

# BIOMEDICAL ENGINEERING, M.SC.

## Biomedical Engineering

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**Academic Staff:** Please refer to the Biomedical Engineering website (<https://umanitoba.ca/engineering/faculty-staff/biomedical-engineering/>) for Faculty information.

## Biomedical Engineering Program Information

Biomedical Engineering (BME) at the University of Manitoba is a graduate program toward Master of Science, Doctor of Philosophy, and/or MD-PhD degrees. It is an interdisciplinary program between the three faculties of Engineering, Medicine and Science, and the associated hospitals and medical industries.

## Admission Information

### Admission to the Faculty of Graduate and Postdoctoral Studies

Application and Admission Procedures are found in the Academic Guide (<https://catalog.umanitoba.ca/graduate-studies/academic-guide/application-admission-registration-policies/>).

Admission requirements for Master's students are found in the Master's Degrees General Regulations ([https://catalog.umanitoba.ca/graduate-studies/academic-guide/masters-degrees-general-regulations/#Admission\\_FGSMasters](https://catalog.umanitoba.ca/graduate-studies/academic-guide/masters-degrees-general-regulations/#Admission_FGSMasters)) section of the Guide.

### Biomedical Engineering M.Sc. Admission Requirements

A student must hold a four year B.Sc. degree in any of the following faculties from a recognized University: Engineering, Natural Sciences, or Medicine/Health Sciences.

In addition, the following **pre-requisite** courses are required prior to an offer of admissions:

Course	Title	Hours
MATH 1210	Techniques of Classical and Linear Algebra	3
MATH 1510	Applied Calculus 1	3
PHYS 1050	Physics 1: Mechanics	3

## Application Information

Students should complete and submit their online application with supporting documentation by the date indicated on the Biomedical Engineering M.Sc. program of study (<https://umanitoba.ca/explore/programs-of-study/biomedical-engineering-msc/>) page.

## Degree Requirements

A minimum of 12 credit hours plus a thesis are required in the BME program. The minimum must include 6 credit hours from the following 6 core courses:

Course	Title	Hours
BME 7012	Foundation of Physiology	2
ANAT 7014	Functional Human Anatomy	2
BME 7022	Biomedical Instrumentation	2
BME 7024	Basics of Electromagnetic	2
BME 7026	Basics of Biological Signal Analysis	2
BME 7028	Basics of Biomechanics	2

plus the 0 credit hour Ethics course (BME 7040) and the 0 credit hour BME Seminar course (BME 7000). Students from Engineering backgrounds normally have to take anatomy and physiology. Students from Science backgrounds should not enroll in anatomy and physiology.

In addition, 6 credit hours of the minimum requirement must be taken at the 7000 level relevant to the student's thesis from any departments of the faculties of Engineering, Science and Health Sciences or Department of Physiology and Pathophysiology based on the suggestions of the student's Advisory Committee.

The student's program of study must be recommended by the student's advisory committee and approved by the Chair of the Curriculum Committee or delegate. Students who lack the necessary background knowledge may be required, by their Advisory Committee, to take additional courses up to the maximum allowed by FGS regulations.

**Expected Time to Graduate:** 2 years

## Progression Chart

Course	Title	Hours
<b>Year 1</b>		
GRAD 7300	Research Integrity Tutorial	0
GRAD 7500	Academic Integrity Tutorial	0
BME 7000	Biomedical Engineering Seminar <sup>1,2</sup>	0
BME M.Sc. Thesis Proposal		0
XXX 7000	Research courses at the 7000-level or 8000-level <sup>3</sup>	6
	<b>Hours</b>	<b>6</b>
<b>Years 1-2</b>		
BME 7040	Biomedical Ethics	0
Select 2 BME Core Courses <sup>4,5,6</sup>		6
	<b>Hours</b>	<b>6</b>
<b>Year 2</b>		
Complete BME Core Course Requirements <sup>5</sup>		
Complete Research Course Requirements		
GRAD 7000	Master's Thesis	0
Final Thesis Presentation <sup>7</sup>		
	<b>Hours</b>	<b>0</b>
	<b>Total Hours</b>	<b>12</b>

<sup>1</sup> BME Graduate Students are required to enroll and attend the Biomedical Engineering Seminar each term until graduation.

