



**UNIVERSITY  
OF ALBERTA**

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## **Graduate Program Manual for the Department of Biomedical Engineering Graduate Program**

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*This document is intended for the use of faculty members and students enrolled in or applying to enter the Department of Biomedical Engineering or in/to the Department when serving as the conjoint department in the Individual Interdisciplinary Studies Program [Interdisciplinary Studies / Faculty of Graduate Studies and Research \(ualberta.ca\)](http://ualberta.ca) and contains information related to Department programs. General guidelines concerning graduate studies can be found on the Faculty of Graduate Studies and Research (FGSR) website at [Faculty of Graduate Studies and Research \(ualberta.ca\)](http://ualberta.ca).*

*The programs offered by the Department of Biomedical Engineering are an MSc (course based), an MSc (thesis based) and a PhD (thesis based), with either an 'in Biomedical Engineering' or an 'in Biomedical Sciences' designation.*

*Policies of the Department of Biomedical Engineering may differ from those set by the FGSR.*

**NOTE: All conditions and procedures specified in this document apply to both students enrolled in the Department of Biomedical Engineering and to those enrolled in the Individual Interdisciplinary Studies Program of the University with the Department of Biomedical Engineering serving as the conjoint department.**

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*This document briefly summarizes the rules and policies for graduate study in the Department of Biomedical Engineering pertaining to the degree programs of Course-Based MSc, Thesis-Based MSc, and PhD.*

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## **A) Admission procedures**

- A1.** Before applying to thesis-based graduate studies (PhD and MSc) in the Department of Biomedical Engineering (BME), a prospective student must have a faculty member from the Department of BME (primary or cross-appointment) to act as their primary supervisor; see the BME website for a listing of faculty members here <https://www.ualberta.ca/biomedical-engineering/people/index.html>. Prospective students that are applying to the course-based masters program in BME do not need a supervisor before applying.
- A2.** The Department of BME has a minimum entrance requirement of a 3.3 (B+) GPA for thesis-based programs (PhD and MSc). The Department of BME has a minimum entrance requirement of a 3.0 (B) GPA for the BME course-based masters. Grades from external institutions are converted according to an internal procedure. Generally, we consider your most recent two years of full time study (or equivalent).
- A3. Language Requirement for thesis-based programs (MSc and PhD)**

The Department of BME and FGSR recognize four English language examinations.

They are:

1. Test of English as a Foreign Language (TOEFL iBT, in-person or special at-home edition). Total score of 100 with a score of at least 25 on each of the individual skill areas (internet-based) or equivalent.
2. Academic International English Language Testing System (IELTS). A minimum overall band score of 7.5, with at least 7 on each band.
3. Canadian Academic English Language Assessment (either CAEL [paper] or CAEL CE [computer]). A minimum score of 70 with at least 60 on each subtest.
4. Pearson Test of English Academic (PTE Academic) 61 with a minimum band score of 60.

## **A4. Language Requirement for the Course-Based Masters program**

The Department of BME accepts FGSR minimum requirements for the Course-Based Masters program and this can be found here <https://www.ualberta.ca/graduate-studies/about/graduate-program-manual/section-5-admissions/5-8-english-language-proficiency-requirement.html>

