McGill

Program/Concentration Revision Form

(2019)

1.0 Degree Title
Specify the two degrees for concurrent degree programs

M.Sc.

1.1 Major (Subject/Discipline) (30-char. max.)

Biological and Biomedical Engineering

1.2 Concentration (Option)
If applicable (30 char. max.)

1.3 Category

- ☐ Faculty Program (FP)
- ☐ Major
- ☐ Joint Major
- ☐ Major Concentration (CON)
- ☐ Minor
- ☐ Minor Concentration (CON)
- ☐ Honours (HON)
- ☐ Joint Honours Component (HC)
- ☐ Internship/Co-op
- ☒ Thesis (T)
- ☐ Non-Thesis (N)
- ☐ Other

Please specify

1.4 Complete Program Title (info from boxes 1.0+1.1+1.2+1.3)

M.Sc. Biological and Biomedical Engineering (Thesis)

2.0 Administering Faculty or GPS

Graduate and Postdoctoral Studies (GPS)

Offering Faculty & Department

Interfaculty Studies/Biological and Biomedical Engineering

3.0 Effective Term of revision or retirement
Please give reasons in 5.0 "Rationale" in the case of retirement
(Ex. Sept. 2019 or 201909) ☐ Retirement

Term: 202309

4.0 Existing Credits/CEUs: 45

Proposed Credits/CEUs: 45

5.0 Rationale for revised program – explain why revising

See Attached

6.0 Revised Program Description (Maximum 150 words) – if revising, the existing must be included

New program description

The M.Sc. in Biological and Biomedical Engineering; Thesis program focuses on the interdisciplinary application of methods, paradigms, technologies, and devices from engineering and the natural sciences to problems in biology, medicine, and the life sciences. The program is multidisciplinary and takes advantage of research collaborations between staff in the Faculties of Medicine and Health Sciences, Science, and Engineering. The program spans broad themes in biomodelling, biosignal processing, medical imaging, nanotechnology, artificial cells and organs, probiotics, bioinformatics, bioengineering, biomaterials, and orthopaedics.

Existing program description

The Biological and Biomedical Engineering (BBME) Master's program focuses on the interdisciplinary application of methods, paradigms, technologies, and devices from engineering and the natural sciences to problems in biology, medicine, and the life sciences. With its unique multidisciplinary environment, and taking advantage of research collaborations between staff in the Faculties of Medicine, Science, and Engineering. BBME offers thesis-based graduate degrees (M.Eng.) that span broad themes in biomodelling, biosignal processing, medical imaging, nanotechnology, artificial cells and organs, probiotics, bioinformatics, bioengineering, biomaterials, and orthopaedics. BBME's internationally renowned staff provide frequent and stimulating interactions with physicians, scientists, and the biomedical industry. Through courses and thesis research, this program will prepare students for careers in industry, academia, hospitals and government and provide a solid basis for Ph.D. studies. Candidates should hold a bachelor's degree in engineering, science, or medicine with a strong emphasis on mathematics, physics, chemistry, and basic physiology or cell biology.

5.0 RATIONALE:

The rationale for changing the Master of Engineering - Thesis option (M.Eng-T) to Master of Science (M.Sc) (Thesis) is to follow the conventional program title terminology used in North America. In the vast majority of North American Engineering programs, the M.Eng program title refers to a *course-based, non-thesis* graduate degree. On the other hand, the M.Sc. designation refers to a graduate program with a research thesis. The change will lead to less confusion among students, will enhance our ability to recruit students, and will allow graduates to have a degree name that clearly reflects the work they have accomplished.

Via this proposal, the existing M.Eng. in Biological and Biomedical Engineering (thesis) (45 cr.) is being retired due to the change in degree designation for this program.

The rationale for revising the program description: The first few words were changed to reflect the new official name, and later on some redundant and outdated text was removed. The uninformative words 'unique' and 'environment' were removed. The name of the Faculty of Medicine was updated. The two sentences (ie, *"BBME's internationally renowned staff provide frequent and stimulating interactions with physicians, scientists, and the biomedical industry"* and *"Through courses and thesis research, this program will prepare students for careers in industry, academia, hospitals and government and provide a solid basis for Ph.D. studies")* were removed because they don't directly describe the programme.