<sup>2</sup> BME M.Sc. student must present at least once at the BME Seminar before graduation.

<sup>3</sup> **Research Courses** as determined by the Academic Advisor. Courses at the 7000-level or 8000-level relevant to the student's research from any departments in the Faculties of Engineering, Science and Health Sciences or from the Physiology and Pathophysiology Program based on the recommendations of the student's Advisor and/or Advisory Committee.

<sup>4</sup> Any combination of courses

from BME 7012, ANAT 7014, BME 7022, BME 7024, BME 7026, BME 7028.

<sup>5</sup> Where a student has already completed similar courses to the BME core courses, the student may, with the recommendation of their Advisory Committee and with the approval of the Chair of the Curriculum Committee or delegate, be exempted from taking the equivalent core courses and allowed to fulfill the six (6) ch of core courses with six (6) ch of other courses taken at the 7000-8000 level from any department in the Faculties of Engineering, Science and Health Sciences or from the Physiology and Pathophysiology Program.

<sup>6</sup> BME M.Sc. Program Requirements:

[http://umanitoba.ca/biomedical\\_engineering/current\\_students/msc.html#CourseReq](http://umanitoba.ca/biomedical_engineering/current_students/msc.html#CourseReq) (Engineering Student must take Life Science Core Courses and Life Science Students must take Engineering Core Courses)

<sup>7</sup> [http://umanitoba.ca/biomedical\\_engineering/current\\_students/msc.html#FinalThesisPresentation](http://umanitoba.ca/biomedical_engineering/current_students/msc.html#FinalThesisPresentation)

- GRAD 7300 prior to applying to any ethics boards which are appropriate to the student's research or within the student's first year, whichever comes first; and
- GRAD 7500 within the first term of registration;

unless these courses have been completed previously, as per Mandatory Academic Integrity Course (<https://catalog.umanitoba.ca/graduate-studies/academic-guide/academic-performance-general/#GRAD7500>) and Mandatory Research Integrity Online Course (<https://catalog.umanitoba.ca/graduate-studies/academic-guide/academic-performance-general/#GRAD7300>).

Students must also meet additional BFAR requirements (<https://umanitoba.ca/graduate-studies/student-experience/core-academic-requirements/#additional-requirements-by-program>) that may be specified for their program.

## General Regulations

All students must:

- maintain a minimum degree grade point average of 3.0 with no grade below C+,
- meet the minimum and not exceed the maximum course requirements, and
- meet the minimum and not exceed the maximum time requirements (in terms of time in program and lapse or expiration of credit of courses).

## Registration Information

Students should familiarize themselves with the Faculty of Graduate and Postdoctoral Studies 'GRAD' courses applicable to their program (<https://catalog.umanitoba.ca/graduate-studies/registration-information/>). If you have questions about which GRAD course(s) to register in, please consult your home department/unit.

Courses are subject to cancellation if there is insufficient enrolment. Courses with insufficient enrolment may be cancelled the first week of classes. Not all courses will be offered each year – contact the department for courses that will not be offered. All returning and newly admitted students must see an academic advisor or the department head prior to attempting to register.

## Regulations

Students must meet the requirements as outlined in both Supplementary Regulation and BFAR documents as approved by Senate.

### Supplementary Regulations

Individual units may require specific requirements above and beyond those of the Faculty of Graduate and Postdoctoral Studies, and students should consult unit supplementary regulations (<https://umanitoba.ca/graduate-studies/supplementary-regulations/>) for these specific regulations.

### Bona Fide Academic Requirements (BFAR)

Bona Fide Academic Requirements (BFAR) (<https://catalog.umanitoba.ca/graduate-studies/academic-guide/academic-performance-general/#BFAR>) represent the core academic requirements a graduate student must acquire in order to gain, and demonstrate acquisition of, essential knowledge and skills.

All students must successfully complete: