

GRADUATE PROGRAM MANUAL

for

MEng, MSc, and PhD in MECHANICAL ENGINEERING

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Engineering Management at the University of Alberta

Most engineers find that their career path takes them into areas of management responsibility, either in a formal managerial role or as a leader of an engineering team or interdisciplinary group. The Engineering Management program at the University of Alberta offers a flexible program that allows a graduate engineer to broaden their knowledge of management-related topics. The program can be individually adapted to include a significant number of technical courses as well. The emphasis in the program is on a core course offering a foundation in engineering management, and a flexible selection of additional courses to meet the needs of each individual in the program.

The Engineering Management (EM) program is open to students from all engineering disciplines. It is housed for administrative purposes in the Department of Mechanical Engineering, but is not limited to students with a mechanical engineering background. It is available as three degree programs. The first is a course-based Master's program (M.Eng.), for which the degree is worded "Master of Engineering in Engineering Management in the Faculty of Engineering". The second is a thesis-based Master's program (M.Sc.), which also includes coursework; and the degree is worded "Master of Science in Engineering Management in the Faculty of Engineering". The highest academic qualification is the Ph.D. program, for which the degree is awarded as "Doctor of Philosophy in Engineering Management in the faculty of Engineering".

The Department of Mechanical Engineering recommends admissions to the Faculty of Graduate Studies and Research, coordinates the programs of ongoing students, and recommends the granting of degrees on behalf of the entire Faculty of Engineering, regardless of the undergraduate specialization of the candidates. While the Graduate Coordinator (Associate Chair, Graduate) of the Mechanical Engineering Department is the ultimate authority for the program, colleagues in the EM program provide assistance and advice. Where this manual mentions the Graduate Coordinator, it is intended that a member of the Graduate Program Committee, such as the Director of Engineering Management programs, is involved in decision making. From time to time, the Graduate Coordinator may delegate responsibility for administration of the EM program admission and course approvals to a designate in the EM program.

This program manual does not supersede any policy of the University of Alberta or its Faculty of Graduate Studies and Research (FGSR).

Admission Requirements

Persons receiving the M.Eng., M.Sc., or PhD Degree in Engineering Management must have a Bachelor's Degree in an Engineering discipline from a recognized university. The minimum admission requirements for MSc and PhD degrees in Engineering Management are an undergraduate degree in an engineering discipline, with a grade point average (GPA) of 3.0 in the last two years of undergraduate work, and a TOEFL score of at least 93 (internet-based) or 580 (paper-based) where applicable. In the case of the MEng degree in Engineering Management, the Department's minimum admission requirements are an undergraduate degree

in an engineering discipline, with a GPA of 3.5 in the last two years of undergraduate work, and a TOEFL score of at least 93 (internet-based) or 580 (paper-based) where applicable.

Work experience is recognized as a significant component of admission requirements. Applicants with exceptional or tenured work experience who do not meet the minimum admission requirement for the MEng degree in Engineering Management may apply directly to the MEng Engineering Management Admissions Review Committee (engmadm@ualberta.ca) for special consideration. These are minimum standards, and admission in a given year may be limited to those who exceed these minimum requirements. Students (including those with a lower grade point average) may be admitted on a qualifying or probationary basis based on the recommendation of the Graduate Coordinator and approval by the Faculty of Graduate Studies and Research (FGSR).

In some circumstances, qualifying admission may be offered to students who have acceptable past academic performance but require some additional courses to fill in missing background. Probationary admission may be offered to students who demonstrate that, despite a lower than standard past academic performance, they have the potential to perform at an acceptable level in the program in the future. Normally, successful work experience is a required component of a probationary admission. The Graduate Coordinator will define the terms of qualifying or probationary admission for each student.

Note that conditional students or students on academic probation may not normally take Master of Business Administration (MBA) courses until the conditions of the probation are met and their status is changed to a regular graduate student.

In cases of doubt whether a student's undergraduate program qualifies as an engineering degree, the Engineering Management Admissions Review Committee will be asked to make the judgment. In such cases, the Engineering Management Admissions Review Committee may specify additional technical courses at the undergraduate level that are required as part of a qualifying admission.

M.Eng. Degree Requirements

- Students must complete a minimum of 9 (nine) three-credit courses or equivalent, i.e. 27 (twenty seven) credits of course work, plus ENGG 600, plus a capstone project equivalent to three credits.
- The Graduate Coordinator can, upon review of the student's transcripts, experience and performance, require additional courses in excess of the twenty-seven credit minimum. These additional requirements can include courses at the undergraduate or graduate level.
- No more than four 500-level Mechanical Engineering courses can be credited towards the course requirements of the M.Eng. in Engineering Management.
- No courses at or below the 400-level will be recognized towards the 27 credit minimum in the M.Eng. degree.
- A minimum of five of the courses must be ENG M courses.

- It is not guaranteed that all courses will be available in a particular year. Students are encouraged to register early as there is no guarantee of spaces for all students.
- Note that any other course substitution (i.e., to get credit towards the above requirements from a normally ineligible course, or otherwise getting approval for a variation in degree requirements) requires the written approval of the Graduate Coordinator. Responsibility for initiating a request for a course substitution or variation in degree requirements lies with the student. Any such request should be made and processed prior to enrolling in a course. **It is the responsibility of the student to ensure that they fulfill their program requirements.**
- Students wishing to enroll in any course that is part of the MBA program offered through the School of Business must apply to do so through the Graduate Coordinator, not directly to the School of Business. Note that no spaces in daytime MBA courses are available to any registrants in the Faculty of Engineering; and only a limited number of spaces may be available in evening courses that are part of the part-time MBA program.
- A capstone project approximately equivalent to one three-credit courses is required for the M.Eng. Degree in Engineering Management. The topic and supervisor of the capstone project requires the approval of the Graduate Coordinator. A two-person faculty committee (i.e. the capstone project supervisor and one other staff member) will review the capstone project report, and must sign the completed report. One copy of the signed report must be submitted to the Departmental Graduate Secretary to confirm completion of the project; it will be retained in the student's file.
- The capstone project normally is developed on a topic of interest to the student, and may be based on some issue that arose in their previous work. Students should develop a one-page summary of their proposed capstone project topic and submit it to their project supervisor. M.Eng. students are responsible for securing a project supervisor (primary reader) and for determining the topic of their capstone project (subject to the approval of their supervisor). The Graduate Coordinator or designate (e.g. the Engineering Management program Director) may be consulted for assistance in identifying an appropriate primary and secondary reader. If students have a particular recommendation for either reader, they can so advise when they submit their capstone project outline. Note that one reader must be from the Department of Mechanical Engineering EM program, but the second reader can be from any department on campus. The student should contact the proposed project supervisor early to plan the project and set out expectations for the content, formatting, and schedule for completion. It is the responsibility of the student to ensure that the requirements set out by the supervisor are completed in a timely manner. The student must maintain registration in good standing throughout the degree program, including the project.

M.Sc. Degree Requirements

- Students must complete a minimum of 5 (five) three-credit courses or equivalent, i.e. 15 (fifteen) credits of course work, as well as passing ENGG 600, and complete and defend a thesis deemed acceptable to the Department of Mechanical Engineering and the Faculty of Graduate Studies and Research.
- The Graduate Coordinator and Graduate Coordinator in consultation with the Thesis Supervisory Committee can, upon review of the student's transcripts, experience and performance, require additional courses in excess of the fifteen-credit minimum. These

additional requirements can include courses at the undergraduate or graduate level.

- No more than three 500-level Mechanical Engineering course can be credited towards the minimum course requirement of the M.Sc. in Engineering Management.
- No courses at or below the 400-level will be recognized towards the fifteen-credit minimum in the M.Sc. degree.
- At least three of the courses must be ENG M courses.
- It is not guaranteed that all courses will be available in a particular year. Students are encouraged to register early as there is no guarantee of spaces for all students.
- Note that any other course substitution (i.e. to get credit towards the above requirements from a normally ineligible course, or otherwise getting approval for a variation in degree requirements) requires the written approval of the Graduate Coordinator. Responsibility for initiating a request for a course substitution or variation in degree requirements lies with the student. Any such request should be made and processed prior to enrolling in a course. **It is the responsibility of the student to ensure that they fulfill their program requirements.**
- Students wishing to enroll in any course that is part of the MBA program offered through the School of Business must apply to do so through the Graduate Coordinator, not directly to the School of Business. Note that no spaces in daytime MBA courses are available to any registrants in the Faculty of Engineering; and only a limited number of spaces may be available in evening courses that are part of the part-time MBA program.
- M.Sc. students must complete a thesis meeting the requirements of the Faculty of Graduate Studies and Research.

PhD Degree Requirements

The normal requirements for PhD course work after a Bachelor's degree are *30 credits (ten graduate courses). The normal requirements after a Master of Science degree are *15 credits (five graduate courses). Ph.D. students must also have passed ENGG 600. Courses require the approval of the supervisor and the Department Graduate Coordinator. Additional courses may be required by the Supervisor, Graduate Coordinator or the Thesis Supervisory Committee. Within approximately two years of the start of their program, Ph.D. students must pass a candidacy examination. Subsequently, the Ph.D. candidate must prepare and defend a thesis of high calibre on an approved topic deemed acceptable to the Department of Mechanical Engineering and the Faculty of Graduate Studies and Research. **It is the responsibility of the student to ensure that they fulfill the program requirements.**

Additional Student Responsibilities

Each student enrolled in the Engineering Management program is encouraged to consult once per year with the Graduate Coordinator or designate if there are any questions or concerns regarding compliance with the regulations outlined in this document. MEng students will likely consult with a designate (e.g., the Engineering Management program Director). Note that in light of the geographical range of part time students, this consultation can be by phone, e-mail, or in person. Responsibility for initiating this consultation lies with the student. Under normal circumstances, this consultation should take place in August or early September of each

academic year.

The purpose of the annual consultation is to review:

- The student's current proposed curriculum. Each student is specifically expected to review his/her proposed program against the degree requirements herein, to discuss any discrepancies with the Graduate Coordinator or designate, and to obtain written approval for any discrepancy. As noted above, responsibility for initiating a request for a course substitution or variation in degree requirements lies with the student; such requests should be made and processed prior to enrolling in a course.
- The student's proposed capstone project or thesis topic and supervisor.
- The student's planned completion date.
- Any other issues of concern or interest to the student.

Specific Regulations

1. INTRODUCTION

The purpose of this manual is to provide students with a statement of the rules and policy for graduate study in Engineering Management, a program offered through the Department of Mechanical Engineering. This information is meant to supplement the University Calendar, which is the primary document describing course and program requirements. This manual is concerned with program, course, and examination requirements that are specific to this program

For other information students can consult the following:

- Graduate Program Manual of the Faculty of Graduate Studies and Research (FGSR)
- International Centre
- Centre for Teaching and Learning (CTL)
- Graduate Student Assistantship Collective Agreement (GSA)

The Engineering Management Program is open to candidates who have an undergraduate degree in any engineering discipline. Engineers frequently follow a career path that sees them moving from technical work to technical management, and often into business management and senior executive positions. The purpose of the Engineering Management Graduate Program is to provide additional training to engineering graduates to help them perform more effectively in management roles. Because of the wide diversity of management roles open to engineers, the Engineering Management program places an emphasis on diversity in course offerings. Students may focus on areas of study that are of particular interest and use to them.

For an outline of the Engineering Management Program, see the program overview above, which covers course requirements, core courses, and the administrative functioning of the program. Appendix 1 summarizes the courses that are eligible within the Engineering Management Program; additional courses may be recognized with the approval of the Graduate Coordinator or designate.

Students in the M.Sc. and Ph.D. Programs in Engineering Management will have a supervisor for their thesis who will, in addition, provide supervision of the overall academic program of the student. Given that the graduate student/supervisor relationship is special, some guidelines for the conduct of supervisors and graduate students are outlined below. Graduate students experiencing difficulty in the administration of their program are encouraged to consult with the Director of the Engineering Management Program, the Graduate Coordinator of the Department of Mechanical Engineering, or the Chair of Mechanical Engineering. Other services are also available, such the Ombudsperson's Office. Early resolution of conflicts or misunderstandings is clearly beneficial to all involved.

Students in the M.Eng. Program in Engineering Management will have a supervisor for their capstone project. The student can request a particular supervisor; but this is subject to agreement by the academic. The supervisor of the capstone project does not serve as a supervisor of the overall academic program for the student. This role is filled by the Graduate Coordinator or

designate.

Some (but not all students) in the Engineering Management Program may have duties as teaching assistants. M.Eng. students are not eligible for teaching assistantships. Those students asked to serve as teaching assistants should request a copy of the Program Manual for Graduate Study in Mechanical Engineering, which may have additional information on duties and expectations for this role.

2. ADMISSION, PROMOTION, PROBATION AND LENGTH OF PROGRAM

2.1 Admission

Work experience is recognized as a significant component of admission requirements. The minimum Grade Point Average (GPA) required for admission to the Engineering Management Program is 3.0/4.0 or equivalent (3.5/4.0 for the M.Eng.). Where applicable, applicants will also be required to have a TOEFL score of at least 93 (internet-based) or 580 (paper-based). M.Eng. applicants with exceptional work experience who do not meet the minimum admission requirement may apply directly to the Engineering Management Admissions Review Committee for special consideration. Applicants whose entrance GPA does not meet the minimum but with strong supporting documentation (e.g. letters of reference, industrial experience) could be admitted on a probationary basis. Students not admissible on a probationary basis have the option of taking selected courses as a special student to demonstrate their capability and competence for graduate work in Engineering Management. However, a student taking courses as special student will not have been admitted to the Faculty of Graduate Studies and Research, and hence will not be enrolled within the Engineering Management Program, until such time as admission is granted based on academic performance.

2.2 Promotion

To continue in the Engineering Management Program, the minimum required cumulative GPA is 3.0 for students registered in the M.Eng. Program, 3.0 for students registered in the M.Sc. Program, and 3.3 for students registered in the Ph.D. Program. The cumulative GPA is evaluated at the end of each term. Students falling below the minimum level will be placed on academic probation for one term, during which they must raise their cumulative GPA above the appropriate minimum level.

Regardless of the student's category, while registered in the Faculty of Graduate Studies and Research the passing grade in any course taken is a grade of C+.

2.3 Academic Probation

A student who has been placed on academic probation must, by the end of the probationary term, obtain the required GPA in order to clear probation. If a satisfactory GPA is not achieved, the Graduate Coordinator and Chair of the Department of Mechanical Engineering may recommend to FGSR whether the student's program should be changed (e.g. M.Sc. to M.Eng.) or the student should be required to withdraw from the program.

2.4 Length of Program

The Faculty of Graduate Studies and Research sets a time limit on the overall length of a thesis-based Master's program of four years, measured from when the student is first admitted to the program.

The time limit for an M.Eng. program is six years, in order to accommodate the high number of part-time students in this program.

The time required to complete the PhD will vary with the individual candidate. The maximum time permitted is six years.

A program extension may be granted, based on an application by the student, with written justification; but an extension is not guaranteed. It is the responsibility of the student to request any program extension.

3. REGISTRATION PROCEDURES

All new graduate students must take part in a counselling session with the Graduate Coordinator, or a designate from the Engineering Management Program, and/or the student's supervisor, if one has been previously arranged, to establish a suitable program of courses and answer other questions the student may have. This session can be done by email, phone, or personal meeting. Prior to the meeting the student should prepare a proposed list of courses he/she is interested in taking, and a potential topic for a capstone project if pursuing the M.Eng. degree. The Graduate Coordinator can also help to identify individuals in the Faculty of Engineering or Faculty of Business that the student can contact as a possible project or thesis supervisor.

Not all graduate courses listed in the Calendar are given every year. If a course identified with the Graduate Coordinator or thesis supervisor is not available, the student should contact this person and discuss program changes. Please note that it is the responsibility of each student to ensure that their program satisfies the requirements set out by FGSR and the Mechanical Engineering Department.

Students who are having difficulty in a course are encouraged to discuss the situation with the instructor and/or the Graduate Coordinator or thesis supervisor. Any course withdrawal form must be reviewed and approved by the Graduate Coordinator prior to being reviewed by the Graduate Coordinator and by FGSR.

4. APPOINTMENT OF SUPERVISOR

All full time M.Sc. and Ph.D. students should be associated with a faculty member by the end of the first term (four months) of starting course work. Part-time students and students in the M.Eng. program need only identify a project/thesis supervisor when they are about to commence this portion of their program. It is the supervisor's responsibility to notify the office staff when a supervisory arrangement has been made so that the appropriate FGSR forms may be completed. It is a good idea for each student to confirm that the supervisor has complied with this requirement. This is typically done with a form filled out by the student and signed by the prospective supervisor. For full time students, if a supervisor has not been officially appointed by the appropriate time, students will be informed in writing and will be required to meet with the Graduate Coordinator to discuss the situation. If a supervisor cannot be found within the Department, the Coordinator may recommend a change in the degree program and/or withdrawal of any funding arrangements.

5. DEGREE REQUIREMENTS

5.1 Course Requirements

All degree course requirements are outlined in the Program Overview.

5.2 Project Requirements for M.Eng. in Engineering Management

M.Eng. students register in MEC E 910 Directed Research Project in the term when they will submit their M.Eng. capstone project report. (MEC E 910 has a course weight of three, making it equivalent to one normal course in terms of fees and course weight.) There is no final oral examination associated with the M.Eng. capstone project, but the project report must be read and approved by two readers, one of whom must be a department member. Students should register in Mec E 910 only when they are sure the final project will be submitted in the same term. Otherwise, additional fees may be assessed. M.Eng. students are responsible for securing a project supervisor and for determining the topic of their capstone project (subject to the approval of the supervisor).

5.3 Thesis Requirements for M.Sc. in Engineering Management

Thesis requirements for the M.Sc. degree are laid out in the Calendar and in the Thesis Manual of FGSR. An oral defence of the M.Sc. thesis is required. The structure of the final oral exam is discussed in Appendix 3.

5.4 Thesis Requirements for Ph.D. in Mechanical Engineering

Thesis requirements for the Ph.D. degree are laid out in the Calendar and in the Thesis Manual of FGSR. An oral candidacy examination and an oral defence of the Ph.D. thesis are both required. The structure of the final oral exam is discussed in Appendix 3.

5.5 Full Time vs. Part Time Enrolment

Effective September 2003, students who are admitted to any thesis-based program and who initially register full-time must register full-time for the remainder of their program.

Students with full-time status will have increased access to scholarships, bursaries, student loans, and travel funds; student loans will be considered as having interest-free status until the program is completed. Full-time status provides tax advantages in the form of an increase in the student's education amount. The GSA Dental Plan covers only those students registered as full-time on-campus students.

Incoming graduate students who intend to be part-time throughout their program must register as part-time in their first semester. The department and supervisor must be informed of this well in advance of the first term of registration.

The University defines "Full Time" as enrolment with a total of 9 units of course weight. A typical course has a weight of 3 units. Any total number of units less than 9 units per term defines the student as "Part Time". Note that course weights are not the same as fee index units. See Section 2.11 THES 90X Courses for information on using THES 90X courses to maintain full time enrolment. Students who have completed their course work and are working on their thesis research the majority of the time and meeting regularly with their supervisor must be registered full time. In addition, full-time registration is usually required if you hold a scholarship or a visa.

Part-time registration is usually reserved for those students who cannot spend the majority of their time on thesis research due to job commitments or some other exceptional circumstances. It is generally not department policy to provide funding as a TA or RA for part-time students. Nor do supervisors normally provide funding for part-time students. In addition, Canada Revenue will not allow you to claim the monthly education deduction if you are not registered full time.

It is the student's responsibility to comply with the terms of any scholarship or other contract. Failure to do so may be a breach of the Code of Student Behaviour, which has serious consequences.

