



Bachelor of Arts and Science
Programs, Courses and University Regulations
2011-2012

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This publication provides guidance to prospects, applicants, students, f

1 About the Faculties

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.

To 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 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.

3.1 Location

853 Sherbrooke Street West
Montreal, Quebec H3A 2T6
Canada

Telephone: 514-398-5442
Faculty websites: www.mcgill.ca/arts and www.mcgill.ca/science
Degree website: www.mcgill.ca/science/sousa/new_students

Science Office for Undergraduate Student Advising (SOUSA)
Website: www.mcgill.ca/science/sousa

The Science Office for Undergraduate Student Advising (SOUSA) of the Faculty of Science and the Office of the Director of Advising Services of the Faculty of Science are located in Dawson Hall. SOUSA serves students in the B.A. & Sc. and B.Sc. degrees.

3.2 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:

B.A. & Sc. Program Administration Committee (PAC)

(valid to August 31, 2011; the PAC membership for the 2011-2012 academic year is not yet determined)

TBA

Chair

Bruce A. Arndtsen; B.A.(Car. College), Ph.D.(Stan.) *(until August 2012)*

Chemistry

Hassan Bencheikroun; Diplôme d'ingénieur d'état(École Mohamedia des Ingenieurs, Morocco),
Ph.D.(Laval)

Economics

B.A. & Sc. Program Administration Committee (PAC)

(valid to August 31, 2011; the PAC membership for the 2011-2012 academic year is not yet determined)

André Costopoulos; B.A.(McG.), M.A.(Montr.), Ph.D.(Oulu)

Anthropology

Nicholas Dew; B.A., M.A., Ph.D.(Oxf.)

History

Laurie Hendren; B.Sc., M.Sc.(Qu.), Ph.D.(C' nell)

Associate Dean (Academic), Faculty of Science

Louis Lefebvre; B.Sc., M.A., Ph.D.(Montr.) (*until August 2011*)

Biology

TBA

Associate Dean (Academic), Faculty of Arts

5.1 Minimum Credit Requirement

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

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: Organismal 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 fulfil 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 (CEAP, CESL)
- 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/transfercredit/>. Students must carefully select their mathematics and science Freshman courses so that they have all the required prerequisites for their intended departmental programs.

5.5 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.

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.

5.6 Course Requirements

All required and complementary courses used to fulfil 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 9: Overview of Programs Offered](#).

For a list of complementary integrative courses, see [section 9.6: Integrative Courses](#).

5.6.1 Course Overlap

You will not receive additional credit toward 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 Lev

- 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*).
- Courses taught through distance education may not be used to complete program requirements, except on an individual basis when serious, documented circumstances warrant it. In such cases, prior approval must be obtained from your program adviser and the Director of Advising Services, Science.

5.6.4 Courses in English as a Second Language (ESL)

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 may take a maximum of 12 credits, including academic writing courses for non-anglophones, from the list of ESL courses published at www.mcgill.ca/science/sousa/continuing_students/basc/conted.

5.6.5 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.

6 Advising

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 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

Interfaculty Programs

Interfaculty programs are interdisciplinary in nature. There are currently three such programs: Environment, Cognitive Science as well as Sustainability, Science and Society. In these programs, you complete 54 credits of the Interfaculty program, a minor of 18 credits, and 3 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

The growth of technology, globalization of economies, and rapid increases in population and per capita consumption have all had dramatic environmental impacts. The Faculty Program in Environment for the Bachelor of Arts and Science is designed to provide students with a broad "Liberal

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)***Arts**

East Asian Language and Literature; see *Faculty of Arts > Bachelor of Arts (B.A.) - Minor Concentration East Asian Language and Literature (18 credits)*

East Asian Cultural Studies; see *Faculty of Arts > Bachelor of Arts (B.A.) - Minor Concentration East Asian Cultural Studies (18 credits)*

East Asian Studies, Supplementary; see *Faculty of Arts > Bachelor of Arts (B.A.) - Minor Concentration Advanced East Asian Studies (18 credits)*

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

English – Cultural Studies; see *Faculty of Arts > Bachelor of Arts (B.A.) - Minor Concentration English – Cultural Studies (18 credits)*

English – Drama and Theatre; see *Faculty of Arts > Bachelor of Arts (B.A.) - Minor Concentration English – Drama and Theatre (18 credits)*

English – Literature; see *Faculty of Arts > Bachelor of Arts (B.A.) - Minor Concentration English – Literature (18 credits)*

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

Geography (Urban Systems); see *Faculty of Arts > Bachelor of Arts (B.A.) - Minor Concentration Geography (Urban Systems) (18 credits)*

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

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

German Literature and Culture in Translation; see *Faculty of Arts > Bachelor of Arts (B.A.) - Minor Concentration German Literature and Culture in Translation (18 credits)*

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

Hispanic Literature and Culture; see *Faculty of Arts > Bachelor of Arts (B.A.) - Minor Concentration Hispanic Literature and Culture (18 credits)*

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

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)*

9.5.2 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)*, *Faculty of Arts (A)*, *Bachelor of Arts & Science (AS)*, or *McGill School of Environment (E)* section of this publication as indicated.

