Academic Mission
Faculty of Science, McGill University

May 15, 2014

1 Introduction

The Faculty of Science prides itself on its undergraduate academic programs. This document summarizes the academic programs offered by Faculty, outlines the guiding principles, and summarizes the structure and functioning of the Academic Committee.

2 Summary of Academic Programs

The Faculty of Science offers B.Sc. degrees through the departments and Schools in the Faculty of Science (Atmospheric and Oceanic Sciences, Biology, Chemistry, Computer Science, Earth and Planetary Sciences, Geography, Mathematics and Statistics, Physics and Psychology) as well as administering and awarding degrees in five biomedical areas where the actual departmental units are part of the Faculty of Medicine (Anatomy and Cell Biology, Biochemistry, Microbiology and Immunology, Pharmacology and Physiology). In addition to department-specific programs, there are many joint programs which combine studies from two departments, and there are two interdisciplinary programs: (1) the Neuroscience program jointly offered by Biology, Physiology and Psychology; and (2) the Earth System Science program offered by Atmospheric and Oceanic Sciences, Earth and Planetary Sciences and Geography. In addition to the departments, Redpath Museum offers some courses and a Minor.

The Faculty of Science offers a significant number of programs in the B.A. and B.A.&Sc. Degrees as well. The B.A. programs include those in Computer Science, Geography, Mathematics and Statistics, and Psychology. In the case of Geography and Psychology, the majority of students in those departments follow B.A. programs.

The B.A.&Sc degree programs are jointly offered by the Faculty of Science and the Faculty of Arts and students follow a program from both faculties. Most units in Science have a 36-credit major concentration available in the B.A.&Sc. Degree. In addition, Science units participate in the three inter-faculty B.A.&Sc programs, namely: Cognitive Science; Environment; Sustainability, Science and Society.

There are two major differences between the B.Sc. and B.A. programs. First, the entrance requirements are different. Entry into the B.Sc. programs requires a Science CEGEP DEC or the completion of the Science Freshman Program. Second, most of the B.A. programs are multi-track ones, consisting of a 36-credit major concentration, plus a minor or a second major. In contrast, most of existing B.Sc. programs are significantly larger, requiring at least 54 credits, but do not

require a second program (except for the B.Sc. Liberal, which is closer to the Arts multi-track model).

2.1 The three kinds of B.Sc. degrees

There are three main kinds of degrees offered: Major, Honours, and Liberal. The current descriptions of these programs, as paraphrased from the 2014-2015 Undergraduate Calendar, are as follows.

Major Program: A major is a versatile, comprehensive primary area of study. Most major programs require about two-thirds of the total program credits. The remaining credits can be used for electives, or to take a minor (a small program which is usually 18-24 credits) which can be chosen from a wide variety of areas both within and outside Science.

Honours Program: Honours programs typically involve an even higher degree of specialization than majors, include supervised research, and require students to maintain a high academic standard. An honours program provides solid preparation for graduate school. Honours programs also help develop critical thinking approaches and analytical perspectives which are skills that are highly desirable for students contemplating further studies in graduate schools or in professional schools such as medicine, law or management.

Liberal Program: The Liberal program is a flexible and modular program which combines a core science component (CSC) in a Science discipline with a breadth component, which may be a minor from a wide variety of areas, a major concentration from the Faculty of Arts, or a second CSC from any group in Science.

2.2 The structure of a B.Sc.

A B.Sc. degree at McGill consists of four years of study (120 credits) for students entering from outside Quebec, and three years of study (90 credits) for Quebec students coming from the CEGEP system. A normal course load is five 3-credit courses per term and each year has two terms, Fall and Winter.

Students entering McGill from a high school outside of Quebec complete a special 30-credit Freshman program and then a 90-credit departmental program. Students entering McGill from the Quebec CEGEP start directly into the 90-credit departmental program. Students entering with advanced placement credits are evaluated on an individual basis and can receive up to 30 credits towards the Freshman program. Students in the Freshman program are said to be in their U0 year, whereas the three years of the departmental programs are called U1, U2 and U3.

All programs are expressed in terms of required and complementary courses. Required courses must be taken by all students in the program, whereas the complementary courses offer some choice and allow students to specialize within their program. Usually, but not always, the complementary courses are in the same discipline as the program. The number of program credits is the sum of the number of credits of required courses and the number of credits of complementary courses. A typical Major Program requires around 60 credits. Normally Liberal programs require about 45 program credits, and the Honours programs require more program credits than Major programs. All students must complete 90 credits and the credits that remain after the required and complementary courses have been accounted for are called elective courses. For example, if a program specifies 60 credits of required/complementary courses, then a student has 30 credits of electives (for students

starting in the freshman program, they may have additional elective credits in their freshman (U0) year). There are currently very few restrictions on which elective courses may be taken. Any course offered by the Faculty of Science or the Faculty of Arts is an acceptable elective course and many courses from other faculties are also allowed. Some students use their elective courses to complete a second program such as a minor.

2.3 The structure of a B.A.&Sc.

The B.A.&Sc. degree has its own version of the 30 credit U0 Freshman program, which includes core math and science courses, as well as some Arts requirements.

After many years of clarifying the purpose of the B.A.&Sc. degree, the structure has been simplified so that the the 90 credit main program comes in two main flavours, a multi-track version and an interfaculty version. The multi-track version requires students to complete two 36-credit major concentrations, one in Arts and one in Science. The interfaculty version allows students to choose one of the predefined interdisciplinary programs which currently includes: Cognitive Science; Environment; and Sustainability, Science and Society. There are also Honours versions of the multi-track and interfaculty programs. In addition to their program, all B.A.&Sc. students must complete a special integrative course, BASC 201.

