equivalents.) (Credit cannot be obtained for both 382-307 and 382-207.) Cellular and organismal aspects of nutrition with emphases on biochemical and physiological roles of carbohy-

crine pharmacology, receptor pharmacology, cardiovascular pharmacology, toxicology, developmental pharmacology, autonomic pharmacology, biochemical pharmacology, and therapeutics.

Training in pharmacology is conducted at both the undergraduate and graduate levels. Because of its breadth, students may be attracted to the subject from a variety of viewpoints; this includes those completing a Bachelor's degree in any number of basic science disciplines, such as biology, zoology, chemistry, physics, biochemistry, microbiology, anatomy and physiology. At the undergraduate level, seven lecture courses are offered. A course involving research projects in pharmacology is also available to provide the student with the opportunity to get first-hand experience in a pharmacology research laboratory. These courses

11.24 Physics (198)

dents who have not included Calculus III in their CEGEP program,

U2 or U3 Required Courses (6 credits)

(Not open to students who have taken or are taking 198-214A.) An elementary astronomy course for non-science students (see "Science for Arts Students" in the Arts section) and for science students not taking a Physics program.

198-208A TOPICS IN PHYSICS. (1 credit; 2 hours lectures, first six weeks) (Not open to students in Physics programs.) Topic for 2001-02: The Safe Use of Nuclear Radiation.

198-214A ASTROPHYSICS. (3) (Prerequisite: CEGEP Physics.) (Not open to students who have taken or are taking 198-204A,B.) An introduction to astrophysics with emphasis placed on methods of observation and current models. Stellar radiation and detectors, stellar classification systems, structures and evolution. Pulsars, quasars, black holes. Galaxies, large scale structure of the university, cosmology.

198-224A PHYSICS & PSYCHOPHYSICS OF MUSIC. (3) (3hours lectures) (Designed for students in the Faculty of Music but suitable for students fnkh:BH+jSo)h(Qr1eknfl.khkfQ,+Qr1ekLo(

U2 Complementary Course (6 credits)

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

U3 Required Courses (15 credits)

552-461D	(6)	Experimental Physiology
198-333B	(3)	Thermal & Statistical Physics
198-340A	(3)	Electricity and Magnetism
198-446A	(3)	Quantum Physics
399-519A	(3)	Analysis of Biomedical Systems and Signals

U3 Complementary Courses (6 credits)

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

3 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 3.30, with no less than a B in 552-209A and 210B. Admission to U3 requires a U2 CGPA of 3.20 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 3.20 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 (56 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
552-314A	(3)	Integrative Neuroscience
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
177-202B	(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 (15 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 physiology courses – see approved list in Department.

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 11.13.

COURSE DESCRIPTIONS
All courses have limited enrolment.

The names of course instructors are listed on the Course Timetable available on ***info*McGill** via the Web http://www.mcgill.ca/students/courses/.

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

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

● Denotes courses not offered in 2001-02.

★ Denotes courses offered in alternate years only

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?".

● **552-198A FEEDBACK & RHYTHMS IN PHYSIOLOGY.** (3) (3 hours seminar) (FYS – for first year students only, maximum 25.) (Corequisite: 189-140)

● **552-199A HISTORY OF GENETIC ENGINEERING.** (3) (3 hours seminar per week) (FYS - for first year students only, maximum 20.)

552-201A HUMAN PHYSIOLOGY: CONTROL SYSTEMS. (3) (3hours 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.

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.

552-201A and 552-202B are companion courses and it is recommended that they be taken in that sequence; under special circumstances 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.

552-210B MAMMALIAN PHYSIOLOGY II. (3) (3 hours lectures weekly) (Prerequisites: as for 552-201A and 552-202B. Pre or co-requisite: 177-200A) (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

gram in Psychology must attend the meeting on August 29, 2001 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 2002, there will be an Information Meeting on December 18th 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. This handbook is also available on the Psychology department website, at http://www.psych.mcgill.ca/ugrad/ugradm.htm

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 Adviser 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 "Project Courses" on page 352.

Complementary Courses (24 credits)
at least 3, but no more than 6, credits selected from:
204-211 (3) Intro. Behavioural Neuroscience
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 or equivalent, Biology CEGEP objective 00UK, 00XU or equivalent, Statistics (Mathematics) 201-307 or 201-337 or equivalent. 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. Some courses are included in two or more areas of specialization. These courses may only be counted for credit in one area. The areas are listed below.