ANTH 227	(3)	Medical Anthropology
ANTH 302	(3)	New Horizons in Medical Anthropology
ANTH 311	(3)	Primate Behaviour and Ecology
ANTH 312	(3)	Zooarchaeology
ANTH 411	(3)	Primate Studies & Conservation
ANTH 418	(3)	Environment and Development
ANTH 423	(3)	Mind, Brain and Psychopathology
ANTH 443	(3)	Medical Anthropological Theory
ANTH 511	(3)	Computational Approaches to Prehistory
BASC 201	(3)	Arts & Science Integrative Topics
BASC 396	(3)	Undergraduate Research Project
BASC 449 D1,D2	(6)	Integrative Research Project
BIOL 210	(3)	Perspectives of Science
BIOL 307	(3)	Behavioural Ecology/Sociobiology
COMP 280	(3)	History and Philosophy of Computing
COMS 200	(3)	History of Communication
COMS 210	(3)	Introduction to Communication Studies
ECON 225	(3)	Economics of the Environment
ECON 310	(3)	Introduction to Behavioural Economics
ECON 326	(3)	Ecological Economics
ECON 347	(3)	Economics of Climate Change
ECON 405	(3)	Natural Resource Economics
ECON 440	(3)	Health Economics
ECON 546	(3)	Game Theory
ENVR 200	(3)	The Global Environment
ENVR 201	(3)	Society, Environment, and Sustainability
ENVR 202	(3)	The Evolving Earth Knowledge, Ethics and En

LING 390	(3)	Neuroscience of Language
LING 555	(3)	Language Acquisition 2
MATH 328	(3)	Computability and Mathematical Linguistics
MATH 338	(3)	History and Philosophy of Mathematics
PHIL 220	(3)	Introduction to History and Philosophy of Science 1
PHIL 221	(3)	Introduction to History and Philosophy of Science 2
PHIL 341	(3)	Philosophy of Science 1
PHIL 350	(3)	History and Philosophy of Ancient Science
PHIL 361	(3)	18th Century Philosophy
PHIL 411	(3)	Topics in Philosophy of Logic and Mathematics
PHIL 441	(3)	Philosophy of Science 2
SOCI 225	(3)	Medicine and Health in Modern Society
SOCI 234	(3)	Population and Society
SOCI 235	(3)	Technology and Society
SOCI 338	(3)	Introduction to Biomedical Knowledge
SOCI 390	(3)	Gender and Health
SOCI 508	(3)	Medical Sociology and Social Psychiatry
SOCI 525	(3)	Health Care Systems in Comparative Perspective

As a substitute, students can fulfil 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.

10 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, liberal education spanning substantive areas in the two faculties so that students can learn diverse content and varied methods of inquiry.

10.1 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 9: Overview of Programs Offered](#).

10.2 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.

Bachelor of Science (175.997 Tm(10.2)Biology (BIOL)

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 courses.

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.

BIOL 200	(3)	Molecular Biology
BIOL 201	(3)	Cell Biology and Metabolism
BIOL 202	(3)	Basic Genetics
CHEM 212**	(4)	Introductory Organic Chemistry 1

Complementary Courses (6 credits)

Any 6 credits of biology courses at the 300 level or higher approved by the Adviser.

10.2.2 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 appro

BIOL 202	(3)	Basic Genetics
BIOL 205	(3)	Biology of Organisms
BIOL 215	(3)	Introduction to Ecology and Evolution
BIOL 300	(3)	Molecular Biology of the Gene
BIOL 301	(4)	Cell and Molecular Laboratory
BIOL 303	(3)	Developmental Biology
CHEM 212**	(4)	Introductory Organic Chemistry 1

Complementary Courses (7 credits)

at least 7 credits selected from:

BIOL 306	(3)	Neural Basis of Behaviour
BIOL 313	(3)	Eukaryotic Cell Biology
BIOL 314	(3)	Molecular Biology of Oncogenes
BIOL 370	(3)	Human Genetics Applied
BIOL 373	(3)	Biometry
BIOL 413	(1)	Directed Reading
BIOL 568	(3)	Topics on the Human Genome
BIOL 575	(3)	Human Biochemical Genetics

or other appropriate course at the 300 level or higher with permission of the Adviser.

