The publication is produced in electronic form and the most recent version is the official university publication. Archival copies are available at [www.mcgill.ca/courses](http://www.mcgill.ca/courses).

This publication provides guidance to prospects, applicants, students, faculty and staff.

1. McGill University reserves the right to make changes to the information contained in this online publication - including correcting errors, altering fees, schedules of admission, and credit requirements, and revising or cancelling particular courses or programs- without prior notice.

2. In the interpretation of academic regulations, the Senate is the final authority.

3. Students are responsible for informing themselves of the University's procedures, policies and regulations, and the specific requirements associated with the degree, diploma, or certificate sought.

4. All students registered at McGill University are considered to have agreed to act in accordance with the University procedures, policies and regulations.

5. Although advice is readily available on request, the responsibility of selecting the appropriate courses for graduation must ultimately rest with the student.

6. Not all courses are offered every year and changes can be made after publication. Always check the Minerva Class Schedule link at [https://banweb.mcgill.ca/mcgp/bwckschd.p_disp_dyn_sched](https://banweb.mcgill.ca/mcgp/bwckschd.p_disp_dyn_sched) for the most up-to-date information on whether a course is offered.

7. The academic publication year begins at the start of the Fall semester and extends through to the end of the Winter semester of any given year. Students who begin study at any point within this period are governed by the regulations in the publication which came into effect at the start of the Fall semester.

8. Notwithstanding any other provision of the publication, it is expressly understood by all students that McGill University accepts no responsibility to provide any course of instruction, program or class, residential or other services including the normal range of academic, residential and/or other services in circumstances of utility interruptions, fire, flood, strikes, work stoppages, labour disputes, war, insurrection, the operation of law or acts of God or any other cause (whether similar or dissimilar to those enumerated) which reasonably prevent their provision.

**Note: throughout this publication, "you" refers to students newly admitted, readmitted or returning to McGill.**
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The B.A. & Sc. is an interdisciplinary degree intended for students who want to pursue simultaneously a program offered by Arts and one offered by Science. The B.A. & Sc. is intended for students with well-defined interdisciplinary interests, and is not meant as a "compromise" between a B.A. and a B.Sc. degree. If you are more interested in Arts, but would like to study some Science, you can do so within the B.A. degree. Similarly, if you are more interested in Science, but would like to study some Arts, you can do so within the B.Sc. degree.

For learn more about the Faculty of Arts, see Faculty of Arts > About the Faculty of Arts. To learn more about the Faculty of Science, see Faculty of Science > About the Faculty of Science.

2 Programs and Teaching in Arts and in Science

Programs and teaching in Arts are described under Faculty of Arts > Programs and Teaching in Arts. Those in Science are described under Faculty of Science > Programs and Teaching in Science. The two faculties jointly offer the B.A. & Sc., so students pursuing that degree are at home in both Arts and Science.

3 Revisions – Bachelor of Arts & Science

Cognitive Science

section 11.6.3: Bachelor of Arts and Science (B.A. & Sc.) - Interfaculty Program Cognitive Science (54 credits)

section 11.6.4: Bachelor of Arts and Science (B.A. & Sc.) - Honours Cognitive Science (60 credits)

Geography

section 11.10.1: Bachelor of Arts and Science (B.A. & Sc.) - Interfaculty Program in Sustainability, Science and Society (54 credits) new

Physics

section 11.12.1: Bachelor of Arts and Science (B.A. & Sc.) - Major Concentration Physics (36 credits)

4 About the Bachelor of Arts and Science (Undergraduate)

The B.A. & Sc. is an interdisciplinary degree intended for students who want to pursue simultaneously a program offered by Arts and one offered by Science. The B.A. & Sc. is intended for students with well-defined interdisciplinary interests, and is not meant as a "compromise" between a B.A. and a B.Sc. degree. If you are more interested in Arts, but would like to study some Science, you can do so within the B.A. degree. Similarly, if you are more interested in Science, but would like to study some Arts, you can do so within the B.Sc. degree.

4.1 Location

853 Sherbrooke Street West
Montreal, Quebec H3A 2T6
Canada

Telephone: 514-398-4210
Faculty websites: www.mcgill.ca/arts and www.mcgill.ca/science
Degree website: www.mcgill.ca/science/sousa/basc

Science Office for Undergraduate Student Advising (SOUUSA)
Website: www.mcgill.ca/science/sousa
The Science Office for Undergraduate Student Advising (SOUUSA) of the Faculty of Science and the Office of the Director of Advising Services of the Faculty of Science are located in Dawson Hall, Rooms 110 and 115. The SOUSA Office serves students in the B.A. & Sc. and B.Sc. degrees.

4.2 Administrative Officers

For a listing of administrative officers in the Faculty of Arts, refer to Faculty of Arts > Administrative Officers and for those in the Faculty of Science, refer to Faculty of Science > Administrative Officers. Note that the Director of Advising Services, Science, is responsible for students pursuing a B.A. & Sc.

The B.A. & Sc. Program Administration Committee (PAC), which oversees the curriculum and regulations for the degree, consists of the following members:

<table>
<thead>
<tr>
<th>B.A. &amp; Sc. Program Administration Committee (PAC)</th>
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<tbody>
<tr>
<td>Bruce A. Arndtsen; B.A.(Car. College), Ph.D.(Stan.)</td>
</tr>
<tr>
<td>Hassan Benchekroun; Diplôme d'ingenieur d'état(École Mohamedia des Ingenieurs, Morocco), Ph.D.(Laval)</td>
</tr>
<tr>
<td>André Costopoulos; B.A.(McG.), M.A.(Montr.), Ph.D.(Oulu)</td>
</tr>
<tr>
<td>Nick de Takacsy, B.Sc., M.Sc.(Montr.), Ph.D.(McG.) <em>(2010-2011)</em></td>
</tr>
<tr>
<td>Nicholas Dew, B.A., M.A., Ph.D. (Oxf.)</td>
</tr>
<tr>
<td>Laurie Hendren; B.Sc., M.Sc.(Qu.), Ph.D.(C’nell) <em>(on sabbatical 2010-2011)</em></td>
</tr>
<tr>
<td>Louis Lefebvre; B.Sc., M.A., Ph.D.(Montr.)</td>
</tr>
<tr>
<td>Suzanne Morton, B.A.(Trent), M.A., Ph.D. <em>(Dal.)</em></td>
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4.3 Science Office for Undergraduate Student Advising (SOUUSA)

The Science Office for Undergraduate Student Advising (SOUUSA) provides ongoing advice and guidance on academic issues related to programs, degree requirements, registration, course change, withdrawal, deferred exams, supplemental exams, academic standing, inter- and intra-faculty transfer, year or term away, transfer credits, second programs, second degrees, and graduation.

Every student in the B.A. & Sc. degree is assigned an adviser in SOUSA. The adviser’s name appears near the top of your Advising Transcript on Minerva. You can contact your adviser directly, or if you do not yet have a SOUSA adviser, email mailto:adviser.science@mcgill.ca.

SOUUSA advisers provide assistance with degree planning and are a valuable referral source. They are a good place to start if you are not sure where to address your question. They also offer help managing academic situations during periods of personal, financial or medical problems, by working with you to identify various possibilities and strategies for making informed decisions.

Special requests can be made, in writing, to the Director of Advising Services, Science, who is responsible for students pursuing a B.A. & Sc.

The Committee on Student Standing (CSS) of the Faculty of Science will consider appeals of the Director of Advising Services’ decisions. For information about CSS, see the Director of Advising Services’ assistant.

For more information, refer to www.mcgill.ca/science/sousa.

5 Degree Admission Requirements

For information about admission requirements to the B.A. & Sc., refer to the Undergraduate Admissions Guide, found at www.mcgill.ca/applying/undergrad.

For information about inter-faculty or inter-degree transfers, refer to University Regulations and Information > Inter-Faculty Transfer, as well as to the relevant information posted on the Science Office for Undergraduate Student Advising (SOUUSA) website at www.mcgill.ca/science/sousa.

6 Degree Requirements

Each student pursuing a B.A. & Sc. must be aware of the regulations as stated in this section of this publication and on the McGill and Science Office for Undergraduate Student Advising (SOUUSA) websites.

While departmental and Faculty advisers and staff are always available to give advice and guidance, the ultimate responsibility for completeness and correctness of course selection and registration, for compliance with, and completion of, program and degree requirements, and for the observance of
DEGREE REQUIREMENTS

regulations and deadlines rests with you. It is your responsibility to seek guidance from the SOUSA Office if in any doubt; misunderstanding or misapprehension will not be accepted as cause for dispensation from any regulation, deadline, program or degree requirement.

To be eligible for a B.A. & Sc., you must fulfil all Faculty degree and program requirements as indicated below:

section 6: Degree Requirements
section 6.1: Minimum Credit Requirement
section 6.2: Residency Requirement

University Regulations and Information > Grading and Grade Point Averages (GPA)
section 6.3: Time and Credit Limit for Completion of the Degree
section 6.6: Course Requirements

6.1 Minimum Credit Requirement

You must complete the minimum credit requirement for the degree as specified in your letter of admission.

Students are normally admitted to a four-year degree requiring the completion of 120 credits, but advanced standing of up to 30 credits may be granted if you obtain satisfactory results in the Diploma of Collegial Studies, International Baccalaureate, French Baccalaureate, Advanced Levels, and Advanced Placement tests.

If you are readmitted after interrupting your studies for a period of five consecutive years or more, you may be required to complete a minimum of 60 credits and satisfy the requirements of a program. In this case, a new GPA will be calculated. The Director of Advising Services, Science, in consultation with the appropriate department, may approve a lower minimum for students who had completed 60 credits or more before interrupting their studies.

If you are readmitted after a period of absence, you are normally subject to the program and degree requirements in effect at the time of readmission.

6.2 Residency Requirement

To obtain a B.A. & Sc., you must satisfy the following residency requirements: a minimum of 60 credits of courses used to satisfy the B.A. & Sc. requirements must be taken and passed at McGill, exclusive of any courses completed as part of the math and science requirements of the B.A. & Sc. Freshman Program. At least two-thirds of all departmental program requirements (Multi-track, Honours, Interfaculty) must normally be completed at McGill. Exceptionally, students in Major Concentrations or Interfaculty or Honours programs who pursue an approved Study Away or Exchange program may, with prior approval from both their department and the Director of Advising Services, Faculty of Science, be exempted from the two-thirds rule. In addition, some departments may require that their students complete specific components of their program at McGill.

6.3 Time and Credit Limit for Completion of the Degree

If you need 96 or fewer credits to complete your degree requirements, you are expected to complete your degree in no more than eight terms after your initial registration. If you are a student in the Freshman Program, you become subject to these regulations one year after your initial registration. If you need or want to exceed this time limit, you must receive permission from the Director of Advising Services, Science, to continue your studies.

If you are registered in the B.A. & Sc., you are expected to complete the requirements of your program and your degree within 120 credits. You will receive credit for all courses (subject to degree regulations) taken up to and including the semester in which you obtain 120 credits. If you want to remain at McGill beyond that semester, you must also seek permission of the Director of Advising Services, Science. Permission for exceeding the time and/or credit limits will normally be granted only for valid academic reasons, such as a change of program (subject to departmental approval) and part-time status. If permission is granted, you will receive credit only for required and complementary courses necessary to complete program requirements.

6.4 Bachelor of Arts and Science (B.A. & Sc.) - Freshman Program (30 credits)

Students who need to complete 97-120 credits to fulfill their degree requirements are admitted to the Freshman Program. Students with specific career goals should consult an academic adviser about their choice of program within the B.A. & Sc. However, students intending to pursue further studies following the B.A. & Sc. should refer to the admissions requirements of particular programs for the appropriate prerequisite courses.

In particular, students should note the following:

The minimum freshman science requirements in the B.A. & Sc. may not satisfy the introductory science requirements of all medical/dental schools.

The Major Concentration in Psychology may not provide a sufficiently focused background for admission to many graduate programs in Psychology.

The Major Concentration Chemistry is not certified by the Ordre des Chimistes du Québec. Students interested in pursuing a career in Chemistry in Quebec are advised to take an appropriate B.Sc. program in Chemistry.

Foundational Courses

The Freshman Program requirements include foundational courses in both Science and Arts which must be selected as follows:

**MATH**

At least two mathematics courses:

One of a first Calculus:

- MATH 139 (4) Calculus 1 with Precalculus
- MATH 140 (3) Calculus 1
- MATH 150 (4) Calculus A

One of a second Calculus:

- MATH 141 (4) Calculus 2
- MATH 151 (4) Calculus B

A Linear Algebra course:

- MATH 133 (3) Linear Algebra and Geometry

**SCIENCE**

At least three foundational science courses:

One or more of Biology or Chemistry:

* Note: CHEM 120 is not open to students who have taken CHEM 115.

- BIOL 111 (3) Principles: Organismsal Biology
- BIOL 112 (3) Cell and Molecular Biology
- CHEM 120* (4) General Chemistry 2

One of General Chemistry:

- CHEM 110 (4) General Chemistry 1
- CHEM 115 (4) Accelerated General Chemistry: Giants in Science

One of Mechanics:

- PHYS 101 (4) Introductory Physics - Mechanics
- PHYS 131 (4) Mechanics and Waves

One of Electromagnetism:

Note: PHYS 101 is a prerequisite for PHYS 102; and PHYS 131 is a prerequisite for PHYS 142.

- PHYS 102 (4) Introductory Physics - Electromagnetism
- PHYS 142 (4) Electromagnetism and Optics

**ARTS**

At least three Arts courses (or 9 credits) to be chosen in two of the following three categories: Humanities, Languages and Social Sciences.

A maximum of two courses (or 6 credits) may be chosen from one category, and no more than two courses (or 6 credits) can be taken in any one department.
Note: No course may fulfill the requirements for more than one program, including the B.A. & Sc. Freshman Program.

**Humanities (Literature and Civilization):**
Courses selected from the following subjects:
- Art History and Communications Studies (ARTH and COMS)
- Classics (CLAS)
- East Asian Studies (EAST)
- English (ENGL)
- French Language and Literature (FREN)
- German Studies (GERM)
- Hispanic Studies (HISP)
- Islamic Studies (ISLA)
- Italian Studies (ITAL)
- Jewish Studies (JWST)
- Philosophy (PHIL)
- Religious Studies (RELG)
- Russian Studies (RUSS)

**Languages:**
Courses may be taken in this category to improve language skills.
Languages include:
- Classics (Latin, Ancient Greek or Modern Greek) (CLAS)
- East Asian Studies (Chinese, Japanese, Korean) (EAST)
- English as a Second Language (ESLN)
- French as a Second Language (FRSL)
- French Language and Literature (FREN)
- German Studies (GERM)
- Hispanic Studies (Spanish) (HISP)
- Islamic Studies (Arabic, Persian, Turkish, Urdu) (ISLA)
- Italian (ITAL)
- Jewish Studies (Hebrew, Yiddish) (JWST)
- Russian and Slavic Studies (Polish, Russian, Armenian, Czech) (RUSS)

**Social Sciences:**
Courses selected from the following subjects:
- Anthropology (ANTH)
- Economics (ECON)
- History (HIST)
- Linguistics (LING)
- Political Science (POLI)
- Sociology (SOCI)

**Advanced Standing/Transfer Credits**
Students who have completed the Diploma of Collegial Studies, Advanced Placement exams, Advanced Levels, the International Baccalaureate, the French Baccalaureate, or McGill placement examinations may receive exemption and/or credit for all or part of the Mathematics and foundational science courses as well as exemption from all or part of the Arts courses requirement of the Freshman Program. Similarly, students who have completed courses at other universities or colleges may receive exemptions and/or credits.

Advanced Placement Examination results with a score of 4 or 5 must be declared by the student at the time of initial registration at the University.
For more information about advanced standing, please consult: http://www.mcgill.ca/students/courses/plan/transfer/. Students must carefully select their mathematics and science Freshman courses so that they have all the required prerequisites for their intended Departmental Programs.

6.5 Departmental Programs

If you are pursuing a B.A. & Sc., other than those registered in the Freshman Program, you are required to have an approved program (Multi-track, Honours, Joint Honours, Interfaculty), and to select your courses in each term with a view to timely completion of your degree and program requirements. You must complete one of the program streams described below.

In all cases, the degree also includes a required integrative course (BASC 201; 3 credits), a complementary integrative course (3 credits) within or outside a student's programs selected from the complementary list in Integrative Courses, plus electives (10-15 credits).

6.5.1 Multi-Track System

To recognize the diversity of student backgrounds and interests and the multiple routes to understanding provided by a modern university, the Faculties of Arts and of Science offer a 90-credit multi-track system that includes a Major Concentration in one faculty complemented by either a Major Concentration or two Minors/Minor Concentrations in the other faculty and that may be completed in one of the following ways:

Options

- Arts Major Concentration (36 credits) + Science Major Concentration (36-38 credits) (see section 10: Overview of Programs Offered for a list of programs open to students in the B.A. & Sc.)
- Major Concentration in Arts or Science (36-38 credits) + two Minors/Minor Concentrations in the other faculty (2 x 18 credits = 36 credits)

Regulations

- Programs offered by Computer Science, Mathematics and Statistics, and Psychology are considered Science programs for the purpose of the B.A. & Sc.
- Within both options, all Concentrations must be in different academic units. Thus, you may take a Geography program either in Arts or in Science, but not in both.
- Students will include within the 36 or 18 credits of their Major Concentrations or Minors or Minor Concentrations any university-level (200- or above) prerequisites to required courses within their programs.
- No course may fulfill the requirements for more than one program.

Definitions

- Units: academic departments or administrative equivalents.
- Programs: lists of required and complementary courses (including university level prerequisites for required courses) prepared and maintained by units.
- Major Concentration: a program of 36-38 credits taken from a unit's course offerings.
- Minor Concentration: a program of 18 credits taken from a unit's course offerings. Expandable Minor Concentrations are those that can, on the completion of 18 additional approved credits, be expanded into a Major Concentration within the appropriate unit.

6.5.2 Honours Program

Honours programs demand a high degree of specialization, and require you to satisfy specific departmental and Faculty Honours requirements while maintaining good academic standing. They are designed to prepare you for graduate study. Students in the B.A. & Sc. who complete an approved Honours program must also complete an approved Minor Concentration or a Minor in the Faculties of Arts or of Science. You must complete at least 30 credits in the Faculty of Arts and at least 30 in the Faculty of Science as part of your Honours program and your Minor Concentration or Minor program. See section 10.3: Honours Programs for a list of available programs.

To choose the Honours option, you must meet the GPA/CGPA requirements set out in University Regulations and Information > Graduation Honours: Honours and First-Class Honours.

6.5.3 Joint Honours Program

If you want to study at the Honours level in two disciplines, you can combine a Joint Honours program component from an Arts discipline with one from a Science discipline; see section 10.4: Joint Honours Programs for a list of available programs. Each Joint Honours component consists of a maximum of 36-38 required and complementary credits (not including program prerequisites). In cases where a minimum of 24 credits are in courses normally restricted to Honours students, the total of required and complementary credits may be as few as 30.
To choose the Joint Honours option, you must meet the GPA/CGPA requirements set out in University Regulations and Information > Graduation Honours: Honours and First-Class Honours.

6.5.4 Interfaculty Program

An Interfaculty program is an approved selection of courses constituting a concentration in an intellectually coherent and inter-faculty field of studies. These courses must include approved selections from the Faculties of Arts and of Science and possibly other faculties. See section 10.2: Interfaculty Programs for a list of approved programs. Students in the B.A. & Sc. who complete an approved Interfaculty program must also complete an approved Minor Concentration or a Minor in the Faculties of Arts or of Science. You must complete at least 30 credits in the Faculty of Arts and at least 30 in the Faculty of Science as part of your Interfaculty program and your Minor Concentration or Minor program.

6.6 Course Requirements

All required and complementary courses used to fulfill program requirements, including the Freshman Program, must be completed with a grade of C or better. If you fail to obtain a satisfactory grade in a required course, you must either pass the supplemental examination in the course or do additional work for a supplemental grade, if these options are available, or repeat the course. Course substitution will be allowed only in special cases; students should consult their academic adviser.

Normally, you are permitted to repeat a failed course only once. (Failure is considered to be a grade of less than C or the administrative failures of J and KF.) If a required course is failed a second time, you must appeal to the Director of Advising Services, Science, for permission to take the course a third time. If permission is denied by the Director of Advising Services and/or by the Committee on Student Standing of the Faculty of Science, on appeal, you must withdraw from the program. If the failed course is a complementary course required by the program, you may choose to replace it with another appropriate complementary course. If you choose to substitute another complementary course for a complementary course in which a D was received, credit for the first course will still be given, but as an elective. If you repeat a required course in which a D was received, credit will be given only once.

Full details of the course requirements for all programs as well as the locations of departmental advisory offices, program directors, and telephone numbers for further information are available as follows:
For a list of all programs available to B.A. & Sc. students, see section 10: Overview of Programs Offered.
For a list of the required and complementary integrative courses, see section 10.6: Integrative Courses.

6.6.1 Course Overlap

You will not receive additional credit towards your degree for any course for which you have already received credit at McGill, CEGEP, at another university, or as a result of Advanced Placement, Advanced Level, International Baccalaureate, or French Baccalauréat exams. It is your responsibility to consult the Science Office for Undergraduate Student Advising (SOUA) or the department offering the course as to whether or not credit can be obtained and to be aware of exclusion clauses specified in the course description in this publication.

Please refer to the following website for specific information about advanced standing credits and McGill course exemptions: www.mcgill.ca/student-records/transfer-credits.

Sometimes two different departments offer the same course. Such courses are called "double-prefix" courses. When such courses are offered simultaneously, you should take the course offered by the department in which you are obtaining your degree. For example, in the case of double-prefix courses CHEM XYZ and PHYS XYZ, Chemistry students take CHEM XYZ and Physics students take PHYS XYZ. If different departments offer a double-prefix course in alternate years, you may take whichever course best fits your schedule.

Credit for computer science and statistics courses will be given with the stipulations specified under Faculty of Science > Course Overlap.

6.6.2 Courses Outside the Faculties of Arts and of Science

The following regulations apply to students in the B.A. & Sc. who want to take courses outside the Faculties of Arts and of Science:

- Regardless of your minimum credit requirement towards your B.A. & Sc., you are allowed a maximum of 12 credits in ELECTIVE and/or COMPLEMENTARY courses taken in faculties other than the Faculties of Arts and of Science.
- Students in certain designated programs that include a number of REQUIRED and COMPLEMENTARY courses in other faculties are permitted a maximum of 30 credits outside the Faculties of Arts and of Science. These programs are the Interfaculty and Honours Programs in Environment, the Minor Concentration in Environment, and the Major Concentration in Geography (Urban Systems).
- Any courses taught at McGill University may be used toward the maximum allowed except for courses in Continuing Education, for which you receive credit only in Continuing Education.
- For the purpose of this policy, courses taught in other faculties and specifically listed under the Faculty of Arts or Faculty of Science section of this publication are considered as courses taught in the Faculties of Arts and of Science.
- The maximum number of credits allowed will be strictly enforced.

6.6.3 Distance Education Courses

- A maximum of 6 credits of courses taught through distance education may be used as electives towards the B.A. & Sc. degree at McGill.
There are four ways to complete programs in the B.A. & Sc. degree:

- you like to study some Arts, you can do so within the B.Sc. degree. For example, B.Sc. students may complete minor concentrations in Arts and vice versa.
- if you are more interested in Arts, but would like to study some Science, you can do so within the B.A. degree. Similarly, if you are more interested in Science, but would like to study some Arts, you may take a maximum of 12 credits, including academic writing courses for non-anglophones.

It should be noted that there also exists considerable circumstances warrant it. In such cases, prior approval must be obtained from your program adviser and the Director of Advising Services, Science.

The B.A. & Sc. is intended for students with well-defined interdisciplinary interests. There are several options for the main program, all of which specify significant components from both Arts and from Science.

The multi-track system is intended for students who want a program that includes significant components from both Arts and from Science. There are four ways to complete programs in the B.A. & Sc. degree:

- courses taught through distance education from institutions other than McGill will be approved as transfer credits under the following conditions:
  - the course is given by a government-accredited, degree-granting institution acceptable to McGill;
  - the course counts for credit towards degrees granted at the institution giving the course;
  - prior approval for the course is obtained from the Science Office for Undergraduate Student Advising (SOUUSA).
- the combined total of regular course credits and distance education course credits may not exceed the permitted maximum number of credits per term according to the regulations for the B.A. & Sc. (see University Regulations and Information > Course Load).

### 6.6.4 Courses in English as a Second Language

ESL courses are only open to students whose primary language is not English and who have studied for fewer than five years in English-language secondary institutions. As a student in the B.A. & Sc., you should consult the Science Office for Undergraduate Student Advising (SOUUSA) to obtain advice and approval of your course selection (please see Departmental Programs). To facilitate program planning, you must present your transcript(s) and letter of admission. If you have not fulfilled the B.A. & Sc. Freshman Program requirements, you should also seek advice from an adviser in the Science Office for Undergraduate Student Advising (SOUUSA). For a detailed description of advising and registration procedures, you should refer to: University Regulations and Information > Registration and University Regulations and Information > Undergraduate Advising; Welcome to McGill, which you receive upon acceptance from Enrolment Services; as well as information posted on the SOUSA website, www.mcgill.ca/science/sousa and the departmental websites.

If you need 97-120 credits to complete your degree requirements, you will normally be registered in a Freshman Program until you complete your first year. You must consult an adviser in the Science Office for Undergraduate Student Advising (SOUUSA) to obtain advice and approval of your course selection. For a detailed description of advising and registration procedures, you should refer to Welcome to McGill which you receive upon acceptance from Enrolment Services, as well as the SOUSA website, www.mcgill.ca/science/sousa.

Advising for all returning students takes place in March for the upcoming academic year. For more information, you should refer to the SOUSA website, www.mcgill.ca/science/sousa.

### 7.1 Choosing a B.A. & Sc. Program

The B.A. & Sc. is intended for students with well-defined interdisciplinary interests. There are several options for the main program, all of which specify 75-80 of the 90 credits, leaving only 10-15 credits for electives. Since there are relatively few electives, students entering a program in the B.A. & Sc. degree should have a clear idea of their objectives, goals, and intended areas of study, so that they can plan their curriculum carefully.

It should be noted that there also exists considerable flexibility within the B.A. (Faculty of Arts) and B.Sc. (Faculty of Science) programs. If you are more interested in Arts, but would like to study some Science, you can do so within the B.A. degree. Similarly, if you are more interested in Science, but would like to study some Arts, you can do so within the B.Sc. degree. For example, B.Sc. students may complete minor concentrations in Arts and vice versa.

There are four ways to complete programs in the B.A. & Sc. degree:

- courses taught through distance education from institutions other than McGill will be approved as transfer credits under the following conditions:
  - the course is given by a government-accredited, degree-granting institution acceptable to McGill;
  - the course counts for credit towards degrees granted at the institution giving the course;
  - prior approval for the course is obtained from the Science Office for Undergraduate Student Advising (SOUUSA).
- The combined total of regular course credits and distance education course credits may not exceed the permitted maximum number of credits per term according to the regulations for the B.A. & Sc. (see University Regulations and Information > Course Load).