Cognitive Psychology
204-310 (3) Human Intelligence
204-311 (3) Human Cognition and the Brain
204-316 (3) Psychology of Deafness
204-341 (3) Psychology of Bilingualism
204-343 (3) Language Acquisition in Children
204-352 (3) Laboratory in Cognitive Psychology
204-353 (3) Laboratory in Human Perception
204-410 (3) Special Topics in Neuropsychology
204-413 (3) Cognitive Development
204-472 (3) Scientific Thinking and Reasoning
204-473 (3) Social Cognition and the Self
204-530 (3) Applied Topics in Deafness
204-532 (3) Cognitive Science

Health Psychology and Psychopathology
204-316 (3) Psychology of Deafness
204-332 (3) Introduction to Personality
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
204-505 (3) The Psychology of Pain
204-530 (3) Applied Topics in Deafness
204-533 (3) International Health Psychology
204-534 (3) Community Psychology

Behavioural Neuroscience
204-308 (3) Behavioural Neuroscience 1
204-311 (3) Human Cognition and the Brain
204-318 (3) Behavioural Neuroscience 2
204-342 (3) Hormones and Behaviour
204-353 (3) Laboratory in Human Perception
204-410 (3) Special Topics in Neuropsychology
204-427 (3) Sensorimotor Behaviour
204-470 (3) Memory and Brain
204-505 (3) The Psychology of Pain
204-522 (3) Neurochemical Basis of Behaviour
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
204-414 (3) Social Development
204-471 (3) Human Motivation
204-473 (3) Social Cognition and the Self
204-474 (3) Interpersonal Relationships
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
204-412 (3) Deviations in Child Development
204-413 (3) Cognitive Development
204-414 (3) Social Development
204-416 (3) Advanced Topics in Child Development

Research and Measurement

Complementary Courses (39 credits)

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)

Complementary Courses (42 credits)

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 5 4credits 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)

U1 or U2 Required Course (3 credits)

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 2.80 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 3.50 based on a 27-30 graded credit program over 2 terms. Once in the Honours program, the student must obtain a GPA of 3.00 in the U2 year in order to continue in the program for U3. Students in the Honours

COURSE DESCRIPTIONS

All courses have limited enrolment.

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 http://www.psych.mcgill.ca/courses/courses.htm or the Psychology Undergraduate Handbook which is on sale in the Departmental Advising Office, N7/9 Stewart Biological Sciences Building.

The names of course instructors are listed on the Course Timetable available on ***info*McGill** via the Web http://www.mcgill.ca/students/courses/.

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

- Denotes courses not offered in 2001-02.

204-100A INTRODUCTION TO PSYCHOLOGY. (3) (2 lectures; 1 conference) (Not open to students who have passed an Introductory Psychology course in CEGEP: 350-101 or 350-102 or equivalent.) Introduction to the scientific study of mind and behavior. Learning, perception, motivation and thinking are explained in a way which emphasizes the continuity of human behavior and the behavior of other species, and which emphasizes the role of the central nervous system in organizing and regulating behavior.

204-204A,B INTRODUCTION TO PSYCHOLOGICAL STATISTICS. (3) (2 lectures, 1 conference) (Not open to students who have passed a CEGEP statistics course(s) with a minimum grade of 75%: Mathematics 201-307 or 201-337 or equivalent or the combination of Quantitative Methods 300 with Mathematics 300.) (**Note:** This course is a prerequisite for 204-305, 204-406, 204-310, 204-336.)

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
Section 03 Limited to non-Psychology students

204-332B INTRODUCTION TO PERSONALITY. (3) (3lectures) (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
Section 03 Limited to non-Psychology students

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
Section 03 Limited to non-Psychology students

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

- **204-335A FORMAL MODELS OF PSYCH. PROCESSES.** (3) (3hour lecture) (Prerequisites: A basic understanding of mathematics,
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istered in 204-380D, 204-481D or 204-450D.) (Please see regulations concerning Project Courses, section 2.6.2 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.

204-505A THE P

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.

MINOR IN EDUCATION FOR SCIENCE STUDENTS (18 credits)
[MARS Program Code 6-282700]

Program Adviser —
Mrs. Cheryl Savage, Department of Integrated Studies, Faculty of Education

This Minor allows Science students to develop or explore an interest in Education without committing themselves to completing a B.Ed. degree. Only a few students are prepared to commit to a teaching career at the start of university, but many students see it as a viable option toward the end of their B.Sc. program. At that time, Science students who have taken the Minor in Education will have completed a substantial number of the necessary credits and might be able to complete a B.Ed. in as little as one additional year. For details, see Faculty of Education section 2.1.8.

The 18 credits for the Minor are the same courses approved by the Faculty of Science as Education electives within the Concurrent B.Sc./B.Ed.

Required Courses (12 credits)

Complementary Courses (6 credits)

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
- biology and mathematics
- 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 six combinations listed above.

A full description of the B.Ed. Secondary Program can be found in the Faculty of Education section 5.1.1. 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 cred-

MAJOR PROGRAM IN BIOLOGY AND MATHEMATICS FOR TEACHERS (67 credits)
Required Science courses (49 credits)

Complementary Science courses

Geoscience List: (3 credits)