



MEMORANDUM

To: Executive Committee of Faculty Council

From: Dr. Graeme Norval
Chair, Undergraduate Curriculum Committee

Date: November 4, 2013 for December 11, 2013 Faculty Council Meeting

Re: Proposed Undergraduate Biomedical Engineering Minor

REPORT CLASSIFICATION

This is a major policy matter that will be considered by the Executive Committee for endorsing and forwarding to Faculty Council for vote as a regular motion (requiring a simple majority of members present and voting to carry).

BACKGROUND

The Biomedical Engineering minor is designed for undergraduate Engineering students who are interested in applying their engineering knowledge to applications specifically in the health care sector. The Committee's definition of biomedical engineering is targeted to areas that include pharmaceutical and therapeutic technologies, medical devices, medical diagnostics, health care delivery, health regulatory and policy development, medical diagnostic technologies, biomedical devices, bioinformatics.

The undergraduate BME minor is expected to prepare students for direct entry into the applied biomedical engineering industry with a proficient degree of specialization for the biomedical technology industry. Students who successfully complete the minor will have the opportunity to be trained in areas of bioinstrumentation, biostatistics and laboratory techniques; biological and biomedical imaging; biomaterials development and processing; biomechanics and rehabilitation technologies; biosystems and quantitative physiology; and cellular, tissue and molecular engineering.

The proposed BME minor will have unique requirements and a greater biomedical focus than is currently required in the Bioengineering minor, which introduces biology with a broader and more encompassing breadth of the field including environmental, nutritional, pharmaceutical, health systems, bioprocessing and other biology related disciplines.

STRUCTURE

Students in the Biomedical Engineering minor must successfully complete the following five mandatory courses (equaling 3.0 credits).

Mandatory Courses

Engineering Biology (CHE353H1 F)

Physiological control systems (MIE331H1 S)

Bio-Instrumentation course (BME440H1 S)

Biomechanics (MIE439H1 S)

New course: Innovation, Applied R&D in Biomedical Engineering (BME499Y1 Y)

Supporting Courses and Co-Curricular Activities

With an interest in exposing interested students to the concepts of Biomedical Engineering right from the start of their programs, the Committee is proposing the creation of additional, optional courses and activities supporting this minor.

IBBME will create a co-curricular seminar series entitled Introduction to Biomedical Engineering. The seminar series will be open to all students and aims to provide an opportunity to learn more about biomedical engineering as early as Year 1 in their undergraduate program, and to clarify how the various engineering disciplines contribute to the field, thereby enabling them to best integrate their undergraduate major with their course selections over the full term of their undergraduate degree.

Recognizing the need to promote alignment with the student's undergraduate major as early as possible in the program to achieve the greatest opportunities for the student, enrolled students will be set up with an IBBME faculty mentor as early as the winter term of Year 1 and they will have that career path mentor for the full term of enrolment in the minor. Mentors will coach students and assist them in identifying and pursuing opportunities that align with their identified career paths until completion of their undergraduate degree. They can also guide Track One students to the undergraduate major aligned with the biomedical engineering minor's curriculum that best suits their interests. This activity will be eligible for consideration as a co-curricular activity.

Two additional new academic courses will also be created. These are not required for the minor, but will be available as electives or substitutions for courses in the students' home department with approval of their department.

BME221H – Biodesign in Society

BME225H – Biostatistics

Students who take advantage of these additional opportunities will have a full, well-rounded understanding of the field and will be well positioned for further studies or direct employment in the growing biomedical industry.

Enrollment

Undergraduate Engineering students from any program are eligible to apply for enrollment in the BME minor with the exception of students enrolled in the Biomedical Systems Option of the Engineering Science program. The program is designed to fit well with the 3rd and 4th year programs in Chemical Engineering, Mechanical Engineering, Materials Science and Engineering, and Electrical Engineering.

Approval to register for the fourth-year course (BME499Y1 Y) must be obtained from the Associate Chair, IBBME, Undergraduate and is normally restricted to students with a cumulative average of at least B ($\geq 73\%$) in the year prior to taking BME499Y.

PROCESS

This proposal has been reviewed and approved by the Undergraduate Curriculum Committee. The Undergraduate Curriculum Committee is composed of representatives from each program, the Vice-Dean Undergraduate, the Chair of First Year Studies, the Associate Dean, Cross-Disciplinary Programs, and the Registrar. The Committee meets regularly, and reviews changes to the curriculum.

PROGRAMS

All programs are involved in these changes, and the impact on students in the various programs has been considered.

PROPOSAL/MOTION FOR FACULTY COUNCIL:

THAT the Biomedical Engineering minor be approved and introduced in the 2014-2015 academic year.