7.0 List of existing program and proposed program

Existing program (list courses as follows: Subj Code/Crse Num, Title, Credit Weight, under the headings of: Required Courses, Complementary Courses, Elective Courses)

~~M.Eng.~~; Biological and Biomedical Engineering (45 credits)
Thesis Courses (30 credits)
BBME 693 Thesis Research 1 (6)
BBME 694 Thesis Research 2 (6)
BBME 695 Thesis Submission (12)
BBME 696 Thesis Research 3 (3)
BBME 697 Thesis Research 4 (3)

Required Courses (3 credits)
BBME 600D1 Seminars in Biological and Biomedical Engineering (1.5)
BBME 600D2 Seminars in Biological and Biomedical Engineering (1.5)

OR

BBME 600N1 Seminars in Biological and Biomedical Engineering (1.5)
BBME 600N2 Seminars in Biological and Biomedical Engineering (1.5)

Complementary Courses (12 credits)
3 credits from the following quantitative courses:
BIEN 510 Engineered Nanomaterials for Biomedical Applications (3)
BIEN 530 Imaging and Bioanalytical Instrumentation (3)
BIEN 550 Biomolecular Devices (3)
BIEN 560 Design of Biosensors (3)
BIEN 570 Active Mechanics in Biology (3)
BIEN 590 Cell Culture Engineering (3)
BMDE 502 BME Modelling and Identification (3)
BMDE 503 Biomedical Instrumentation (3)
BMDE 512 Finite-Element Modelling in Biomedical Engineering (3)
BMDE 519 Biomedical Signals and Systems (3)
BMDE 610 Functional Neuroimaging Fusion (3)
BMDE 660 Advanced Magnetic Resonance Imaging and Spectroscopy of the Brain (3)
MDPH 607 Medical Imaging (3)

~~3 credits from the following:~~
BIEN 510 Engineered Nanomaterials for Biomedical Applications (3)
BIEN 530 Imaging and Bioanalytical Instrumentation (3)
BIEN 540 Information Storage and Processing in Biological Systems (3)
BIEN 550 Biomolecular Devices (3)
BIEN 560 Design of Biosensors (3)
BIEN 570 Active Mechanics in Biology (3)
BIEN 590 Cell Culture Engineering (3)
BIEN 680 Bioprocessing of Vaccines (4)
…/continued

Proposed program (list courses as follows: Subj Code/Crse Num, Title, Credit Weight, under the headings of: Required Courses, Complementary Courses, Elective Courses)

M.Sc.; Biological and Biomedical Engineering (45 credits)
Thesis Courses (30 credits)
BBME 693 Thesis Research 1 (6)
BBME 694 Thesis Research 2 (6)
BBME 695 Thesis Submission (12)
BBME 696 Thesis Research 3 (3)
BBME 697 Thesis Research 4 (3)

Required Courses (3 credits)
BBME 600D1 Seminars in Biological and Biomedical Engineering (1.5)
BBME 600D2 Seminars in Biological and Biomedical Engineering (1.5)

OR

BBME 600N1 Seminars in Biological and Biomedical Engineering (1.5)
BBME 600N2 Seminars in Biological and Biomedical Engineering (1.5)

Complementary Courses (12 credits)
3 credits from the following quantitative courses:
BIEN 510 Engineered Nanomaterials for Biomedical Applications (3)
BIEN 530 Imaging and Bioanalytical Instrumentation (3)
BIEN 550 Biomolecular Devices (3)
BIEN 560 Design of Biosensors (3)
BIEN 570 Active Mechanics in Biology (3)
BIEN 590 Cell Culture Engineering (3)
BMDE 502 BME Modelling and Identification (3)
BMDE 503 Biomedical Instrumentation (3)
BMDE 512 Finite-Element Modelling in Biomedical Engineering (3)
BMDE 519 Biomedical Signals and Systems (3)
BMDE 610 Functional Neuroimaging Fusion (3)
BMDE 660 Advanced Magnetic Resonance Imaging and Spectroscopy of the Brain (3)
MDPH 607 Medical Imaging (3)

3-4 credits from the following courses:
BIEN 510 Engineered Nanomaterials for Biomedical Applications (3)
BIEN 530 Imaging and Bioanalytical Instrumentation (3)
BIEN 540 Information Storage and Processing in Biological Systems (3)
BIEN 550 Biomolecular Devices (3)
BIEN 560 Design of Biosensors (3)
BIEN 570 Active Mechanics in Biology (3)
BIEN 590 Cell Culture Engineering (3)
BIEN 680 Bioprocessing of Vaccines (4)
…/continued

Attach extra page(s) as needed

7.0 List of existing program and proposed program

Existing program (list courses as follows: Subj Code/Crse Num, Title, Credit Weight, under the headings of: Required Courses, Complementary Courses, Elective Courses)

~~M.Eng.~~; Biological and Biomedical Engineering (45 credits)
Complementary Courses [Continued]

BMDE 501 Selected Topics in Biomedical Engineering (3)
BMDE 502 BME Modelling and Identification (3)
BMDE 503 Biomedical Instrumentation (3)
BMDE 504 Biomaterials and Bioperformance (3)
BMDE 505 Cell and Tissue Engineering (3)
BMDE 508 Introduction to Micro and Nano-Bioengineering (3)
BMDE 512 Finite-Element Modelling in Biomedical Engineering (3)
BMDE 519 Biomedical Signals and Systems (3)
BMDE 525D1/D2 Design of Assistive Technologies: Principles and Praxis (6)
BMDE 610 Functional Neuroimaging Fusion (3)
BMDE 650 Advanced Medical Imaging (3)
BMDE 654 Biomedical Regulatory Affairs - Medical Devices (3)
BMDE 660 Advanced Magnetic Resonance Imaging and Spectroscopy of the Brain (3)
MDPH 607 Medical Imaging (3)

~~6 credits at the 500-level or higher chosen from a list on the program web site https://www.mcgill.ca/bbme/students/courses or from other courses, at the 500 level or higher~~, at least 3 credits of which have both life sciences content and content from the physical sciences, engineering, or computer science, with the prior written approval of the Thesis Supervisor and the Graduate Program Director.

Proposed program (list courses as follows: Subj Code/Crse Num, Title, Credit Weight, under the headings of: Required Courses, Complementary Courses, Elective Courses)

M.Sc.; Biological and Biomedical Engineering (45 credits)
Complementary Courses [Continued]

BMDE 501 Selected Topics in Biomedical Engineering (3)
BMDE 502 BME Modelling and Identification (3)
BMDE 503 Biomedical Instrumentation (3)
BMDE 504 Biomaterials and Bioperformance (3)
BMDE 505 Cell and Tissue Engineering (3)
BMDE 508 Introduction to Micro and Nano-Bioengineering (3)
BMDE 512 Finite-Element Modelling in Biomedical Engineering (3)
BMDE 519 Biomedical Signals and Systems (3)
BMDE 525D1/D2 Design of Assistive Technologies: Principles and Praxis (6)
BMDE 610 Functional Neuroimaging Fusion (3)
BMDE 650 Advanced Medical Imaging (3)
BMDE 654 Biomedical Regulatory Affairs - Medical Devices (3)
BMDE 660 Advanced Magnetic Resonance Imaging and Spectroscopy of the Brain (3)
MDPH 607 Medical Imaging (3)

5-6 credits at the 500-level or higher to complete the 12 credits of Complementary Courses (at least 3 credits of which have both life sciences content and content from the physical sciences, engineering, or computer science), with the prior written approval of the Thesis Supervisor and the Graduate Program Director.

Attach extra page(s) as needed

8.0 Consultation with Related Units ☐ Yes ☐ No Financial Consult ☐ Yes ☐ No

Attach list of consultations

9. Approvals

Routing Sequence	Name	Signature	Meeting Date
Department	Prof. Yu (Brandon) Xia		March 25, 2021
Curric/Acad Committee			
Faculty 1			
Faculty 2			
Faculty 3			
CGPS			
SCTP			
APC			
Senate			

Submitted by

Name	Yu (Brandon) Xia
Phone	514-398-5026
Email	brandon.xia@mcgill.ca
Submission Date	Feb. 24, 2021

To be completed by ES:

CIP Code

REMINDER: Major revision proposals must be accompanied by a 2-3 page support document. See "Approval Paths" document on APC Web page to determine if your proposal is considered major: https://mcgill.ca/apc/.

Executive Summary

We are proposing to change the Thesis option (M.Eng-T) to Master of Science (M.Sc.) (Thesis) to follow the conventional program title terminology used in North America. In the vast majority of North American Engineering programs, the M.Eng program title refers to a course-based, non-thesis graduate degree. On the other hand, the M.Sc. designation refers to a graduate program with a research thesis.

This follows other Engineering thesis-based graduate programs at McGill which have proposed to make the same name change.

8.0 Consultation with Related Units ☐ Yes ☐ No Financial Consult ☐ Yes ☐ No

Attach list of consultations

9. Approvals

Routing Sequence	Name	Signature	Meeting Date
Department	Prof. Yu (Brandon) Xia		March 25, 2021
Curric/Acad Committee	Prof. Roni Khazaka	Roni Khazaka	March 31, 2021
Faculty 1	Prof. Roni Khazaka	Roni Khazaka	April 13, 2021
Faculty 2			
Faculty 3			
CGPS			
SCTP			
APC			
Senate			

Submitted by

Name	Yu (Brandon) Xia
Phone	514-398-5026
Email	brandon.xia@mcgill.ca
Submission Date	Feb. 24, 2021

To be completed by ES:

CIP Code

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8.0 Consultation with Related Units ☐ Yes ☐ No Financial Consult ☐ Yes ☐ No

Attach list of consultations

9. Approvals

Routing Sequence	Name	Signature	Meeting Date
Department	Prof. Yu (Brandon) Xia		March 25, 2021
Curric/Acad Committee	Melissa Vollrath- FCC Chair		March 30, 2021
Faculty 1	Aimee Ryan- Assoc. Dean	Aimee Ryan Digitally signed by Aimee Ryan Date: 2021.04.16 16:08:59 -04'00'	
Faculty 2			
Faculty 3			
CGPS			
SCTP			
APC			
Senate			

Submitted by

Name	Yu (Brandon) Xia
Phone	514-398-5026
Email	brandon.xia@mcgill.ca
Submission Date	Feb. 24, 2021

To be completed by ES:

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