## **B) Funding Commitment for students in thesis-based BME programs (PhD, MSc):**

### **B1. Procedures and expectations**

- All graduate students in the thesis-based BME programs (PhD, MSc) must receive funding throughout the tenure of their program. The department **does not** have funds to support a student's stipend, which is the **responsibility in whole of the supervisor**. Please note that students in the Course-Based Masters program do not typically receive any funding and are responsible for funding all aspects of their programs.
- Before a student commences their thesis-based graduate program, the supervisor must provide a letter stating the salary of the student, e.g., xx dollars is available for xx years. Following this, supervisors are to commit their funding on standard letters each year to their students. The graduate programs advisor will secure a written confirmation from the supervisor and keep it in the student's file. Minimum pay per year should exceed \$25,000 for MSc and \$28,000 for PhD.
- To attract top students, supervisors can offer additional funding beyond the department's minimum amount but the amount and duration should be clearly stated in an additional letter to the student.
- All U of A assistantships are governed by collective agreements based on how the assistantship is funded. See the links for complete information about assistantships <http://www.hrs.ualberta.ca/MyEmployment/Agreements.aspx>
- Students are encouraged to apply for all graduate scholarships that they are eligible for. Please refer to the FGSR awards website for the latest award types and procedures (<https://www.ualberta.ca/graduate-studies/awards-and-funding/index.html>). Other awards that students might be eligible for include the Faculty of Medicine (75th Anniversary Awards), the University (Province of Alberta, Dissertation fellowships, etc.), and external agencies (Alberta Innovates, NSERC, CIHR, and disease-specific agencies like Heart and Stroke, etc.). Please ensure that you are eligible to apply since the requirements (found on their websites) for each agency are different.
- Registrations: See minimum registration requirements [Regulations of the Faculty of Graduate Studies and Research - University of Alberta - Acalog ACMST<sup>TM</sup> \(ualberta.ca\)](https://www.ualberta.ca/graduate-studies/awards-and-funding/index.html)

**Thesis-Based students:** For full-time status, students must be registered in 9 units of course weight or more for credit in each of the Fall and Winter Terms, and in THES 906 (6 units) in every Spring and Summer Term of the program. See Graduate Project Course and Thesis Registration for further information on THES 906.

<https://calendar.ualberta.ca/content.php?catoid=39&navoid=12235#graduate-project-course-and-thesis-registration>

- This booklet does not cover questions concerning tuition. Students should check the FGSR website for regulations and fees - <https://www.ualberta.ca/graduate-studies/prospective-students/index.html>

## **C) Requirements while in Graduate Program**

<https://www.ualberta.ca/graduate-studies/about/graduate-program-manual>

### **The Graduate Student**

Graduate students are ultimately responsible for their own programs. They are expected to read the Calendar and any other relevant documents to become familiar with all regulations and deadlines relating to their programs.

The students' fundamental responsibilities include ensuring that their registration is accurate and does not lapse, submitting appropriate forms to the department for signature and processing, and paying all fees required by the deadline dates set out in the Calendar.

### **Graduate Student Guidelines**

Graduate students should:

- make themselves aware of the contents of the graduate portions of the Calendar and take responsibility for their own programs in that the Calendar sets out the requirements for the various programs;
- be aware of possible scholarship opportunities, and seek advice and assistance from the department in making applications, etc.;
- be aware of the supervisor's and any departmental expectations;
- inform the supervisor or advisor regularly about progress, and provide the supervisor with an annual report for distribution to the supervisory committee;
- maintain open communication with their supervisor or advisor and Associate Dean, Graduate Students concerning any problem; and in the event of a conflict in the supervisor-student or advisor-student relationship, discuss with the supervisor or advisor and Associate Dean, Graduate Students in a timely fashion (see [Section 9](#) of the Graduate Program Manual for further information);
- make research results accessible (beyond their appearance in a thesis) to an appropriate audience;

(FGSR Council, 1989/06/19)

## **Recommendation for Termination by a Department**

On occasion, it becomes necessary to consider the termination of a student's program. Only the FGSR can terminate a graduate student's program. All departmental requests for termination of a student's program must be made in writing by the Chair or Associate Dean, Graduate Students of the department to an Associate Dean of FGSR, with a copy to the student. Supervisors and department administrators cannot terminate a student's program but they can recommend such action to an Associate Dean, FGSR through the Chair or Associate Dean, Graduate students.

The written recommendation should give the effective date of the proposed termination and document carefully the reasons for the recommendation. Reference should be made to any previous discussions or correspondence with the student related to the matter. It is expected that the Chair or Associate Dean, Graduate Students will have discussed the issue with the student (and with the supervisor, where appropriate) prior to the letter being sent. Departments are encouraged, but not required, to have internal appeal procedures. If the recommendation is upheld, the student's transcript will indicate "Required to Withdraw".

If a student completes a Withdrawal form due to lack of adequate academic progress, this does not preclude a department from recommending the student be required to withdraw.

## **Reasons for Termination**

The reasons for termination may include:

- failure to maintain adequate academic standing; failure to meet requirements set out in a conditional admission; candidacy or final oral examination failure; or expiry of program time limit. Requests to terminate for these reasons must be documented in the academic record or student's file: for example, grades, exam reports, etc.;
- failure to make satisfactory academic progress in other aspects of the program, such as adequate progress in research. Requests to terminate for these reasons should be supported by evidence that the process of progressive discipline (as outlined below) has been followed;
- failure to secure a supervisor (for thesis-based students); or
- failure to complete the practicum component of a graduate program, if that practicum component is an integral part of the program.
- failure to complete the capstone component for course-based Masters students;

Except in documented emergency cases (health, safety issues, etc.) students shall be given adequate warning, feedback and timelines related to what is the nature of the inadequate progress, what special performance would be required to rectify the inadequacy, and what is the timeline for demonstration of the required improved performance. Students should be given an opportunity to respond in writing to any warning given.

Cases requiring mediation should be brought first to the Chair and then, if necessary to the FGSR for resolution.

See the FGSR academic appeals procedures here <https://www.ualberta.ca/graduate-studies/about/graduate-program-manual/section-9-disputes-and-resolutions/9-2-academic-grievances-and-appeals.html>

### **Termination Made by a Student**

Students wishing to terminate their own program of studies are strongly advised to discuss the issue with their supervisor, Associate Dean, Graduate students and, if desired, with an Associate Dean, FGSR before terminating their program. There may be alternative actions that are more in the student's interest.

Following this consultation if a student still wishes to withdraw from the program, the student should complete a Withdrawal form indicating on it, withdrawal from the entire program. The form should include the effective date of the proposed termination. The transcript will indicate "Voluntarily Withdrew from Program."

### **DISCIPLINE**

<https://www.ualberta.ca/governance/resources/policies-standards-and-codes-of-conduct/code-of-student-behaviour>

#### **C1. Required courses:**

See minimum registration requirements here

<https://calendar.ualberta.ca/content.php?catoid=39&navoid=12235#minimum-registration-requirements>

#### Course-based Masters Program

Students must complete a minimum of eight 3-unit graduate courses (500 level or above) as well as BME 600 during the degree program. Attendance in BME 600 is compulsory. The course selection must have the ultimate approval from the BME Associate Dean, Graduate Students. Students must also complete INT D 710, professional development training, and one 3-unit capstone project (BME 900).

#### Thesis-Based Master Program:

Students must complete a minimum of 3 graduate level (500 level or above) courses (at least 1 BME course) as well BME 600 during the degree program. Attendance in BME 600 is compulsory. Student's courses in the Thesis-Based MSc program are suggested by the supervisory committee but must have the ultimate approval from the BME Associate Dean, Graduate Students. Students must also complete INT D 710, professional development training, and complete and orally defend a thesis deemed acceptable to the BME Department and FGSR.

### PhD Program:

Students must complete a minimum of 4 graduate level courses (at least 1 BME course) as well as BME 600 during the degree program. Attendance in BME 600 is compulsory. Students with a prior Master's degree only require 2 graduate courses for the PhD program (at least 1 BME course). If a student transfers from a Master's Program to a PhD program without completing the Master's degree, all courses and time taken in the MSc program will be credited towards the PhD program (see time limit for PhD program below).

- Approval of the course list is suggested by the supervisory committee but must have the ultimate approval from the BME Associate Dean, Graduate Students. For this reason, it is important that the Supervisory Committee meet within the student's first year.
- If a suitable graduate-level BME course is not available, another graduate-level course may be taken pending approval from the BME Associate Dean, Graduate Students.
- Students must also complete INT D 710, INT D 720, professional development training, and complete and orally defend a thesis deemed acceptable to the BME Department and FGSR. Note that completion of a PhD thesis also requires successful completion of a candidacy exam as described below.

BME 600 is a seminar series course, presently required of all first year (thesis-based MSc and PhD) students. BME 600 must be taken in addition to the required credit courses. Attendance is compulsory. Course-based MSc students are required to take BME 600 and should enroll in the course towards the end of their degree program.

### **C2. Required GPA**

- All students in degree programs (including time spent as a qualifying graduate student) or diploma programs must maintain a minimum cumulative grade point average of 3.0 (B) throughout the course of the program. In cases where the cumulative grade point average falls below 3.0, the Department may recommend termination of the program or continuation in the program for a specified period as a probationary student; in any case, convocation shall not take place with a cumulative grade point average of less than 3.0. Notwithstanding the above, a student whose academic standing falls below a grade point average of 2.7 may be required to withdraw at any time.
- The pass mark in any course taken is a grade of C+ (2.3). See also FGSR Manual Ch. 7: <https://www.ualberta.ca/graduate-studies/about/graduate-program-manual/section-7-administration-of-graduate-programs/7-4-academic-standing/index.html>

*Note: As with entrance requirements, the Department of Biomedical Engineering minimum may differ from the FGSR requirement.*



### **C3. Student Program Monitoring**

- A student summary report must be filled out each year by the supervisor and student.
- Conditions of admissions are monitored regularly by the FGSR.
- Grades of individual students are monitored and approved by the FGSR after each term.
- The Department and FGSR monitor individual student time limits.
- The Department and FGSR monitor to ensure students have registered in at least the minimum number of course weights (or equivalent) in order to convocate.

**For thesis-based students, it is the responsibility of the supervisors to monitor their students' program, RE: committee members, meetings, and courses taken and their grades after each term and duration of their degree program.** It is the responsibility of the supervisor to keep the Student Progress Form up to date and to send updated forms to the Graduate Program Administrator.

Program advisors and Associate Dean, Graduate Programs will monitor progress for course-based Masters students.

### **C4. Supervisory Committee**

#### Thesis-Based MSc program:

- The MSc supervisory committee shall be comprised of a minimum of the supervisor (with primary or cross-appointment in the Department of BME) plus one fulltime faculty member. The Supervisory Committee Form shall be completed within the first year of the student's graduate program and submitted to FGSR via the BME Graduate Program Administrator.
- The Supervisory Committee must meet within the first year of the student's program and no less than once per year after that. A summary of the meeting shall be filled out and placed in the student's file.

#### PhD program:

- The PhD Supervisory Committee shall be comprised of a minimum of the three members including the supervisor (primary or cross-appointment in the Department of BME) plus two full-time faculty members. The Supervisory Committee Form shall be sent within the first year of the student's graduate program to FGSR via the BME Administrator.
- The Supervisory Committee must meet within the first year of the student's program and no less than once per year after that. A summary of the meeting shall be filled out and placed in the student's file.

Course-Based Masters in BME

- Students in this program are not required to have supervisors or supervisory committees. Once they have completed their course requirements or completed a significant volume of their course requirements, they should select a capstone supervisor who is an expert in the area that they are interested in exploring in their capstone. The Graduate Program Administrator should be notified when a capstone supervisor has been selected.

**C5. Eligibility Criteria for Supervisors & Supervisory Committee Members**

As minimum criteria, supervisors and committee members must:

- normally be full-time faculty
- be active in the general area of the student's research
- have a tenured (or tenure track) faculty appointment in a department relevant to the field
- hold a degree equivalent to or higher than that for which the student is a candidate (this would always be the case for newly appointed faculty, but certain recognized and well-established exceptions should be respected)
- demonstrate continuing scholarly or creative activity of an original nature
- must have a primary or cross-appointment in the Department of BME

For all FGSR forms go to [FGSR Forms Cabinet](https://www.ualberta.ca/graduate-studies/policies/resources-for-faculty-and-staff/forms-cabinet.html) here <https://www.ualberta.ca/graduate-studies/policies/resources-for-faculty-and-staff/forms-cabinet.html>

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**C6. Thesis Proposal and Candidacy Exam Regulations for Thesis-Based Programs**

Thesis-Based MSc Program

- A thesis proposal meeting is not required, but supervisory meetings should occur each year.
- MSc students do not require candidacy examinations

## PhD Program

- The PhD program in BME is conducted under the Biomedical Graduate Program (BMGP)
- A thesis proposal application must be completed within the first two years of program. This requirement includes both students entering into the BME PhD program with a prior Masters and students transferring from an MSc in BME to a PhD in BMGP with a minimum requirement of GPA 3.3. Guidelines and Application forms can be found accessed from the Department.
- An oral candidacy exam must be completed within the first two years of the PhD program, preferably after completion of required courses. The PhD proposal must be approved before scheduling the candidacy exam. If the student fails the candidacy exam, the student will revert to an MSc program or apply to the BME graduate committee for reexamination.
- PhD Candidacy committee: Minimum of Supervisory Committee plus one member from the Department of BME (cross- or primary appointment) and one faculty member outside of the Department of BME (minimum total of 5).
- Students must complete all required course work, INT D 710, INT D 720, Professional Development, and the Candidacy exam within the first three years of the program to meet FGSR guidelines. However, the Department requirement is to complete these within the first two years of the PhD program.

## **C7. Duration of Program**

### Course-Based Masters in BME

- A course-based masters program is recommended for 2 years and not more than 6 years. If the student is not finished after 6 years, an explanatory letter shall be sent to the Associate Dean, Graduate Students. Students in part-time programs can have up to six (6) years to complete their programs. Course-Based Masters programs are considered complete when students in the program have completed all course requirements including the capstone. The graduate programs administrator sends a notice of completion of course-based masters program to FGSR.

### Thesis-Based MSc Program

- An MSc program is recommended for 2 years (minimum) and not more than 3 years. If the student is not finished after 3 years, an explanatory letter shall be sent to the Associate Dean, Graduate Students. After a 4th year, the supervisor must apply for an extension to FGSR (see Section D below) to allow student to continue in a 5<sup>th</sup> year.

## PhD Program

- Recommended duration of the PhD program is 4 years (minimum 3 years) and should not exceed 5 years. Supervisors must provide a written letter to the BME Associate Dean, Graduate Students outlining the reasons for the PhD program extending beyond 5 years. After a 6th year, the supervisor must apply for an extension to FGSR (see Section D below) to allow the student to continue in a 7<sup>th</sup> year.

## **C 8. Thesis Defense**

Please refer to the Structure of Examining Committees on the U of A Calendar for additional information. <https://calendar.ualberta.ca/content.php?catoid=39&navoid=12236#the-role-and-structure-of-examining-committees>

MSc Thesis Committee: a minimum of 2 Supervisory Committee members plus one University Examiner. A chair from the BME department (primary or cross-appointment) is required. It is recommended that the chair be a non-examining additional member of the exam committee.

### **Master's Time Lines and Approval of the Final Oral Examining Committee**

- At least three weeks prior to the final oral examination the department MSc preliminary acceptance of thesis (<https://www.ualberta.ca/biomedical-engineering/graduate/student-resources/forms-cabinet.html>) should be completed and sent to the department before we can forward the “Notice and Approval of a Master’s Final Oral Examination” to FGSR.
- Student must supply to the examiners a copy of the thesis so that they may have adequate time to appraise the thesis

PhD Thesis Committee: Supervisory Committee plus one University Examiner and one External Examiner (must be external to the University). In addition, a non-examining/non-supervisory chair is required from the department of BME. Professors in BME who have no conflict with the exam will take rotating turns to chair exams.

### **Scheduling of PhD Final Oral Examinations**

**According to FGSR regulations, it is the responsibility of the supervisor, and not the student to arrange the final oral examinations.**

The arrangements that must be made before the final oral examination include:

- Three months in advance: The supervisor must submit the name and CV of external examiner to the BMGP / FGSR for approval.
- Five weeks in advance: Supervisory committee members must each declare in writing that the thesis is of adequate substance to warrant that the student proceed to the final examination.

- Four weeks in advance: Notice of final exam must be submitted to BMGP/FGSR for approval.
- Three weeks in advance: Distribute copies of thesis to supervisory committee and the External examiner.

External examiners and supervisory committee members deserve the courtesy of receiving a complete, carefully written thesis well in advance of the final examination and students need to know that arrangements for their thesis defenses will not be changed at the last minute.

**All students in the MSc and PhD program must give a public seminar within 2 weeks before their Final Oral examinations.**

A standard “Thesis Defense” form is to be used.

### **C 9. Thesis Submission**

For complete details on the process of thesis submission (electronic format) see Thesis Preparation, Requirements & Deadlines | Faculty of Graduate Studies and Research here <https://www.ualberta.ca/graduate-studies/current-students/academic-requirements/thesis-requirement-and-preparation/index.html>

Students may still have bound copies produced for their supervisor/personal use, should they choose.

### **C 10. Required Documentation**

#### **Ethics and Academic Citizenship Requirement:**

The Ethics and Academic Citizenship Requirement outlined by FGSR is mandatory for all graduate students. It is the student’s responsibility to complete all training and to keep track of any policy changes or changes in requirements or training delivery modes. Students are required to successfully complete University-wide online courses (INT D 710 for students in all programs plus INT D 720 for PhD students only).

Course-based MSc students must complete the above requirements before program completion. Thesis-based MSc students must complete the above requirements before the final thesis defense. PhD students must complete these requirements within the first 3 years of their program and **before** the candidacy exam.

#### **Professional Development Requirement:**

The Professional Development requirement outlined by FGSR is mandatory for all BME graduate students. See current FGSR requirements here <https://www.ualberta.ca/engineering/programs/graduate-studies/graduate-studies-professional-development.html>. Students are required to complete an Individual

Development Plan (IDP) and eight (8) hours of professional development activities. Requirements may be met by attending various workshops offered by the university.

Students are required to submit IDP to our department for their program of studies within 12 months of the program's commencement for MSc students and within 18 months of the program's commencement for PhD students.

For more information, please refer to the FGSR websites:

<https://www.ualberta.ca/graduate-studies/professional-development>

<https://www.ualberta.ca/graduate-studies/professional-development/professional-developmentrequirement>

#### **D. Program Extension:**

The FGSR will consider a departmental recommendation for an extension of the time limit for a candidate who has failed to complete all the requirements for the degree within the appropriate period.

FGSR limit for MSc is 4 years. The Department of BME limit is 3 years.

FGSR limit for Course-Based Masters is 6 years. The BME limit is 6 years.

FGSR limit for PhD is 6 years. The Department of BME limit is 5 years.

Extensions are viewed as exceptions. Requests for one or more extensions will be considered only under compelling circumstances. The department approves a first extension. Second and subsequent extensions are approved by FGSR. To qualify for an extension, candidates must present in writing to the department the causes for the delay and demonstrate substantial progress on the thesis or in the course-based program. Unanticipated events unrelated to the student's program, such as family emergency, personal crisis, and parental leave may be considered. An extension is normally granted for no more than one year.

Frequent requests by one supervisor or one department will be viewed by the FGSR as a possible indication of problems with students' supervision.

To request an extension, the department must submit a Request for a Program Extension form and attach the following information:

- a summary of the student's progress to date (the timetable for completion preferably approved by the supervisory committee)
- written justification by the department for the extension
- an explanatory letter from the supervisor
- an explanatory letter from the student with the expected date of completion

The FGSR will return its decision in writing to the department and the student. An approved extension begins when the time limit for the degree has been reached.

A candidate who is granted an extension may be required to remain in close geographic proximity to the campus until all degree requirements have been met.