### 6.6.5 Registration for First-Year Seminars

Registration for First-Year Seminars is limited to students in their first year of study at McGill, i.e., newly admitted students in U0 or U1. These courses are designed to provide a closer interaction with professors and better working relations with peers than is available in large introductory courses. These seminars endeavour to teach the latest scholarly developments and expose participants to advanced research methods. Registration is on a first-come, first-served basis. The maximum number of students in any seminar is 25, although some are limited to even fewer than that.

You may take only one First-Year Seminar during your first year at McGill. If you register for more than one, you will be obliged to withdraw from all but one of them.

A list of First-Year Seminars is available in the Arts section (see Faculty of Arts > First-Year Seminar Courses) and the Science section (see Faculty of Science > Registration for First-Year Seminars) of this publication.

If you need 96 or fewer credits to complete your degree requirements, you must consult an academic adviser in your proposed department of study to obtain course selection (please see Departmental Programs). To facilitate program planning, you must present your transcript(s) and letter of admission. If you have not fulfilled the B.A. & Sc. Freshman Program requirements, you should also seek advice from an adviser in the Science Office for Undergraduate Student Advising (SOUUSA). For a detailed description of advising and registration procedures, you should refer to: University Regulations and Information > Registration and University Regulations and Information > Undergraduate Advising; Welcome to McGill, which you receive upon acceptance from Enrolment Services; as well as information posted on the SOUSA website, www.mcgill.ca/science/sousa and the departmental websites.

You must consult an adviser in the Science Office for Undergraduate Student Advising (SOUUSA) to obtain advice and approval of your course selection (please see Departmental Programs). To facilitate program planning, you must present your transcript(s) and letter of admission. If you have not fulfilled the B.A. & Sc. Freshman Program requirements, you should also seek advice from an adviser in the Science Office for Undergraduate Student Advising (SOUUSA). For a detailed description of advising and registration procedures, you should refer to: University Regulations and Information > Registration and University Regulations and Information > Undergraduate Advising; Welcome to McGill, which you receive upon acceptance from Enrolment Services; as well as information posted on the SOUSA website, www.mcgill.ca/science/sousa and the departmental websites.

Advising for all returning students takes place in March for the upcoming academic year. For more information, you should refer to the SOUSA website, www.mcgill.ca/science/sousa.

### 7 Advising

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### 7.1 Choosing a B.A. & Sc. Program

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It should be noted that there also exists considerable flexibility within the B.A. (Faculty of Arts) and B.Sc. (Faculty of Science) programs. If you are more interested in Arts, but would like to study some Science, you can do so within the B.A. degree. Similarly, if you are more interested in Science, but would like to study some Arts, you can do so within the B.Sc. degree. For example, B.Sc. students may complete minor concentrations in Arts and vice versa.

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### 6.6.4 Courses in English as a Second Language

ESL courses are only open to students whose primary language is not English and who have studied for fewer than five years in English-language secondary institutions. As a student in the B.A. & Sc., you should consult the Science Office for Undergraduate Student Advising (SOUUSA) to obtain advice and approval of your course selection. For a detailed description of advising and registration procedures, you should refer to: University Regulations and Information > Registration and University Regulations and Information > Undergraduate Advising; Welcome to McGill, which you receive upon acceptance from Enrolment Services; as well as information posted on the SOUSA website, www.mcgill.ca/science/sousa and the departmental websites.

If you need 97-120 credits to complete your degree requirements, you will normally be registered in a Freshman Program until you complete your first year. You must consult an adviser in the Science Office for Undergraduate Student Advising (SOUUSA) to obtain advice and approval of your course selection. For a detailed description of advising and registration procedures, you should refer to Welcome to McGill which you receive upon acceptance from Enrolment Services, as well as the SOUSA website, www.mcgill.ca/science/sousa.

Advising for all returning students takes place in March for the upcoming academic year. For more information, you should refer to the SOUSA website, www.mcgill.ca/science/sousa.
Multi-track System

other. Additional guidelines for the multi-track system can be found in section 6.5: Departmental Programs. You will find the program descriptions for the major and minor concentrations in Science which are unique to the B.A. & Sc. within this section of this publication.

Descriptions of programs offered in Arts are located under the Faculty of Arts section of this publication.

Interfaculty Programs

Interfaculty programs are interdisciplinary in nature. There are currently two such programs: Environment and Cognitive Science. In these programs, you complete 54 credits of the interfaculty program, a minor of 18 credits, and 6 credits of integrative courses. You must complete at least 30 credits in the Faculty of Arts and at least 30 credits in the Faculty of Science as part of your interfaculty program and your minor concentration or program.

Environment

In contrast to other Environment programs offered through the McGill School of Environment, the B.A. & Sc. Interfaculty Environment Program does not have predefined themes and is intended for students who have a specific goal and want to define their own theme by choosing courses that help them progress towards that goal. Further information about Environment programs and academic advising can be found at www.mcgill.ca/mse.

Cognitive Science

The Interfaculty Program in Cognitive Science offered within the B.A. & Sc. degree is the only major program currently offered at McGill for students interested in this discipline. The requirements encourage you to choose courses in two of the five subject areas in Cognitive Science (Computer Science, Linguistics, Neuroscience, Philosophy, Psychology) as the focus of your program. In addition, if you are interested in research in this field, you may include up to 12 credits of research courses within your program.

Joint Honours

The Joint Honours option is similar to the multi-track system except that you complete two Joint Honours components, one in Arts and one in Science. Currently, the choice of Science component is restricted to either Math or Psychology. However, there is a great range of choices for the Arts component.

To choose the Joint Honours option, you must meet the GPA/CGPA requirements set out in University Regulations and Information > Graduation Honours: Honours and First-Class Honours.

Honours

There are two B.A. & Sc. Honours programs. The Honours Program in Environment is similar to the Interfaculty Program in Environment but has additional GPA requirements and an additional 6-credit required research course. Likewise, the Honours Program in Cognitive Science is similar to the Interfaculty Program in Cognitive Science with additional GPA requirements and an additional 6-credit research course requirement. If you are completing an honours program, you must also complete a minor concentration or program, and 6 credits of integrative courses. You must complete at least 30 credits in the Faculty of Arts and at least 30 credits in the Faculty of Science as part of your honours program and your minor concentration or program.

To choose the Honours option, you must meet the GPA/CGPA requirements set out in University Regulations and Information > Graduation Honours: Honours and First-Class Honours.

Preparation for Graduate School

Any choice of undergraduate degree and program constrains options for graduate school. The B.A. & Sc. provides good preparation for graduate degrees in integrated disciplines such as Cognitive or Environmental Science. Depending on the Arts or Science specific program you want to enter in graduate school, the B.A. & Sc. may or may not be adequate preparation. If you intend to pursue an Arts or Science specific program at the graduate level, you should consult academic advisers in that discipline at McGill and at universities where you intend to apply in order to find out whether the B.A. & Sc. will prepare you adequately. If you are considering continuing on in a specific Science graduate program, you should examine the difference between the preparation provided by the 36-credit major concentrations in the B.A. & Sc. program versus the significantly more specialized major and honours programs offered in the B.Sc. programs.

8 Freshman Interest Groups

Freshman Interest Groups (FIGs) are groups of approximately 15 U0 students in the B.Sc. or B.A. & Sc., led by a professor in the Faculty of Science or Faculty of Medicine and an upper-year undergraduate student. They meet once every two weeks in the Fall semester to discuss a wide range of topics, such as science in the news, program choices, undergraduate research opportunities, or just aspects of life in Montreal. The purpose of a FIG is to ease the transition
9 Examinations

You should see University Regulations and Information > Examinations: General Information for information about final examinations and deferred examinations.

The exam schedules are posted on the McGill website, www.mcgill.ca/students, normally one month after the start of classes for the tentative Examination Schedule, and two months after the start of classes for the final Examination Schedule.

Students are warned not to make travel arrangements to leave Montreal prior to the scheduled end of any examination period.

10 Overview of Programs Offered

- Major Concentrations; see section 10.1: Major Concentrations
- Interfaculty Programs; see section 10.2: Interfaculty Programs
- Honours Programs; see section 10.3: Honours Programs
- Joint Honours Programs; see section 10.4: Joint Honours Programs
- Minor Concentrations or Minors; see section 10.5: Minor Concentrations or Minors
- Integrative Courses; see section 10.6: Integrative Courses

10.1 Major Concentrations

10.1.1 Faculty of Arts

The Arts Major Concentrations available to B.A. & Sc. students are listed here and are described in detail under the Faculty of Arts section of this publication. Since the B.A. & Sc. degree requires a certain number of credits in the Arts and in the Sciences, there are special requirements for B.A. & Sc. students. To be counted as an Arts Major Concentration, the program must include at least 30 credits of Arts courses. Similarly, to be counted as a Science Major Concentration, the program must include at least 30 credits of Science courses.

For example, a student completing the 36-credit African Studies Major Concentration in Arts must complete at least 30 of those credits in Arts courses and at most 6 credits in Science courses.

- African Studies; see Faculty of Arts > Bachelor of Arts (B.A.) - Major Concentration African Studies (36 credits)
- Anthropology; see Faculty of Arts > Bachelor of Arts (B.A.) - Major Concentration Anthropology (36 credits)
- Art History; see Faculty of Arts > Bachelor of Arts (B.A.) - Major Concentration Art History (36 credits)
- Canadian Studies; see Faculty of Arts > Bachelor of Arts (B.A.) - Major Concentration Canadian Studies (36 credits)
- Classics; see Faculty of Arts > Bachelor of Arts (B.A.) - Major Concentration Classics (36 credits)
- East Asian Studies; see Faculty of Arts > Bachelor of Arts (B.A.) - Major Concentration East Asian Studies (36 credits)
- Economics; see Faculty of Arts > Bachelor of Arts (B.A.) - Major Concentration Economics (36 credits)
- English – Cultural Studies; see Faculty of Arts > Bachelor of Arts (B.A.) - Major Concentration English – Cultural Studies (36 credits)
- English – Drama and Theatre; see Faculty of Arts > Bachelor of Arts (B.A.) - Major Concentration English – Drama and Theatre (36 credits)
- English – Literature; see Faculty of Arts > Bachelor of Arts (B.A.) - Major Concentration English – Literature (36 credits)
- Geography; see Faculty of Arts > Bachelor of Arts (B.A.) - Major Concentration Geography (36 credits)
- Geography (Urban Systems); see Faculty of Arts > Bachelor of Arts (B.A.) - Major Concentration Geography - Urban Systems (36 credits)
- German Language and Literature; see Faculty of Arts > Bachelor of Arts (B.A.) - Major Concentration German Studies - Language and Literature (36 credits)
- German Literature and Culture; see Faculty of Arts > Bachelor of Arts (B.A.) - Major Concentration German Studies - Literature and Culture (36 credits)
German Studies, Contemporary; see Faculty of Arts > Bachelor of Arts (B.A.) - Major Concentration Contemporary German Studies (36 credits)

Hispanic Languages; see Faculty of Arts > Bachelor of Arts (B.A.) - Major Concentration Hispanic Studies - Languages (36 credits)

Hispanic Literature and Culture; see Faculty of Arts > Bachelor of Arts (B.A.) - Major Concentration Hispanic Studies - Literature and Culture (36 credits)

History; see Faculty of Arts > Bachelor of Arts (B.A.) - Major Concentration History (36 credits)

International Development Studies; see Faculty of Arts > Bachelor of Arts (B.A.) - Major Concentration International Development Studies (36 credits)

Italian Studies; see Faculty of Arts > Bachelor of Arts (B.A.) - Major Concentration Italian Studies (36 credits)

Jewish Studies; see Faculty of Arts > Bachelor of Arts (B.A.) - Major Concentration Jewish Studies (36 credits)

Langue et littérature françaises – Études et pratiques littéraires; see Faculty of Arts > Bachelor of Arts (B.A.) - Concentration majeure langue et littérature françaises - Études et pratiques littéraires (36 crédits)

Langue et littérature françaises – Traduction; see Faculty of Arts > Bachelor of Arts (B.A.) - Concentration majeure langue et littérature françaises - Traduction (36 crédits)

Latin-American Studies; see Faculty of Arts > Bachelor of Arts (B.A.) - Major Concentration Latin-American Studies (36 credits)

Linguistics; see Faculty of Arts > Bachelor of Arts (B.A.) - Major Concentration Linguistics (36 credits)

Middle East Studies; see Faculty of Arts > Bachelor of Arts (B.A.) - Major Concentration Middle East Studies (36 credits)

North American Studies; see Faculty of Arts > Bachelor of Arts (B.A.) - Major Concentration North American Studies (36 credits)

Philosophy; see Faculty of Arts > Bachelor of Arts (B.A.) - Major Concentration Philosophy (36 credits)

Philosophy and Western Religions; see Faculty of Arts > Bachelor of Arts (B.A.) - Major Concentration Philosophy and Western Religions (36 credits)

Political Science; see Faculty of Arts > Bachelor of Arts (B.A.) - Major Concentration Political Science (36 credits)

Quebec Studies; see Faculty of Arts > Bachelor of Arts (B.A.) - Major Concentration Quebec Studies / La concentration Majeur en Études sur le Québec (36 credits)

Russian; see Faculty of Arts > Bachelor of Arts (B.A.) - Major Concentration Russian (36 credits)

Scriptures and Interpretations; see Faculty of Arts > Religious Studies (RELG) > Bachelor of Arts (B.A.) - Major Concentration Scriptures and Interpretations (36 credits)

Sociology; see Faculty of Arts > Bachelor of Arts (B.A.) - Major Concentration Sociology (36 credits)

Women's Studies; see Faculty of Arts > Bachelor of Arts (B.A.) - Major Concentration Women's Studies (36 credits)

World Religions; see Faculty of Arts > Religious Studies (RELG) > Bachelor of Arts (B.A.) - Major Concentration World Religions (36 credits)

### 10.1.2 Faculty of Science

The Science Major Concentrations available to B.A. & Sc. students are listed here and are described in detail either below under the Bachelor of Arts & Science (AS) section or under the Faculty of Arts (A) section of this publication as indicated.

Biology – Cell/Molecular Option (AS); see Bachelor of Arts & Science > Bachelor of Arts and Science (B.A. & Sc.) - Major Concentration Biology – Cell/Molecular (36 credits)

Biology – Organismal Option (AS); see Bachelor of Arts & Science > Bachelor of Arts and Science (B.A. & Sc.) - Major Concentration Biology – Organismal (37 credits)

Chemistry (AS); see Bachelor of Arts & Science > Bachelor of Arts and Science (B.A. & Sc.) - Major Concentration Chemistry (36 credits)

Computer Science (A); see Faculty of Arts > Bachelor of Arts (B.A.) - Major Concentration in Computer Science (36 credits)

Earth, Atmosphere and Ocean Sciences (AS); see Bachelor of Arts & Science > Bachelor of Arts and Science (B.A. & Sc.) - Major Concentration Earth, Atmosphere and Ocean Science (36 credits)

Geography – Physical Geography Option (AS); see Bachelor of Arts & Science > Bachelor of Arts and Science (B.A. & Sc.) - Major Concentration Geography – Physical Geography (36 credits)

Mathematics (A); see Faculty of Arts > Bachelor of Arts (B.A.) - Major Concentration Mathematics (36 credits)

Physics (AS); see Bachelor of Arts & Science > Bachelor of Arts and Science (B.A. & Sc.) - Major Concentration Physics (36 credits)

Psychology (A); see Faculty of Arts > Bachelor of Arts (B.A.) - Major Concentration Psychology (36 credits)

Software Engineering (AS); see Bachelor of Arts & Science > Bachelor of Arts and Science (B.A. & Sc.) - Major Concentration in Software Engineering (37 credits)
10.2 Interfaculty Programs

The Interfaculty programs available to B.A. & Sc. students are listed here and are described in detail either under the Bachelor of Arts & Science (AS) section or under the McGill School of Environment (E) section of this publication as indicated.

Revision, Fall 2010. Start of revision.

| Cognitive Science (AS), section 11.6.3: Bachelor of Arts and Science (B.A. & Sc.) - Interfaculty Program Cognitive Science (54 credits) |
| Environment (E), see McGill School of Environment > Bachelor of Arts and Science (B.A. & Sc.) - Interfaculty Program in Environment |
| Sustainability, Science and Society (AS), section 11.10.1: Bachelor of Arts and Science (B.A. & Sc.) - Interfaculty Program in Sustainability, Science and Society (54 credits) |

Revision, Fall 2010. End of revision.

10.3 Honours Programs

There are two Honours programs available to B.A. & Sc. students:

- The Honours Program in Environment is described in detail in this publication under McGill School of Environment > Honours Program in Environment.
- The Honours Program in Cognitive Science is described in detail in section 11.6: Cognitive Science.

Students interested in an Honours degree should also consider the Joint Honours Programs; see section 10.4: Joint Honours Programs.

10.4 Joint Honours Programs

Joint Honours programs in the B.A. & Sc. are created by combining a Joint Honours Program component from an Arts discipline with one from a Science discipline. Students must register for both Joint Honours Program components. Joint Honours students should consult an adviser in each department to discuss their course selection and their interdisciplinary research project (if applicable).

10.4.1 Faculty of Arts

The Arts Joint Honours components available to B.A. & Sc. students are listed here and are described in detail under the Faculty of Arts section of this publication.

- Anthropology; see Faculty of Arts > Bachelor of Arts (B.A.) - Joint Honours Component Anthropology (36 credits)
- Art History; see Faculty of Arts > Bachelor of Arts (B.A.) - Joint Honours Component Art History (36 credits)
- Canadian Studies; see Faculty of Arts > Bachelor of Arts (B.A.) - Joint Honours Component Canadian Studies (36 credits)
- Classics; see Faculty of Arts > Bachelor of Arts (B.A.) - Joint Honours Component Classics (36 credits)
- East Asian Studies; see Faculty of Arts > Bachelor of Arts (B.A.) - Joint Honours Component East Asian Studies (36 credits)
- Economics; see Faculty of Arts > Bachelor of Arts (B.A.) - Joint Honours Component Economics (30 credits)
- English – Cultural Studies; see Faculty of Arts > Bachelor of Arts (B.A.) - Joint Honours Component English – Cultural Studies (36 credits)
- English – Drama and Theatre; see Faculty of Arts > Bachelor of Arts (B.A.) - Joint Honours Component English – Drama and Theatre (36 credits)
- English – Literature; see Faculty of Arts > Bachelor of Arts (B.A.) - Joint Honours Component English – Literature (36 credits)
- Geography; see Faculty of Arts > Bachelor of Arts (B.A.) - Joint Honours Component Geography (36 credits)
- German Studies; see Faculty of Arts > Bachelor of Arts (B.A.) - Joint Honours Component German (36 credits)
- Hispanic Studies; see Faculty of Arts > Bachelor of Arts (B.A.) - Joint Honours Component Hispanic Studies (36 credits)
- History; see Faculty of Arts > Bachelor of Arts (B.A.) - Joint Honours Component History (36 credits)
- International Development Studies; see Faculty of Arts > Bachelor of Arts (B.A.) - Joint Honours Component International Development Studies (36 credits)
- Italian Studies; see Faculty of Arts > Bachelor of Arts (B.A.) - Joint Honours Component Italian Studies (36 credits)
OVERVIEW OF PROGRAMS OFFERED

10.4.2 Faculty of Science

There are currently only two Science Joint Honours components available to B.A. & Sc. students, which are listed here and are described in detail under the Faculty of Arts section of this publication.

Mathematics; see Faculty of Arts > Bachelor of Arts (B.A.) - Joint Honours Component Mathematics (36 credits)

Psychology; see Faculty of Arts > Bachelor of Arts (B.A.) - Joint Honours Component Psychology (36 credits)

10.5 Minor Concentrations or Minors

10.5.1 Faculty of Arts

The Arts Minor Concentrations available to B.A. & Sc. students are listed here and are described in detail under the Faculty of Arts section of this publication. Since the B.A. & Sc. degree requires a certain number of credits in the Arts and in the Sciences, there are special requirements for B.A. & Sc. students. To be counted as an Arts Minor or Minor Concentration, the program must include at least 15 credits of Arts courses. Similarly, to be counted as a Science Minor or Minor Concentration, the program must include at least 15 credits of Science courses.

For example, a student completing the 18-credit African Studies Minor Concentration in Arts must complete at least 15 of those credits in Arts courses and at most 3 credits in Science courses. As another example, a student completing a 24-credit Science Minor in Interdisciplinary Life Sciences must complete at least 15 credits in Science courses and at most 9 credits in Arts courses.

African Studies; see Faculty of Arts > Bachelor of Arts (B.A.) - Minor Concentration African Studies (18 credits)

Anthropology; see Faculty of Arts > Bachelor of Arts (B.A.) - Minor Concentration Anthropology (18 credits)

Art History; see Faculty of Arts > Bachelor of Arts (B.A.) - Minor Concentration Art History (18 credits)

Canadian Ethnic and Racial Studies; see Faculty of Arts > Bachelor of Arts (B.A.) - Minor Concentration Canadian Ethnic and Racial Studies (18 credits)

Canadian Studies; see Faculty of Arts > Bachelor of Arts (B.A.) - Minor Concentration Canadian Studies (18 credits)

Catholic Studies; see Faculty of Arts > Bachelor of Arts (B.A.) - Minor Concentration Catholic Studies (18 credits)

Classics; see Faculty of Arts > Bachelor of Arts (B.A.) - Minor Concentration Classics (18 credits)

Communication Studies; see Faculty of Arts > Bachelor of Arts (B.A.) - Minor Concentration Communication Studies (18 credits)

Comparative Politics; see Faculty of Arts > Political Science (POLI) > Bachelor of Arts (B.A.) - Minor Concentration Comparative Politics (18 credits)
<table>
<thead>
<tr>
<th>Field of Study</th>
<th>Minor Concentration</th>
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<tbody>
<tr>
<td>East Asian Language and Literature</td>
<td>Bachelor of Arts (B.A.) - Minor Concentration East Asian Language and Literature (18 credits)</td>
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<tr>
<td>East Asian Cultural Studies</td>
<td>Bachelor of Arts (B.A.) - Minor Concentration East Asian Cultural Studies (18 credits)</td>
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<tr>
<td>East Asian Studies, Advanced</td>
<td>Bachelor of Arts (B.A.) - Minor Concentration East Asian Studies (18 credits)</td>
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<tr>
<td>Economics</td>
<td>Bachelor of Arts (B.A.) - Minor Concentration Economics (18 credits)</td>
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<tr>
<td>English – Drama and Theatre</td>
<td>Bachelor of Arts (B.A.) - Minor Concentration English – Drama and Theatre (18 credits)</td>
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<tr>
<td>English – Literature</td>
<td>Bachelor of Arts (B.A.) - Minor Concentration English – Literature (18 credits)</td>
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<tr>
<td>Geography</td>
<td>Bachelor of Arts (B.A.) - Minor Concentration Geography (18 credits)</td>
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<tr>
<td>Geography (Urban Systems)</td>
<td>Bachelor of Arts (B.A.) - Minor Concentration Geography (Urban Systems) (18 credits)</td>
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<tr>
<td>German Language</td>
<td>Bachelor of Arts (B.A.) - Minor Concentration German Language (18 credits)</td>
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<tr>
<td>German Literature and Culture in Translation</td>
<td>Bachelor of Arts (B.A.) - Minor Concentration German Literature and Culture in Translation (18 credits)</td>
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<tr>
<td>Hispanic Languages</td>
<td>Bachelor of Arts (B.A.) - Minor Concentration Hispanic Languages (18 credits)</td>
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<tr>
<td>Hispanic Literature and Culture</td>
<td>Bachelor of Arts (B.A.) - Minor Concentration Hispanic Literature and Culture (18 credits)</td>
</tr>
<tr>
<td>History</td>
<td>Bachelor of Arts (B.A.) - Minor Concentration History (18 credits)</td>
</tr>
<tr>
<td>History and Philosophy of Science</td>
<td>Bachelor of Arts (B.A.) - Minor Concentration History and Philosophy of Science (18 credits)</td>
</tr>
<tr>
<td>International Development Studies</td>
<td>Bachelor of Arts (B.A.) - Minor Concentration International Development Studies (18 credits)</td>
</tr>
<tr>
<td>International Relations</td>
<td>Bachelor of Arts (B.A.) - Minor Concentration International Relations (18 credits)</td>
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<tr>
<td>Islamic Studies</td>
<td>Bachelor of Arts (B.A.) - Minor Concentration Islamic Studies (18 credits)</td>
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<tr>
<td>Italian Studies</td>
<td>Bachelor of Arts (B.A.) - Minor Concentration Italian Studies (18 credits)</td>
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<tr>
<td>Jewish Law</td>
<td>Bachelor of Arts (B.A.) - Minor Concentration Jewish Law (18 credits)</td>
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<tr>
<td>Jewish Studies</td>
<td>Bachelor of Arts (B.A.) - Minor Concentration Jewish Studies (18 credits)</td>
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<tr>
<td>Langue et littérature françaises – Critique littéraire</td>
<td>Bachelor of Arts (B.A.) - Concentration mineure langue et littérature françaises – Critique littéraire (18 credits)</td>
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<td>Langue et littérature françaises – Études et pratiques littéraires</td>
<td>Bachelor of Arts (B.A.) - Concentration mineure langue et littérature françaises – Études et pratiques littéraires (18 crédits)</td>
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<td>Langue et littérature françaises – Langue française et traduction</td>
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<td>Linguistics</td>
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<td>Middle East Languages</td>
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<tr>
<td>North American Studies</td>
<td>Bachelor of Arts (B.A.) - Minor Concentration North American Studies (18 credits)</td>
</tr>
<tr>
<td>Philosophy</td>
<td>Bachelor of Arts (B.A.) - Minor Concentration Philosophy (18 credits)</td>
</tr>
<tr>
<td>Philosophy and Western Religions</td>
<td>Bachelor of Arts (B.A.) - Minor Concentration Philosophy and Western Religions (18 credits)</td>
</tr>
<tr>
<td>Political Economy</td>
<td>Bachelor of Arts (B.A.) - Minor Concentration Political Economy (18 credits)</td>
</tr>
<tr>
<td>Political Science</td>
<td>Bachelor of Arts (B.A.) - Minor Concentration Political Science (18 credits)</td>
</tr>
<tr>
<td>Political Science: Canada/Quebec</td>
<td>Bachelor of Arts (B.A.) - Minor Concentration Political Science Canada/Quebec (18 credits)</td>
</tr>
<tr>
<td>Political Theory</td>
<td>Bachelor of Arts (B.A.) - Minor Concentration Political Theory (18 credits)</td>
</tr>
</tbody>
</table>
Politics, Law and Society; see Faculty of Arts > Political Science (POLI) > Bachelor of Arts (B.A.) - Minor Concentration Politics, Law and Society (18 credits)

Quebec Studies; see Faculty of Arts > Bachelor of Arts (B.A.) - Minor Concentration Quebec Studies / La concentration Mineur en Études sur le Québec (18 credits)

Russian; see Faculty of Arts > Bachelor of Arts (B.A.) - Minor Concentration Russian (18 credits)

Russian Culture; see Faculty of Arts > Bachelor of Arts (B.A.) - Minor Concentration Russian Culture (18 credits)

Scriptural Languages; see Faculty of Arts > Religious Studies (RELG) > Bachelor of Arts (B.A.) - Minor Concentration Scriptural Languages (18 credits)

Sexual Diversity Studies; see Faculty of Arts > Bachelor of Arts (B.A.) - Minor Concentration Sexual Diversity Studies (18 credits)

Social Studies of Medicine; see Faculty of Arts > Bachelor of Arts (B.A.) - Minor Concentration Social Studies of Medicine (18 credits)

Sociology; see Faculty of Arts > Bachelor of Arts (B.A.) - Minor Concentration Sociology (18 credits)

South Asia; see Faculty of Arts > Political Science (POLI) > Bachelor of Arts (B.A.) - Minor Concentration South Asia (18 credits)

Women's Studies; see Faculty of Arts > Bachelor of Arts (B.A.) - Minor Concentration Women's Studies (18 credits)

World Religions; see Faculty of Arts > Religious Studies (RELG) > Bachelor of Arts (B.A.) - Minor Concentration World Religions (18 credits)

10.5.2 Faculty of Science

The Science Minors (M) or Minor Concentrations (MC) available to B.A. & Sc. students are listed here and are described in detail either under the Faculty of Science (S) or Faculty of Arts (A), or Bachelor of Arts & Science (AS) section of this publication as indicated.

Atmospheric Science (M-S); see Faculty of Science > Bachelor of Science (B.Sc.) - Minor Atmospheric Science (18 credits)

Biology – Cell/Molecular (MC-AS); see Bachelor of Arts & Science > Bachelor of Arts and Science (B.A. & Sc.) - Minor Concentration Biology - Cell/Molecular (19 credits)

Biology – Organismal (MC-AS); see Bachelor of Arts & Science > Bachelor of Arts and Science (B.A. & Sc.) - Minor Concentration Biology - Organismal (19 credits)

Chemistry (M-S); see Faculty of Science > Bachelor of Science (B.Sc.) - Minor Chemistry (18 credits)

Computer Science (MC-A); see Faculty of Arts > Bachelor of Arts (B.A.) - Minor Concentration in Computer Science (18 credits)

Environment (M-S); see McGill School of Environment > Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) or Bachelor of Science (B.Sc.) - Minor Environment (18 credits)

Geographic Information Systems (M-S); see Faculty of Science > Bachelor of Science (B.Sc.) - Minor Geographic Information Systems (18 credits)

Geography (M-S); see Faculty of Science > Bachelor of Science (B.Sc.) - Minor Geography (18 credits)

Geology (M-S); see Faculty of Science > Bachelor of Science (B.Sc.) - Minor Geology (18 credits) (previously named Earth and Planetary Sciences)

Interdisciplinary Life Sciences (M-S); see Faculty of Science > Bachelor of Science (B.Sc.) - Minor Interdisciplinary Life Sciences (24 credits)

Mathematics (MC-A); see Faculty of Arts > Bachelor of Arts (B.A.) - Minor Concentration Mathematics (18 credits)

Physics (M-S); see Faculty of Science > Bachelor of Science (B.Sc.) - Minor Physics (18 credits)

Psychology (MC-A); see Faculty of Arts > Bachelor of Arts (B.A.) - Minor Concentration Psychology (18 credits)

Statistics (MC-A see Mathematics & Statistics); see Faculty of Arts > Bachelor of Arts (B.A.) - Minor Concentration Statistics (18 credits)

10.6 Integrative Courses

10.6.1 Required Integrative Course

BASC 201 Arts & Science Integrative Topics

10.6.2 Complementary Integrative Course

Students in the B.A. & Sc. are required to complete at least one other integrative course (at least 3 credits), possibly within one of their programs, chosen from the following:
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Credits</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANTH 201</td>
<td>3</td>
<td>Prehistoric Archaeology</td>
</tr>
<tr>
<td>ANTH 203</td>
<td>3</td>
<td>Human Evolution</td>
</tr>
<tr>
<td>ANTH 208</td>
<td>3</td>
<td>Evolutionary Anthropology</td>
</tr>
<tr>
<td>ANTH 227</td>
<td>3</td>
<td>Medical Anthropology</td>
</tr>
<tr>
<td>ANTH 302</td>
<td>3</td>
<td>New Horizons in Medical Anthropology</td>
</tr>
<tr>
<td>ANTH 311</td>
<td>3</td>
<td>Primate Behaviour and Ecology</td>
</tr>
<tr>
<td>ANTH 312</td>
<td>3</td>
<td>Zooarchaeology</td>
</tr>
<tr>
<td>ANTH 411</td>
<td>3</td>
<td>Primate Studies &amp; Conservation</td>
</tr>
<tr>
<td>ANTH 418</td>
<td>3</td>
<td>Environment and Development</td>
</tr>
<tr>
<td>ANTH 423</td>
<td>3</td>
<td>Mind, Brain and Psychopathology</td>
</tr>
<tr>
<td>ANTH 443</td>
<td>3</td>
<td>Medical Anthropological Theory</td>
</tr>
<tr>
<td>ANTH 511</td>
<td>3</td>
<td>Computational Approaches to Prehistory</td>
</tr>
<tr>
<td>BASC 396</td>
<td>3</td>
<td>Undergraduate Research Project</td>
</tr>
<tr>
<td>BIOL 210</td>
<td>3</td>
<td>Perspectives of Science</td>
</tr>
<tr>
<td>BIOL 307</td>
<td>3</td>
<td>Behavioural Ecology/Sociobiology</td>
</tr>
<tr>
<td>COMP 280</td>
<td>3</td>
<td>History and Philosophy of Computing</td>
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<td>COMS 200</td>
<td>3</td>
<td>History of Communication</td>
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<tr>
<td>COMS 210</td>
<td>3</td>
<td>Introduction to Communication Studies</td>
</tr>
<tr>
<td>ECON 225</td>
<td>3</td>
<td>Economics of the Environment</td>
</tr>
<tr>
<td>ECON 310</td>
<td>3</td>
<td>Introduction to Behavioural Economics</td>
</tr>
<tr>
<td>ECON 326</td>
<td>3</td>
<td>Ecological Economics</td>
</tr>
<tr>
<td>ECON 347</td>
<td>3</td>
<td>Economics of Climate Change</td>
</tr>
<tr>
<td>ECON 405</td>
<td>3</td>
<td>Natural Resource Economics</td>
</tr>
<tr>
<td>ECON 440</td>
<td>3</td>
<td>Health Economics</td>
</tr>
<tr>
<td>ECON 546</td>
<td>3</td>
<td>Game Theory</td>
</tr>
<tr>
<td>ENVR 200</td>
<td>3</td>
<td>The Global Environment</td>
</tr>
<tr>
<td>ENVR 201</td>
<td>3</td>
<td>Society, Environment, and Sustainability</td>
</tr>
<tr>
<td>ENVR 202</td>
<td>3</td>
<td>The Evolving Earth</td>
</tr>
<tr>
<td>ENVR 203</td>
<td>3</td>
<td>Knowledge, Ethics and Environment</td>
</tr>
<tr>
<td>GEOG 200</td>
<td>3</td>
<td>Geographical Perspectives: World Environmental Problems</td>
</tr>
<tr>
<td>GEOG 203</td>
<td>3</td>
<td>Environmental Systems</td>
</tr>
<tr>
<td>GEOG 221</td>
<td>3</td>
<td>Environment and Health</td>
</tr>
<tr>
<td>GEOG 302</td>
<td>3</td>
<td>Environmental Management 1</td>
</tr>
<tr>
<td>GEOG 303</td>
<td>3</td>
<td>Health Geography</td>
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<tr>
<td>GEOG 350</td>
<td>3</td>
<td>Ecological Biogeography</td>
</tr>
<tr>
<td>HIST 238</td>
<td>3</td>
<td>Histories of Science</td>
</tr>
<tr>
<td>HIST 249</td>
<td>3</td>
<td>Health and the Healer in Western History</td>
</tr>
<tr>
<td>HIST 292</td>
<td>3</td>
<td>History and the Environment</td>
</tr>
<tr>
<td>HIST 319</td>
<td>3</td>
<td>The Scientific Revolution</td>
</tr>
<tr>
<td>HIST 330</td>
<td>3</td>
<td>Science in the Medieval West</td>
</tr>
<tr>
<td>HIST 348</td>
<td>3</td>
<td>China: Science-Medicine-Technology</td>
</tr>
<tr>
<td>HIST 350</td>
<td>3</td>
<td>Science and the Enlightenment</td>
</tr>
<tr>
<td>HIST 356</td>
<td>3</td>
<td>Medicine in the Medieval West</td>
</tr>
</tbody>
</table>
As a substitute, students can fulfill the requirement for a complementary integrative course by conducting library or empirical research that integrates the components of their program as a 3- or 6-credit independent study course, thesis course, or research course, with approval of the Director of Advising Services, Science.

11 Academic Programs

The B.A. & Sc. is an interdisciplinary degree intended for students who want to pursue simultaneously a program offered by Arts and one offered by Science. The overall objective is to provide a broad education spanning substantive areas in the two faculties so that students can learn diverse content and varied methods of inquiry.

11.1 Required Integrative Course

BASC 201 Arts & Science Integrative Topics is a required course in the B.A. & Sc., normally taken in U1. It introduces students to a variety of interdisciplinary topics that exemplify the benefits of applying scholarship from Arts and Science to a problem. It also provides students in the degree with a common experience and a reference group.

11.2 Programs in Arts or in Science

All B.A. & Sc. Arts programs are described in detail under the Faculty of Arts section of this publication. B.A. & Sc. Science programs that are open to B.A. students (i.e., programs in Computer Science, Mathematics and Statistics, and Psychology as well as some in Geography) are described under the Faculty of Arts section. Science Minors that are open to B.A. & Sc. students are described under the Faculty of Science section. B.A. & Sc. Science programs that are open only to B.A. & Sc. students are described under Bachelor of Arts and Science.

For information about where each B.A. & Sc. program is listed, see section 10: Overview of Programs Offered.
11.3 Biology (BIOL)

The Department of Biology, the discipline, and specific courses are described under the Faculty of Science section of this publication. The minimum freshman science requirements in the B.A. & Sc. may not satisfy the introductory science requirements of all medical/dental schools. Please see your departmental adviser for more information.

11.3.1 Bachelor of Arts and Science (B.A. & Sc.) - Minor Concentration Biology - Cell/Molecular (19 credits)

The Minor Concentration Biology - Cell/Molecular, is restricted to students in the B.A. & Sc. It is a sequence of courses designed to yield a broad introduction to cell/molecular biology.

Advising Note: Students interested in a Biology Minor Concentration must choose either the Cell/Molecular option or the Organismal option, but may not take both. Students interested in a more in-depth program in Biology should consider the Major Concentration.

Students may complete this program with a minimum of 18 credits or a maximum of 19 credits depending if they are exempt from taking CHEM 212 and their choice of complementary course.

Required Courses* (13 credits)

* Required courses taken at CEGEP or elsewhere that are not credited toward the B.A. & Sc. must be replaced by approved complementary courses. Regardless of the substitution, students must take at least 18 credits in this program.

** Students who have already taken CHEM 212 or its equivalent will choose another appropriate complementary course, to be approved by the adviser.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 200</td>
<td>Molecular Biology</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 201</td>
<td>Cell Biology and Metabolism</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 202</td>
<td>Basic Genetics</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 212</td>
<td>Introductory Organic Chemistry 1</td>
<td>4</td>
</tr>
</tbody>
</table>

Complementary Courses (6 credits)

Any biology course at the 300-level or higher approved by an adviser.

11.3.2 Bachelor of Arts and Science (B.A. & Sc.) - Minor Concentration Biology - Organismal (19 credits)

The Minor Concentration Biology - Organismal, is restricted to students in the B.A. & Sc. It is a sequence of courses designed to yield a broad introduction to organismal biology.

Advising Note: Students interested in a Biology Minor Concentration must choose either the Cell/Molecular option or the Organismal option, but may not take both. Students interested in a more in-depth program in Biology should consider the Major Concentration.

Students may complete this program with a minimum of 18 credits or a maximum of 19 credits depending if they are exempt from taking CHEM 212 and their choice of complementary course.

Required Courses* (16 credits)

* Required courses taken at CEGEP or elsewhere that are not credited toward the B.A. & Sc. must be replaced by approved complementary courses. Regardless of the substitution, students must take at least 18 credits in this program.

** Students who have already taken CHEM 212 or its equivalent will choose another appropriate complementary course, to be approved by the adviser.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 200</td>
<td>Molecular Biology</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 201</td>
<td>Cell Biology and Metabolism</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 205</td>
<td>Biology of Organisms</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 215</td>
<td>Introduction to Ecology and Evolution</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 212</td>
<td>Introductory Organic Chemistry 1</td>
<td>4</td>
</tr>
</tbody>
</table>

Complementary Course (3 credits)

Any biology course at the 300-level or higher approved by an adviser.
11.3.3 Bachelor of Arts and Science (B.A. & Sc.) - Major Concentration Biology - Cell/Molecular (36 credits)

The Major Concentration Biology - Cell/Molecular is a planned sequence of courses designed to permit a degree of specialization in cell/molecular biology.

Advising Note: Freshman students should be aware that PHYS 101 and/or PHYS 102 are required for some of the courses in the major and minor concentrations in Biology.

**Required Courses* (29 credits)**

* Required courses taken at CEGEP or elsewhere that are not credited toward the B.A. & Sc. or B.Sc./B.Ed. must be replaced by 3-credit courses from the Complementary Course List. Regardless of the substitution, students must take at least 36 credits in this program.

** Students who have already taken CHEM 212 or its equivalent will choose another appropriate complementary course, to be approved by the adviser.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Credits</th>
<th>Course Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 200</td>
<td>3</td>
<td>Molecular Biology</td>
</tr>
<tr>
<td>BIOL 201</td>
<td>3</td>
<td>Cell Biology and Metabolism</td>
</tr>
<tr>
<td>BIOL 202</td>
<td>3</td>
<td>Basic Genetics</td>
</tr>
<tr>
<td>BIOL 205</td>
<td>3</td>
<td>Biology of Organisms</td>
</tr>
<tr>
<td>BIOL 215</td>
<td>3</td>
<td>Introduction to Ecology and Evolution</td>
</tr>
<tr>
<td>BIOL 300</td>
<td>3</td>
<td>Molecular Biology of the Gene</td>
</tr>
<tr>
<td>BIOL 301</td>
<td>4</td>
<td>Cell and Molecular Laboratory</td>
</tr>
<tr>
<td>BIOL 303</td>
<td>3</td>
<td>Developmental Biology</td>
</tr>
<tr>
<td>CHEM 212**</td>
<td>4</td>
<td>Introductory Organic Chemistry 1</td>
</tr>
</tbody>
</table>

**Complementary Courses (7 credits)**

at least 7 credits selected from:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Credits</th>
<th>Course Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 306</td>
<td>3</td>
<td>Neural Basis of Behaviour</td>
</tr>
<tr>
<td>BIOL 313</td>
<td>3</td>
<td>Eukaryotic Cell Biology</td>
</tr>
<tr>
<td>BIOL 314</td>
<td>3</td>
<td>Molecular Biology of Oncogenes</td>
</tr>
<tr>
<td>BIOL 370</td>
<td>3</td>
<td>Human Genetics Applied</td>
</tr>
<tr>
<td>BIOL 373</td>
<td>3</td>
<td>Biometry</td>
</tr>
<tr>
<td>BIOL 413</td>
<td>1</td>
<td>Directed Reading</td>
</tr>
<tr>
<td>BIOL 568</td>
<td>3</td>
<td>Topics on the Human Genome</td>
</tr>
<tr>
<td>BIOL 575</td>
<td>3</td>
<td>Human Biochemical Genetics</td>
</tr>
</tbody>
</table>

or other appropriate course at the 300-level or higher with permission of an adviser.

11.3.4 Bachelor of Arts and Science (B.A. & Sc.) - Major Concentration Biology - Organismal (37 credits)

The Major Concentration Biology - Organismal is a planned sequence of courses designed to permit a degree of specialization in organismal biology.

Advising Note: Freshman students should be aware that PHYS 101 and/or PHYS 102 are required for some of the courses in the major and minor concentrations in Biology.

**Required Courses* (28 credits)**

* Required courses taken at CEGEP or elsewhere that are not credited toward the B.A. & Sc. or B.Sc./B.Ed. must be replaced by 3-credit courses from the Complementary Course List. Regardless of the substitution, students must take at least 36 credits in this program.

** Students who have already taken CHEM 212 or its equivalent will choose another appropriate complementary course, to be approved by the adviser.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Credits</th>
<th>Course Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 200</td>
<td>3</td>
<td>Molecular Biology</td>
</tr>
<tr>
<td>BIOL 201</td>
<td>3</td>
<td>Cell Biology and Metabolism</td>
</tr>
<tr>
<td>BIOL 202</td>
<td>3</td>
<td>Basic Genetics</td>
</tr>
<tr>
<td>BIOL 205</td>
<td>3</td>
<td>Biology of Organisms</td>
</tr>
</tbody>
</table>
Methods in Biology of Organisms (3) BIOL 206
Introduction to Ecology and Evolution (3) BIOL 215
Evolution (3) BIOL 304
Ecological Dynamics (3) BIOL 308
Introductory Organic Chemistry 1 (4) CHEM 212**

Complementary Courses (9 credits)
9 credits selected from:

Developmental Biology (3) BIOL 303
Animal Diversity (3) BIOL 305
Neural Basis of Behaviour (3) BIOL 306
Behavioural Ecology/Sociobiology (3) BIOL 307
Biodiversity and Ecosystems (3) BIOL 310
Ecology/Behaviour Field Course (3) BIOL 331
Marine Biology (3) BIOL 342
Insect Biology and Control (3) BIOL 350
Vertebrate Evolution (3) BIOL 352
Biometry (3) BIOL 373
Herpetology (3) BIOL 427
Natural Selection (3) BIOL 435
Biological Oceanography (3) BIOL 441
Conservation Biology (3) BIOL 465

or other appropriate course at the 300-level or higher with permission of an adviser.

11.4 Biomedical Sciences

11.4.1 Location

Program Advisers:

Professor Teresa Trippenbach, Department of Physiology
McIntyre Medical Sciences Building, Room 1116
Email: teresa.trippenbach@mcgill.ca
Telephone: 514-398-4331

Professor Ann Wechsler, Department of Physiology
McIntyre Medical Sciences Building, Room 1135
Email: ann.wechsler@mcgill.ca
Telephone: 514-398-4341

Student Affairs Officer, Department of Physiology
McIntyre Medical Sciences Building, Room 1022
Telephone: 514-398-3689

11.4.2 About Biomedical Sciences

The Major Concentration in Biomedical Sciences has been retired. Students completing the program should refer to the Calendar (http://www.mcgill.ca/students/courses/calendars) at their time of entrance to the program for the program requirements and consult with their academic adviser.
11.5 Chemistry (CHEM)

The Department of Chemistry, the discipline, and specific courses are described under the Faculty of Science section of this publication.

The Major Concentration in Chemistry is not certified by the Ordre des Chimistes du Québec. Students interested in pursuing a career in Chemistry in Quebec are advised to take an appropriate B.Sc. program in Chemistry. The minimum freshman science requirements in the B.A. & Sc. may not satisfy the introductory science requirements of all medical/dental schools (see section 6.4: Bachelor of Arts and Science (B.A. & Sc.) - Freshman Program (30 credits)).

11.5.1 Bachelor of Arts and Science (B.A. & Sc.) - Major Concentration Chemistry (36 credits)

The Major Concentration Chemistry is not certified by the Ordre des Chimistes du Québec. Students interested in pursuing a career in Chemistry in Quebec are advised to take an appropriate B.Sc. program in Chemistry.

The Major Concentration Chemistry, which is restricted to students in the B.A. & Sc. or B.Sc./B.Ed. is a planned sequence of courses designed to permit a degree of specialization in this discipline.

**Required Courses** (18 credits)

* Required courses taken at CEGEP or elsewhere that are not credited toward the B.A. & Sc. or B.Sc./B.Ed. must be replaced by courses from the Complementary Course List equal to or exceeding their credit value. Regardless of the substitution, students must take at least 36 credits in this program.

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 203</td>
<td>3</td>
<td>Survey of Physical Chemistry</td>
</tr>
<tr>
<td>CHEM 212</td>
<td>4</td>
<td>Introductory Organic Chemistry 1</td>
</tr>
<tr>
<td>CHEM 222</td>
<td>4</td>
<td>Introductory Organic Chemistry 2</td>
</tr>
<tr>
<td>CHEM 253</td>
<td>1</td>
<td>Introductory Physical Chemistry 1 Laboratory</td>
</tr>
<tr>
<td>CHEM 281</td>
<td>3</td>
<td>Inorganic Chemistry 1</td>
</tr>
<tr>
<td>CHEM 287</td>
<td>2</td>
<td>Introductory Analytical Chemistry</td>
</tr>
<tr>
<td>CHEM 297</td>
<td>1</td>
<td>Introductory Analytical Chemistry Laboratory</td>
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</tbody>
</table>

**Complementary Courses (18 credits)**

18 credits selected from:

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 219</td>
<td>3</td>
<td>Introduction to Atmospheric Chemistry</td>
</tr>
<tr>
<td>CHEM 263</td>
<td>1</td>
<td>Introductory Physical Chemistry 2 Laboratory</td>
</tr>
<tr>
<td>CHEM 302</td>
<td>3</td>
<td>Introductory Organic Chemistry 3</td>
</tr>
<tr>
<td>CHEM 307</td>
<td>3</td>
<td>Analytical Chemistry of Pollutants</td>
</tr>
<tr>
<td>CHEM 334</td>
<td>3</td>
<td>Advanced Materials</td>
</tr>
<tr>
<td>CHEM 367</td>
<td>3</td>
<td>Instrumental Analysis 1</td>
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<td>CHEM 381</td>
<td>3</td>
<td>Inorganic Chemistry 2</td>
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<tr>
<td>CHEM 382</td>
<td>3</td>
<td>Organic Chemistry: Natural Products</td>
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<tr>
<td>CHEM 531</td>
<td>3</td>
<td>Chemistry of Inorganic Materials</td>
</tr>
<tr>
<td>CHEM 571</td>
<td>3</td>
<td>Polymer Synthesis</td>
</tr>
<tr>
<td>CHEM 582</td>
<td>3</td>
<td>Supramolecular Chemistry</td>
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<tr>
<td>CHEM 591</td>
<td>3</td>
<td>Bioinorganic Chemistry</td>
</tr>
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</table>

11.6 Cognitive Science

11.6.1 Location

Ian Gold
Director, Program in Cognitive Science
3465 Peel Street, Room 401
11.6.2 About Cognitive Science

Cognitive Science is the multidisciplinary study of cognition in humans and machines. The goal is to understand the principles of intelligence and thought with the hope that this will lead to better understanding of the mind and of learning, and to the development of intelligent devices that constructively extend human abilities.

An Interfaculty Program in Cognitive Science (54 credits) is offered by the following departments:

- Computer Science (COMP) (Science)
- Linguistics (LING) (Arts)
- Philosophy (PHIL) (Arts)
- Psychology (PSYC) (Science)

Cognitive Science Committee Members:

- Brendan Gillon (Linguistics)
- Stephen McAdams (Music)
- Doina Precup (Computer Science)
- David Ragsdale (Neuroscience)
- Debra Titone (Psychology)

Please note: New students are required to attend an Information Session held at the end of August. Please consult the cognitive science website in early August for the date and location.

11.6.3 Bachelor of Arts and Science (B.A. & Sc.) - Interfaculty Program Cognitive Science (54 credits)

Revision, Fall 2010. Start of revision.

The Interfaculty Program Cognitive Science, which is restricted to students in the B.A. & Sc., is a planned sequence of courses designed to permit students to focus on at least two relevant areas of study.

Note: B.A. & Sc. students who take Interfaculty programs must take at least 30 credits in Arts and 30 in Science across their interfaculty program and their minor or minor concentration.

Required Course (3 credits)

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<th>Course</th>
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<td>Cognitive Science</td>
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Complementary Courses (51 credits)

Credits are selected as follows:

- 3 credits from the following:
  - COMP 230 (3) Logic and Computability
  - MATH 318 (3) Mathematical Logic
  - PHIL 210 (3) Introduction to Deductive Logic 1

18 credits from List A in one of the following five units: Computer Science, Linguistics, Neuroscience, Philosophy, or Psychology.

12 credits from List A in one of the four remaining units.

18 credits chosen from Lists A and/or B in Computer Science, Linguistics, Neuroscience, Philosophy, Psychology and/or Research Courses of which at least 12 credits must be at the 400-level or higher.
Note 1: Students are responsible for ensuring that they meet all pre- and corequisites for all their courses.

Note 2: With the permission of the Director of the Cognitive Science program, students may be able to substitute up to 6 credits in cognate departments, such as Anatomy and Cell Biology, Biology, Neurology, or Physiology. For further information, consult the Cognitive Science website: http://www.mcgill.ca/cogsci.

Computer Science

List A:

- COMP 202 (3) Introduction to Computing 1
- COMP 206 (3) Introduction to Software Systems
- COMP 250 (3) Introduction to Computer Science
- COMP 251 (3) Data Structures and Algorithms
- COMP 302 (3) Programming Languages and Paradigms
- COMP 424 (3) Artificial Intelligence
- COMP 527 (3) Logic and Computation
- MATH 240 (3) Discrete Structures 1

List B:

- COMP 280 (3) History and Philosophy of Computing
- COMP 330 (3) Theoretical Aspects: Computer Science
- COMP 360 (3) Algorithm Design Techniques
- COMP 400 (3) Technical Project and Report
- COMP 409 (3) Concurrent Programming
- COMP 417 (3) Introduction Robotics and Intelligent Systems
- COMP 421 (3) Database Systems
- COMP 490 (3) Introduction to Probabilistic Analysis of Algorithms
- COMP 526 (3) Probabilistic Reasoning and AI
- COMP 531 (3) Theory of Computation
- COMP 558 (3) Fundamentals of Computer Vision
- MATH 222 (3) Calculus 3
- MATH 223 (3) Linear Algebra

Linguistics

List A:

- LING 201 (3) Introduction to Linguistics
- LING 330 (3) Phonetics
- LING 331 (3) Phonology 1
- LING 350 (3) Linguistic Aspects of Bilingualism
- LING 355 (3) Language Acquisition 1
- LING 360 (3) Introduction to Semantics
- LING 371 (3) Syntax 1
- LING 390 (3) Neuroscience of Language
- LING 419 (3) Linguistic Theory and its Foundations
- LING 451 (3) Acquisition of Phonology
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**Philosophy**

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<td>PHIL 310</td>
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<td>Intermediate Logic</td>
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<td>PHIL 341</td>
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<td>Philosophy of Science 1</td>
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<td>PHIL 360</td>
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<td>17th Century Philosophy</td>
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<td>PHIL 370</td>
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<td>Problems in Analytic Philosophy</td>
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**List B:**

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<td>PHIL 474</td>
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<td>PHIL 511</td>
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**Psychology**

**List A/B:**

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<td>PSYC 204</td>
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### Neuroscience

**List A/B:**

* Students select either PHGY 311 or BIOL 306, but not both.

** Students select either BIOL 514 or PSYC 514, but not both.

*** Students select either NSCI 200 or PHGY 209, but not both.

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<td>BIOL 200</td>
<td>Molecular Biology</td>
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<td>BIOL 201</td>
<td>Cell Biology and Metabolism</td>
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<tr>
<td>BIOL 306*</td>
<td>Neural Basis of Behaviour</td>
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<td>BIOL 514**</td>
<td>Neurobiology Learning and Memory</td>
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<td>BIOL 530</td>
<td>Advances in Neuroethology</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 588</td>
<td>Advances in Molecular/Cellular Neurobiology</td>
<td>3</td>
</tr>
<tr>
<td>NEUR 310</td>
<td>Cellular Neurobiology</td>
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<td>NSCI 200***</td>
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<td>PHGY 209***</td>
<td>Mammalian Physiology 1</td>
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<td>PHGY 311*</td>
<td>Channels, Synapses &amp; Hormones</td>
<td>3</td>
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<td>PHGY 314</td>
<td>Integrative Neuroscience</td>
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</tr>
<tr>
<td>PHGY 556</td>
<td>Topics in Systems Neuroscience</td>
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</table>
PSYC 211  (3)  Introductory Behavioural Neuroscience
PSYC 311  (3)  Human Cognition and the Brain
PSYC 317  (3)  Genes and Behaviour
PSYC 318  (3)  Behavioural Neuroscience 2
PSYC 342  (3)  Hormones and Behaviour
PSYC 410  (3)  Special Topics in Neuropsychology
PSYC 427  (3)  Sensorimotor Behaviour
PSYC 502  (3)  Psychoneuroendocrinology
PSYC 514** (3)  Neurobiology of Learning and Memory
PSYC 522  (3)  Neurochemistry and Behaviour
PSYT 301  (3)  Issues in Drug Dependence
PSYT 500  (3)  Advances: Neurobiology of Mental Disorders

Research Courses

COGS 401  (6)  Research Cognitive Science 1
COGS 402  (6)  Research Cognitive Science 2

Revision, Fall 2010. End of revision.

11.6.4  Bachelor of Arts and Science (B.A. & Sc.) - Honours Cognitive Science (60 credits)

Revision, Fall 2010. Start of revision.

The Honours Cognitive Science, which is restricted to students in the B.A. & Sc., is an extension of the Interfaculty Program and offers students an opportunity to undertake a research project in close association with professors in their main Arts and Science focus areas. Prior to selecting the Honours Program, students should meet with the Interdisciplinary Program Advisor and review the B.A. & Sc. academic requirements for Honours and First Class Honours, which can also be found under "University Regulations and Information", "Graduation" and "Graduation Honours."

To receive an honours degree, students are required to achieve a minimum overall program GPA of 3.3 at graduation, and attain a grade of B+ (3.3) or better in COGS 444. Students must complete both the 60 credit Honours Program, plus an approved Minor Concentration or a Minor in the Faculties of Arts or of Science.

Note: B.A. & Sc. students who take Interfaculty programs, including the Honours in Cognitive Science, must take at least 30 credits in Arts and 30 in Science across their interfaculty program and their minor or minor concentration.

Required Courses (9 credits)

COGS 444  (6)  Honours Research
PSYC 532  (3)  Cognitive Science

Complementary Courses (51 credits)

Credits are selected as follows:

3 credits, one of:

COMP 230  (3)  Logic and Computability
MATH 318  (3)  Mathematical Logic
PHIL 210  (3)  Introduction to Deductive Logic 1

18 credits from List A in one of Computer Science, Linguistics, Neuroscience, Philosophy, or Psychology.
12 credits from List A in one of the four remaining units.
18 credits chosen from Lists A and/or B in Computer Science, Linguistics, Neuroscience, Philosophy, Psychology and/or Research Courses of which at least 12 credits must be at the 400-level or higher.

Note 1: Students are responsible for ensuring that they meet all pre- and corequisites for all their courses.

Note 2: With the permission of the Director of the Cognitive Science program, students may be able to substitute courses in cognate departments, such as Anatomy and Cell Biology, Biology, Neurology, or Physiology. For further information, consult the Cognitive Science website: http://www.mcgill.ca/cogsci.

### Computer Science

**List A:**

<table>
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<th>Course</th>
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<tr>
<td>COMP 206</td>
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<td>COMP 250</td>
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<td>Introduction to Computer Science</td>
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<td>COMP 251</td>
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<td>Data Structures and Algorithms</td>
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<td>COMP 302</td>
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<td>Programming Languages and Paradigms</td>
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<tr>
<td>COMP 424</td>
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<td>Artificial Intelligence</td>
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<td>COMP 527</td>
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<td>Logic and Computation</td>
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<td>MATH 240</td>
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**List B:**

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<tr>
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<td>Algorithm Design Techniques</td>
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<td>Technical Project and Report</td>
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### Linguistics

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<td>Linguistic Aspects of Bilingualism</td>
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<td>Language Acquisition 1</td>
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**Philosophy**

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**Psychology**

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<td>Animal Learning &amp; Theory</td>
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<td>Psychology of Deafness</td>
</tr>
<tr>
<td>PSYC 318</td>
<td>3</td>
<td>Behavioural Neuroscience 2</td>
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<tr>
<td>PSYC 340</td>
<td>3</td>
<td>Psychology of Language</td>
</tr>
<tr>
<td>PSYC 341</td>
<td>3</td>
<td>The Psychology of Bilingualism</td>
</tr>
<tr>
<td>PSYC 352</td>
<td>3</td>
<td>Cognitive Psychology Laboratory</td>
</tr>
<tr>
<td>PSYC 353</td>
<td>3</td>
<td>Laboratory in Human Perception</td>
</tr>
<tr>
<td>PSYC 410</td>
<td>3</td>
<td>Special Topics in Neuropsychology</td>
</tr>
<tr>
<td>PSYC 413</td>
<td>3</td>
<td>Cognitive Development</td>
</tr>
<tr>
<td>PSYC 470</td>
<td>3</td>
<td>Memory and Brain</td>
</tr>
<tr>
<td>PSYC 522</td>
<td>3</td>
<td>Neurochemistry and Behaviour</td>
</tr>
<tr>
<td>PSYC 529</td>
<td>3</td>
<td>Music Cognition</td>
</tr>
<tr>
<td>PSYC 537</td>
<td>3</td>
<td>Advanced Seminar in Psychology of Language</td>
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<tr>
<td>PSYC 545</td>
<td>3</td>
<td>Topics in Language Acquisition</td>
</tr>
<tr>
<td>PSYC 561</td>
<td>3</td>
<td>Methods: Developmental Psycholinguistics</td>
</tr>
</tbody>
</table>

**Neuroscience**

**List A/B:**

* Students select either PHGY 311 or BIOL 306, but not both.

** Students select either BIOL 514 or PSYC 514, but not both.

*** Students select either NSCI 200 or PHGY 209, but not both.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Credits</th>
<th>Course Title</th>
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</thead>
<tbody>
<tr>
<td>ANAT 321</td>
<td>3</td>
<td>Circuitry of the Human Brain</td>
</tr>
<tr>
<td>BIOL 200</td>
<td>3</td>
<td>Molecular Biology</td>
</tr>
<tr>
<td>BIOL 201</td>
<td>3</td>
<td>Cell Biology and Metabolism</td>
</tr>
<tr>
<td>BIOL 306*</td>
<td>3</td>
<td>Neural Basis of Behaviour</td>
</tr>
<tr>
<td>BIOL 514**</td>
<td>3</td>
<td>Neurobiology Learning and Memory</td>
</tr>
<tr>
<td>BIOL 530</td>
<td>3</td>
<td>Advances in Neuroethology</td>
</tr>
<tr>
<td>BIOL 588</td>
<td>3</td>
<td>Advances in Molecular/Cellular Neurobiology</td>
</tr>
<tr>
<td>NEUR 310</td>
<td>3</td>
<td>Cellular Neurobiology</td>
</tr>
<tr>
<td>NSCI 200***</td>
<td>3</td>
<td>Introduction to Neuroscience 1</td>
</tr>
<tr>
<td>NSCI 201</td>
<td>3</td>
<td>Introduction to Neuroscience 2</td>
</tr>
<tr>
<td>NSCI 300</td>
<td>3</td>
<td>Neuroethics</td>
</tr>
<tr>
<td>PHGY 209***</td>
<td>3</td>
<td>Mammalian Physiology 1</td>
</tr>
<tr>
<td>PHGY 311*</td>
<td>3</td>
<td>Channels, Synapses &amp; Hormones</td>
</tr>
<tr>
<td>PHGY 314</td>
<td>3</td>
<td>Integrative Neuroscience</td>
</tr>
<tr>
<td>PHGY 556</td>
<td>3</td>
<td>Topics in Systems Neuroscience</td>
</tr>
</tbody>
</table>
PSYC 211 (3) Introductory Behavioural Neuroscience
PSYC 311 (3) Human Cognition and the Brain
PSYC 317 (3) Genes and Behaviour
PSYC 318 (3) Behavioural Neuroscience 2
PSYC 342 (3) Hormones and Behaviour
PSYC 410 (3) Special Topics in Neuropsychology
PSYC 427 (3) Sensorimotor Behaviour
PSYC 502 (3) Psychoneuroendocrinology
PSYC 514** (3) Neurobiology of Learning and Memory
PSYC 522 (3) Neurochemistry and Behaviour
PSYT 301 (3) Issues in Drug Dependence
PSYT 500 (3) Advances: Neurobiology of Mental Disorders

Research Courses

COGS 401 (6) Research Cognitive Science 1
COGS 402 (6) Research Cognitive Science 2

Revision, Fall 2010. End of revision.

11.7 Computer Science

The School of Computer Science and the discipline are described under Faculty of Science > Computer Science (COMP).

The following are considered Science programs in the B.A. & Sc.:

Minor Concentration in Computer Science
Major Concentration in Computer Science
Major Concentration in Software Engineering

The requirements of the Software Engineering Program are described under the Bachelor of Arts and Science section while the requirements of the Computer Science programs are described under Faculty of Arts > Computer Science (COMP).

11.7.1 Bachelor of Arts and Science (B.A. & Sc.) - Major Concentration Software Engineering (37 credits)

This major concentration provides a program of study that covers the subject commonly known as "Software Engineering". This program may be used to satisfy part of the requirements for a B.A. & Sc. degree. This program does not lead to certification as a Professional Engineer.

Students may complete this program with a minimum of 36 credits or a maximum of 37 credits depending on their choice of complementary courses.

Required Courses (30 credits)

* Students who have sufficient knowledge in a programming language do not need to take COMP 202 and can replace it with additional computer science complementary course credits.

COMP 202* (3) Introduction to Computing 1
COMP 206 (3) Introduction to Software Systems
COMP 250 (3) Introduction to Computer Science
COMP 251 (3) Data Structures and Algorithms
COMP 273 (3) Introduction to Computer Systems
COMP 302 (3) Programming Languages and Paradigms
COMP 303 (3) Software Development
COMP 421 (3) Database Systems
MATH 223 (3) Linear Algebra
MATH 240 (3) Discrete Structures 1

Complementary Courses (7 credits)

6 - 7 credits from:

COMP 322 (1) Introduction to C++
COMP 361D1 (3) Software Engineering Project
COMP 361D2 (3) Software Engineering Project
COMP 529 (4) Software Architecture
COMP 533 (3) Object-Oriented Software Development

or any computer science course at the 300-level or above, excluding COMP 364, COMP 396, and COMP 431.

11.8 Earth, Atmosphere and Ocean Sciences

The following departments jointly offer a B.A. & Sc. program:

   Atmospheric and Oceanic Sciences (ATOC)
   Earth and Planetary Sciences (EPSC)

The departments, the disciplines, and specific courses are described in their respective sections under Faculty of Science.

11.8.1 Bachelor of Arts and Science (B.A. & Sc.) - Major Concentration Earth, Atmosphere and Ocean Sciences (36 credits)

The Major Concentration Earth, Atmosphere and Ocean Sciences, which is restricted to students in the B.A. & Sc., is a sequence of courses designed to permit a degree of specialization in these disciplines.

Required Courses (18 credits)

ATOC 214 (3) Introduction: Physics of the Atmosphere
ATOC 215 (3) Oceans, Weather and Climate
ATOC 309 (3) Weather Radars and Satellites
ATOC 315 (3) Water in the Atmosphere
EPSC 210 (3) Introductory Mineralogy
EPSC 212 (3) Introductory Petrology

Complementary Courses (18 credits)

A minimum of 18 credits, at least 6 of which must be at the 300-level or higher, distributed as follows:

3 credits from:

EPSC 201 (3) Understanding Planet Earth
EPSC 233 (3) Earth and Life History

9 credits from:

EPSC 203 (3) Structural Geology
EPSC 220 (3) Principles of Geochemistry
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Credits</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>EPSC 231</td>
<td>3</td>
<td>Field School 1</td>
</tr>
<tr>
<td>EPSC 320</td>
<td>3</td>
<td>Elementary Earth Physics</td>
</tr>
<tr>
<td>EPSC 331</td>
<td>3</td>
<td>Field School 2</td>
</tr>
<tr>
<td>EPSC 341</td>
<td>3</td>
<td>Field School 3</td>
</tr>
<tr>
<td>EPSC 425</td>
<td>3</td>
<td>Sediments to Sequences</td>
</tr>
<tr>
<td>EPSC 455</td>
<td>3</td>
<td>Sedimentary Geology</td>
</tr>
<tr>
<td>EPSC 542</td>
<td>3</td>
<td>Chemical Oceanography</td>
</tr>
<tr>
<td>EPSC 549</td>
<td>3</td>
<td>Hydrogeology</td>
</tr>
</tbody>
</table>

6 credits from:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Credits</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATOC 219</td>
<td>3</td>
<td>Introduction to Atmospheric Chemistry</td>
</tr>
<tr>
<td>ATOC 412</td>
<td>3</td>
<td>Atmospheric Dynamics</td>
</tr>
<tr>
<td>GEOG 308</td>
<td>3</td>
<td>Principles of Remote Sensing</td>
</tr>
</tbody>
</table>

### 11.9 Environment

The requirements for the B.A. & Sc. Interfaculty Program and the Honours Program in Environment are described in detail under McGill School of Environment. See McGill School of Environment > Bachelor of Arts and Science (B.A. & Sc.) - Interfaculty Program in Environment or see McGill School of Environment > Honours Program in Environment.

### 11.10 Geography (GEOG)

The Department of Geography, the discipline, and specific courses are described under the Faculty of Science section of this publication.

**Note:** students may take a Geography program either in Arts or in Science, but not in both.

The following are considered Arts programs in the B.A. & Sc. and are described under the Faculty of Arts section of this publication:

- Major Concentration in Geography
- Major Concentration in Geography (Urban Systems)
- Minor Concentration in Geography
- Minor Concentration in Geography (Urban Systems)

The following are considered Science programs in the B.A. & Sc. (Major Concentration) and are described either under the Bachelor of Arts and Science section or under the Faculty of Science section (Minors) of this publication:

- Major Concentration in Geography (Physical Geography)
- Minor in Geographical Information Systems
- Minor in Geography

### 11.10.1 Bachelor of Arts and Science (B.A. & Sc.) - Interfaculty Program in Sustainability, Science and Society (54 credits)

Revision, Fall 2010. Start of revision. New program.

The grand challenge of the 21st century is Sustainable Well-being, that is, to improve human well being while maintaining the Earth's life support systems. This B.A. & Sc. Program provides the inter-disciplinary and integrative knowledge and skills required to effectively understand and address this challenge in its multiple dimensions - scientific-technological, socio-economic, political-institutional, ethical, and human behavioural - and to chart a transition to sustainability. It is built upon three pillars: 1) Science and Technology, to provide an in-depth understanding of the underpinnings of the problems of concern along these dimensions; 2) Economics, Policy, and Governance, to understand how we can make the Sustainability transition; and 3) Ethics, Equity, and Justice, to discuss why we need change, and the issues of equity and justice associated with taking action. This Program is a partnership between Geography and the MSE and will be administered through Geography.

**Required Courses (27 credits)**
27 credits selected from section A and B as follows:

**Foundations of Sustainability**

9 credits selected from Foundations of Sustainability as follows:

- ENVR 201 (3) Society, Environment and Sustainability
- GEOG 360 (3) Analyzing Sustainability
- GEOG 460 (3) Research in Sustainability

**Biophysical, Societal, Cultural, Institutional and Ethical**

18 credits from introduction to biophysical, societal, cultural, institutional and ethical dimensions of sustainability.

- ENVR 200 (3) The Global Environment
- ENVR 202 (3) The Evolving Earth
- ENVR 203 (3) Knowledge, Ethics and Environment
- GEOG 203 (3) Environmental Systems
- GEOG 310 (3) Development and Livelihoods
- MGPO 440 (3) Strategies for Sustainability

**Complementary Courses (27 credits)**

27 credits selected as follows:

- 3 credits of Statistics
- 3 credits of System Modelling tools
- 3 credits of Economics
- 18 credits selected from 3 areas listed below

**Statistics**

3 credits of Statistics from the following:

- AEMA 310 (3) Statistical Methods 1
- BIOL 373 (3) Biometry
- GEOG 202 (3) Statistics and Spatial Analysis
- PSYC 204 (3) Introduction to Psychological Statistics

**System Modelling**

3 credits of System Modelling tools from the following:

- ESYS 301 (3) Earth System Modelling
- GEOG 501 (3) Modelling Environmental Systems

**Economics**

3 credits of Economics from the following:

- AGEC 333 (3) Resource Economics
- ECON 225 (3) Economics of the Environment
- ECON 326 (3) Ecological Economics

18 additional credits of complementary courses chosen from 3 areas listed below:

Students must choose at least two courses from each area, and in total complete at least 9 credits at 300 or higher level.
AREA 1: Methods: Observation, Analysis, Modelling and Management

AGRI 435 (3) Soil and Water Quality Management
ENVR 544 (3) Environmental Measurement and Modelling
ESYS 500 (3) Earth System Applications
GEOG 201 (3) Introductory Geo-Information Science
GEOG 302 (3) Environmental Management 1
GEOG 306 (3) Raster Geo-Information Science
GEOG 308 (3) Principles of Remote Sensing
GEOG 351 (3) Quantitative Methods
GEOG 404 (3) Environmental Management 2
GEOG 509 (3) Qualitative Methods
GEOG 523 (3) Global Ecosystems and Climate
NRSC 437 (3) Assessing Environmental Impact
URBP 506 (3) Environmental Policy and Planning

AREA 2: Society, Economics, Policy, Ethics and Equity

Take at least one course from each subsection 2A and 2B below:

2A: Society, Economics and Policy

Note:
*Students select either AGEC 200 or ECON 208 but not both.
**Students may select either AGEC 201 or ECON 209 but not both.

AGEC 200* (3) Principles of Microeconomics
AGEC 201** (3) Principles of Macroeconomics
AGEC 430 (3) Agriculture, Food and Resource Policy
AGEC 442 (3) Economics of International Agricultural Development
ANTH 206 (3) Environment and Culture
ANTH 212 (3) Anthropology of Development
ANTH 339 (3) Ecological Anthropology
ECON 208* (3) Microeconomic Analysis and Applications
ECON 209** (3) Macroeconomic Analysis and Applications
ECON 230 (6) Microeconomic Theory
ECON 347 (3) Economics of Climate Change
ECON 405 (3) Natural Resource Economics
ENVR 519 (3) Global Environmental Politics
GEOG 210 (3) Global Places and Peoples
GEOG 216 (3) Geography of the World Economy
GEOG 303 (3) Health Geography
GEOG 316 (3) Political Geography
GEOG 408 (3) Geography of Development
GEOG 410 (3) Geography of Underdevelopment: Current Problems
GEOG 508 (3) Resources, People and Power
HIST 292 (3) History and the Environment
MGCR 360 (3) Social Context of Business
MGPO 475 (3) Strategies for Developing Countries
MGPO 567 (3) Business in Society
NRSC 540 (3) Socio-Cultural Issues in Water
URBP 530 (3) Urban Environmental Planning

2B: Ethics and Equity
ENVR 400 (3) Environmental Thought
GEOG 382 (3) Principles Earth Citizenship
MGPO 450 (3) Ethics in Management

AREA 3: Sustainability and Biophysical processes

Note:
*Students select either BREE 217 or GEOG 322, but not both.
**Students select either BIOL 540 or ENVR 540, but not both.

ATOC 214 (3) Introduction: Physics of the Atmosphere
ATOC 215 (3) Oceans, Weather and Climate
BIOL 308 (3) Ecological Dynamics
BIOL 310 (3) Biodiversity and Ecosystems
BIOL 540** (3) Ecology of Species Invasions
BREE 217* (3) Hydrology and Water Resources
ENVB 410 (3) Ecosystem Ecology
ENVR 540** (3) Ecology of Species Invasions
ESYS 200 (3) Earth System Processes
ESYS 300 (3) Investigating the Earth System
GEOG 221 (3) Environment and Health
GEOG 305 (3) Soils and Environment
GEOG 322* (3) Environmental Hydrology
GEOG 372 (3) Running Water Environments
GEOG 403 (3) Global Health and Environmental Change
GEOG 470 (3) Wetlands
GEOG 530 (3) Global Land and Water Resources
GEOG 555 (3) Ecological Restoration
NRSC 333 (3) Pollution and Bioremediation

Students who wish to explore the following topics in more depth may select the courses listed below:
1) Climate Change: ESYS 200, ESYS 300, ESYS 500, GEOG 523, ATOC 214, ATOC 215,
2) Land Resources; Food, Forests: AGEC 430, AGEC 442, AGRI 435, BIOL 308, BIOL 310, ENVB 410, GEOG 523, GEOG 530
3) Water Resources: AGRI 435, NRSC 540, BREE 217, GEOG 322, GEOG 372, GEOG 470, GEOG 530
4) Biodiversity: BIOL 308, BIOL 310, BIOL 540, ENVB 410, ENVR 540, GEOG 555
5) Human Health: GEOG 221, GEOG 303, GEOG 403
6) Development: GEOG 408, GEOG 410, ANTH 212

Revision, Fall 2010. End of revision.
11.10.2 Bachelor of Arts and Science (B.A. & Sc.) - Major Concentration Geography - Physical Geography (36 credits)

The Major Concentration Geography, which is restricted to students in the B.A. & Sc., is a planned sequence of courses designed to permit a degree of specialization in this discipline.

**Required Courses (12 credits)**

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<tr>
<td>GEOG 201</td>
<td>Introductory Geo-Information Science</td>
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<tr>
<td>GEOG 202</td>
<td>Statistics and Spatial Analysis</td>
<td>(3)</td>
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<tr>
<td>GEOG 203</td>
<td>Environmental Systems</td>
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<tr>
<td>GEOG 272</td>
<td>Earth's Changing Surface</td>
<td>(3)</td>
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**Complementary Courses (24 credits)**

Courses are selected as follows:

6 credits of analytical techniques are selected from:

<table>
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<th>Credits</th>
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<tbody>
<tr>
<td>GEOG 306</td>
<td>Raster Geo-Information Science</td>
<td>(3)</td>
</tr>
<tr>
<td>GEOG 307</td>
<td>Socioeconomic Applications of GIS</td>
<td>(3)</td>
</tr>
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<td>GEOG 308</td>
<td>Principles of Remote Sensing</td>
<td>(3)</td>
</tr>
<tr>
<td>GEOG 351</td>
<td>Quantitative Methods</td>
<td>(3)</td>
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3 credits of field courses selected from:

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<th>Credits</th>
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<tbody>
<tr>
<td>GEOG 495</td>
<td>Field Studies - Physical Geography</td>
<td>(3)</td>
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<tr>
<td>GEOG 496</td>
<td>Geographical Excursion</td>
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<tr>
<td>GEOG 497</td>
<td>Ecology of Coastal Waters</td>
<td>(3)</td>
</tr>
<tr>
<td>GEOG 499</td>
<td>Subarctic Field Studies</td>
<td>(3)</td>
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9 - 15 credits in systematic physical geography selected from:

<table>
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<th>Course</th>
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</thead>
<tbody>
<tr>
<td>GEOG 305</td>
<td>Soils and Environment</td>
<td>(3)</td>
</tr>
<tr>
<td>GEOG 321</td>
<td>Climatic Environments</td>
<td>(3)</td>
</tr>
<tr>
<td>GEOG 322</td>
<td>Environmental Hydrology</td>
<td>(3)</td>
</tr>
<tr>
<td>GEOG 372</td>
<td>Running Water Environments</td>
<td>(3)</td>
</tr>
<tr>
<td>GEOG 470</td>
<td>Wetlands</td>
<td>(3)</td>
</tr>
</tbody>
</table>

0 - 6 credits in integrative and advanced topics selected from:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG 302</td>
<td>Environmental Management 1</td>
<td>(3)</td>
</tr>
<tr>
<td>GEOG 501</td>
<td>Modelling Environmental Systems</td>
<td>(3)</td>
</tr>
<tr>
<td>GEOG 505</td>
<td>Global Biogeochemistry</td>
<td>(3)</td>
</tr>
<tr>
<td>GEOG 506</td>
<td>Advanced Geographic Information Science</td>
<td>(3)</td>
</tr>
<tr>
<td>GEOG 536</td>
<td>Geocryology</td>
<td>(3)</td>
</tr>
<tr>
<td>GEOG 537</td>
<td>Advanced Fluvial Geomorphology</td>
<td>(3)</td>
</tr>
<tr>
<td>GEOG 550</td>
<td>Historical Ecology Techniques</td>
<td>(3)</td>
</tr>
<tr>
<td>GEOG 555</td>
<td>Ecological Restoration</td>
<td>(3)</td>
</tr>
</tbody>
</table>
11.11 Mathematics

The requirements for the B.A. & Sc. Major Concentration in Mathematics are described in detail under Faculty of Arts > Mathematics and Statistics (MATH).

11.12 Physics (PHYS)

The Department of Physics, the discipline, and specific courses are described under the Faculty of Science section of this publication.

11.12.1 Bachelor of Arts and Science (B.A. & Sc.) - Major Concentration Physics (36 credits)

Revision, Fall 2010. Start of revision.

The Major Concentration Physics, which is restricted to students in the B.A. & Sc. or B.Sc./B.Ed. is a planned sequence of courses designed to permit a degree of specialization in this discipline. This program is insufficient to prepare a student for professional or graduate work in physics; students interested in pursuing a career in physics are advised to take the appropriate B.Sc. program in physics.

Required Courses* (30 credits)

* Required courses taken at CEGEP or elsewhere that are not credited toward the B.A. & Sc. or B.Sc./B.Ed. must be replaced by courses from the Complementary Course List.

MATH 222 (3) Calculus 3
MATH 223 (3) Linear Algebra
MATH 314 (3) Advanced Calculus
MATH 315 (3) Ordinary Differential Equations
PHYS 230 (3) Dynamics of Simple Systems
PHYS 232 (3) Heat and Waves
PHYS 257 (3) Experimental Methods 1
PHYS 333 (3) Thermal and Statistical Physics
PHYS 340 (3) Majors Electricity and Magnetism
PHYS 446 (3) Majors Quantum Physics

Complementary Courses (6 credits)

6 credits selected from:

PHYS 214 (3) Introductory Astrophysics
PHYS 224 (3) Physics of Music
PHYS 241 (3) Signal Processing
PHYS 258 (3) Experimental Methods 2
PHYS 334 (3) Advanced Materials
PHYS 534 (3) Nanoscience and Nanotechnology

or any 300- or 400-level course approved by an adviser.

Revision, Fall 2010. End of revision.

11.13 Psychology

The requirements for the B.A. & Sc. Major Concentration in Psychology, Joint Honours Component in Psychology and Minor Concentration in Psychology are described in detail under Faculty of Arts > Psychology (PSYC).