10.2.4 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.

Students may complete this program with a minimum of 36 credits or a maximum of 37 credits depending if they have already taken CHEM 212 or its equivalent, and on their choice of complementary courses.

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 Courses 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.

BIOL 200	(3)	Molecular Biology
BIOL 201	(3)	Cell Biology and Metabolism
BIOL 202	(3)	Basic Genetics
BIOL 205	(3)	Biology of Organisms
BIOL 206	(3)	Methods in Biology of Organisms
BIOL 215	(3)	Introduction to Ecology and Evolution
BIOL 304	(3)	Evolution
BIOL 308	(3)	Ecological Dynamics
CHEM 212**	(4)	Introductory Organic Chemistry 1

Complementary Courses (9 credits)

9 credits selected from:

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

or other appropriate course at the 300 level or higher with permission of the Adviser.

10.3 Biomedical Sciences

10.3.1 Location

Program Adviser:

* 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.

CHEM 203	(3)	Survey of Physical Chemistry
CHEM 212	(4)	Introductory Organic Chemistry 1
CHEM 222	(4)	Introductory Organic Chemistry 2
CHEM 253	(1)	Introductory Physical Chemistry 1 Laboratory
CHEM 281	(3)	Inorganic Chemistry 1
CHEM 287	(2)	Introductory Analytical Chemistry
CHEM 297	(1)	Introductory Analytical Chemistry Laboratory

Complementary Courses (18 credits)

18 credits selected from:

CHEM 219	(3)	Introduction to Atmospheric Chemistry
CHEM 263	(1)	Introductory Physical Chemistry 2 Laboratory
CHEM 302	(3)	Introductory Organic Chemistry 3
CHEM 307	(3)	Analytical Chemistry of Pollutants
CHEM 334	(3)	Advanced Materials
CHEM 367	(3)	Instrumental Analysis 1
CHEM 381	(3)	Inorganic Chemistry 2
CHEM 382	(3)	Organic Chemistry: Natural Products
CHEM 531	(3)	Chemistry of Inorganic Materials
CHEM 571	(3)	Polymer Synthesis
CHEM 582	(3)	Supramolecular Chemistry
CHEM 591	(3)	Bioinorganic Chemistry

10.5 Cognitive Science

10.5.1 Location

Ian Gold
Director, Program in Cognitive Science
3465 Peel Street, Room 401
Montreal, Quebec H3A 1W7

Interdisciplinary Programs Adviser
Ryan Bouma, Interim Adviser
Email: ryan.bouma@mcgill.ca

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.

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

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 credits in Science across their interfaculty program and their minor or minor concentration.

Required Course (3 credits)

PSYC 532 (3) Cognitive Science

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
LING 455	(3)	Second Language Syntax

List B:

LING 417	(3)	Topics at the Interfaces 1
LING 418	(3)	Topics at the Interfaces 2
LING 440	(3)	Morphology
LING 461	(3)	Formal Methods in Linguistics
LING 531	(3)	Phonology 2
LING 555	(3)	Language Acquisition 2
LING 565	(3)	Pragmatics
LING 571	(3)	Syntax 2

(3) Language Acquisition and Breakdown

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
LING 455	(3)	Second Language Syntax

List B:

LING 417	(3)	Topics at the Interfaces 1
LING 418	(3)	Topics at the Interfaces 2
LING 440	(3)	Morphology
LING 461	(3)	Formal Methods in Linguistics
LING 531	(3)	Phonology 2
LING 555	(3)	Language Acquisition 2
LING 565	(3)	Pragmatics
LING 571	(3)	Syntax 2
LING 590	(3)	Language Acquisition and Breakdown

Philosophy

List A:

NSCI 300	(3)	Neuroethics
PHIL 304	(3)	Chomsky
PHIL 306	(3)	Philosophy of Mind
PHIL 310	(3)	Intermediate Logic
PHIL 341	(3)	Philosophy of Science 1
PHIL 360	(3)	17th Century Philosophy
PHIL 370	(3)	Problems in Analytic Philosophy
PHIL 415	(3)	Philosophy of Language
PHIL 419	(3)	Epistemology
PHIL 441	(3)	Philosophy of Science 2
PHIL 506	(3)	Seminar: Philosophy of Mind

List B:

PHIL 410	(3)	Advanced Topics in Logic 1
PHIL 411	(3)	Topics in Philosophy of Logic and Mathematics
PHIL 421	(3)	Metaphysics
PHIL 470	(3)	Topics in Contemporary Analytic Philosophy
PHIL 474	(3)	Phenomenology
PHIL 511	(3)	Seminar: Philosophy of Logic and Mathematics

Psychology**List A/B:**

ANTH 440	(3)	Cognitive Anthropology
MUMT 250	(3)	Music Perception and Cognition
NSCI 201	(3)	Introduction to Neuroscience 2
PSYC 204	(3)	Introduction to Psychological Statistics
PSYC 212	(3)	Perception
PSYC 213	(3)	Cognition
PSYC 301	(3)	Animal Learning & Theory
PSYC 304	(3)	Child Development
PSYC 305	(3)	Statistics for Experimental Design
PSYC 311	(3)	Human Cognition and the Brain
PSYC 315	(3)	Computational Psychology
PSYC 316	(3)	Psychology of Deafness
PSYC 318	(3)	Behavioural Neuroscience 2
PSYC 340	(3)	Psychology of Language
PSYC 341	(3)	The Psychology of Bilingualism
PSYC 352	(3)	Cognitive Psychology Laboratory
PSYC 353	(3)	Laboratory in Human Perception
PSYC 410	(3)	Special Topics in Neuropsychology

PSYC 413	(3)	Cognitive Development
PSYC 470	(3)	Memory and Brain
PSYC 522	(3)	Neurochemistry and Behaviour
PSYC 529	(3)	Music Cognition
PSYC 537	(3)	Advanced Seminar in Psychology of Language
PSYC 545	(3)	Topics in Language Acquisition
PSYC 561	(3)	Methods: Developmental Psycholinguistics

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.

ANAT 321	(3)	Circuitry of the Human Brain
BIOL 200	(3)	Molecular Biology
BIOL 201	(3)	Cell Biology and Metabolism
BIOL 306*	(3)	Neural Basis of Behaviour
BIOL 514**	(3)	Neurobiology Learning and Memory
BIOL 530	(3)	Advances in Neuroethology
BIOL 588	(3)	Advances in Molecular/Cellular Neurobiology
NEUR 310	(3)	Cellular Neurobiology
NSCI 200***	(3)	Introduction to Neuroscience 1
NSCI 201	(3)	Introduction to Neuroscience 2
NSCI 300	(3)	Neuroethics
PHGY 209***	(3)	Mammalian Physiology 1
PHGY 311*	(3)	Channels, Synapses & Hormones
PHGY 314	(3)	Integrative Neuroscience
PHGY 556	(3)	Topics in Systems Neuroscience
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

10.6 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)*.

10.6.1 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.

10.7 Earth, Atmosphere and Ocean Sciences

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

Atmospheric and Oceanic Sciences (AOC)

Earth and Planetary Sciences (EPS)

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

10.7.1 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)

10.8 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*.

10.9 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

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

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 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

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 the 300 level or higher.

AREA 1: Methods: Observation, Analysis, Modelling, and Management

AGRI 435	(3)	Soil and Water Quality Management
ENVB 437	(3)	Assessing Environmental Impact
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

3)GEC 333

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

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

** 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

10.9.2 Bachelor of Arts and Science (B.A. & Sc.) - Major Concentration Geography - Physical Geography (36 credits)

The Major Concentration Geography - Physical 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)

GEOG 201	(3)	Introductory Geo-Information Science
GEOG 202	(3)	Statistics and Spatial Analysis
GEOG 203	(3)	Environmental Systems
GEOG 272	(3)	Earth's Changing Surface

Complementary Courses (24 credits)

Courses are selected as follows:

6 credits of analytical techniques are selected from:

GEOG 306	(3)	Raster Geo-Information Science
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GEOG 307	(3)	Socioeconomic Applications of GIS
GEOG 308	(3)	Principles of Remote Sensing
GEOG 351	(3)	Quantitative Methods

3 credits of field courses selected from:

GEOG 495	(3)	Field Studies - Physical Geography
GEOG 496	(3)	Geographical Excursion
GEOG 497	(3)	Ecology of Coastal Waters
GEOG 499	(3)	Subarctic Field Studies

9-15 credits in systematic physical geography selected from:

GEOG 305	(3)	Soils and Environment
GEOG 321	(3)	Climatic Environments
GEOG 322	(3)	Environmental Hydrology
GEOG 372	(3)	Running Water Environments
GEOG 470	(3)	Wetlands

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

GEOG 302	(3)	Environmental Management 1
GEOG 501	(3)	Modelling Environmental Systems

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