2.4 Course Levels and Numbering

The Faculty of Science has taken a principled approach to the numbering of courses.[1]

There is a set group of freshman courses (those taken by students coming from outside of Quebec, directly from high school), which mostly have 100 course numbers (the current exception is COMP 202). In addition, at the 100-level there are three special categories of courses: (1) FIGS 196 are non-credit First-Year Interest Groups, (2) 199 courses are First-Year Seminar Courses, which are small seminar-style courses, and (3) 18x courses are General Interest Courses. Courses numbered at the 200, 300 and 400 levels form the core of the discipline-specific programs. Courses at the 500 level are typically advanced undergraduate courses that are also suitable for beginning graduate students.

3 Guiding Principles for Academic Programs

3.1 Quality: Students, Professors and Programs

The Faculty of Science prides itself on the high quality of its students, professors and academic programs.

The quality of students is maintained by ensuring that the entrance requirements, for all applicant groups, are kept at a very high level. Students accepted into the Faculty of Science must have demonstrated a very high overall academic average, as well as demonstrating high-level grades in core mathematics and science courses. The high quality of the professors is maintained by hiring the best professors, and ensuring that those professors take pride in good undergraduate teaching. The high quality of the academic programs is ensured by each department designing the courses

[1] The guidelines are available at: `https://www.mcgill.ca/science/sites/mcgill.ca.science/files/CourseLevelsDraft2-1.pdf`.

and programs carefully, as well as the peer-review of all course and program changes through the Academic Committee.

3.2 Teaching and Research: the Teacher-Scholar Model

Professors in the Faculty of Science are active researchers, and it is those same active researchers who are also in front of the classrooms teaching the undergraduates. Most of the professors also actively include undergraduates in their research through undergraduate research courses, lab placements, and summer undergraduate research projects. As of 2014, over half of the graduating B.Sc. students had completed at least one undergraduate research course in their degree.

Teaching is a key part of the job for all Faculty of Science professors, and the quality of the teaching is evaluated for merit and promotion, including promotion to Full Professor.

There are also many professors from the Faculty of Medicine who make important contributions to teaching undergraduate courses in the B.Sc. programs.

3.3 A Spectrum of Choices

As outlined in the first part of this document, students in the Faculty of Science have a wide variety of programs to choose from. They may select a broad-based Liberal program, a more focused Major program, or a highly-specialized Honours program. They also have the opportunity to choose between a single discipline or an interdisciplinary program. Students may follow an interdisciplinary program in many ways, including: (1) choosing a joint-major or joint-honours program, (2) choosing an explicitly interdisciplinary program like Neuroscience or Earth System Science, or (3) adding a minor to their program.

Interdisciplinary programs have become much more popular in recent years. In 2007 just over 10% of the B.Sc. students with a declared major (not including freshman or undeclared students) were in a joint or interdisciplinary program, whereas this has grown to over 25% in 2013. This growth is due to both an increased interest in well established joint programs like Mathematics & Physics, Physiology & Physics, and Physiology & Mathematics; as well as the introduction of new interdisciplinary programs such as Neuroscience and the new joint Biology and Mathematics, and Computer Science and Biology programs.

3.4 Depth and Breadth

Whether a single discipline, or an interdisciplinary program, the Faculty of Science ensures that all programs have both depth and breadth. Programs are designed so that students must complete a core component, and that they must also proceed to some advanced courses (courses at the 400 or 500 level), in at least one specialized area.

3.5 Fundamentals, Work and Learning

Courses and programs in the Faculty of Science are designed to ensure that students are exposed to the correct fundamentals of their discipline, and they are provided with a wide variety of homework exercises, assignments, writing exercises, labs, and field trips to aid them in their learning. It is understood that students must take an active part in their own learning, and that it is through their hard work that they master the material.

3.6 Extras

Students in the Faculty of Science have many ways in which they can enrich their academic experience. Over the last decade the Faculty has spearheaded the growth of undergraduate research, which is coordinated by the Office of Undergraduate Research. There has also been an active development of local and international field courses, and complete field study programs such as the Field Study Semesters in Panama and Africa, which are managed by the Faculty of Science. In addition, students may participate in paid internships.

4 Academic Committee

Courses and programs in the Faculty of Science are constantly being updated to adapt to new material, subjects, and the hiring of new faculty members.

The Academic Committee (AC) of the Faculty of Science is where all course and program proposals are discussed and fine-tuned. The committee is chaired by the Dean, and is composed of faculty representatives from each department, a representative from the library, student representatives, the Director of Advising, and the Associate Dean (Academic).

The committee considers all proposals that originate from the departments, as well as faculty-wide issues like teaching guidelines, program guidelines, or faculty-wide initiatives such as the 396 research courses. The committee works in a very collegial fashion, and forms an important bridge between the departments.

In the case of the biomedical units, course and program proposal originate with the departments, and then are discussed and approved by the Undergraduate Biomedical Curriculum Committee before submission to the Academic Committee.

The administrative staff in the Faculty offices, including the Associate Dean (Academic), the Assistant to the Dean (currently Josie D'Amico) and the Administrative Coordinator, all work to help the departments put forward changes to their courses and programs. They are always available to help the departments, as well as providing on-line documentation at `https://www.mcgill.ca/science/about/administration/help-minerva-course-proposal-revision`.