5.6 Residency Requirement

The M.Eng. In Engineering Management has no residency requirement. The M.Sc. in Engineering Management has a residency requirement of two terms of full time registration. The minimum period of residence for PhD students is one academic year of full-time attendance at the University of Alberta. Exceptions require the approval of the Graduate Coordinator and Chair of the Department of Mechanical Engineering.

5.7 Continuous Enrolment

All students are required to register at least once in any September - August period; this includes part-time course based programs. Students in thesis-based programs must register in something each term, whether part-time or full-time. Failure to register in any academic year will be interpreted by FGSR as a withdrawal from the program; and the student will have to apply for re-admission and pay an FGSR readmission fee. FGSR has a Continuous Registration fee that will allow registered students to maintain their student privileges when not taking any other courses.

5.8 THES 90x Courses

Some students in the M.Sc. thesis-based program will take fewer than three courses per term but wish to be categorized as Full Time (for example, for immigration, student loan or scholarship purposes). Students can register in a course called THES 90x where $x = 3, 4, 5 \dots 9$ and is the weighting unit. FGSR also requires a minimum amount of THES registration. Students must be registered in THES 9xx for the term in which they submit their thesis. Also, all Masters programs require a minimum of ★24 in course and THES 90x weight. Hence, an M.Sc. student taking 6 courses (★18) would require ★6 of THES 90x registration.

Students in course-based programs, (M.Eng. students), cannot register in THES 90x. Any student in a course-based program taking fewer than 3 courses is therefore classified as part time. Note that this can have ramifications on visa status or student loans.

5.9 Transfer and Advanced Credit

Requests for transfer and/or advanced credit must be approved by FGSR. For thesis-based programs, a maximum of two courses (weighting of ★6) can be applied to a program. For course-based programs, the maximum number of transfer/advanced credit courses is effectively 3 courses, unless the Graduate Coordinator has required the student to take more than the minimum 9 courses.

6 EXAMINATION REQUIREMENTS

6.1 Master of Engineering in Engineering Management

A minimum of two readers, one of whom is the project supervisor, must approve the M.Eng. project report in writing (typically by signing a report completion form). The Project Supervisor may require an additional reader. There is no oral defence. One copy of the project report signed by the two readers must be provided to the graduate secretary of the department prior to graduation for retention in the Department of Mechanical Engineering.

6.2 Master of Science in Engineering Management

An oral defence of the thesis is a program requirement. The purpose is to ensure that the thesis research is of high quality, that the student carried out the work, the student understands and can interpret the results, and the thesis is written in a clear and concise manner. The procedure followed for the M.Sc. oral examination is outlined in Appendix 3.

6.3 PhD in Engineering Management

Students are admitted to the doctoral program based on the assumption that they hold a Master's degree, or equivalent, from an approved University. In addition to the required course work described above, all doctoral students must pass an oral candidacy examination and a final thesis defence. Full details of the procedures followed in each of the above examinations are given in Appendices 3 and 4, respectively. Briefly, the main features of these exams are as follows:

- (a) The candidacy exam will normally be scheduled between eighteen (18) and twenty-four (24) months after the student enters the doctoral program. It should occur after completion of the bulk of the student's course work and some progress has been made on the topic of research. This oral exam is intended to ensure that the student has adequate preparation to proceed with the thesis research. For further details on this exam, see Appendix 3.

Once the candidacy exam is passed, the department will send a notice to the FGSR indicating successful completion of the candidacy. This comment will be reflected on the student's transcript. The candidacy exam is an important milestone in a student's program. Failure to hold the exam within the time frame given above will result in action by the Graduate Coordinator and/or Department Chair.

- (b) The oral defence of a PhD thesis is conducted according to the procedure outlined in the Faculty of Graduate Studies and Research Calendar, sections 203.12 and 204.2. Further details are given in Appendix 4.

7 OTHER REQUIREMENTS

7.1 Formal First Meeting with Supervisor

For M.Sc. and Ph.D. students admitted for September 2016 and onwards, it is an FGSR requirement (Calendar section: “Time Line for the Appointment of Supervisors and Introductory Meetings”) that supervisors have and document an initial meeting with graduate students to discuss “program requirements, academic integrity requirements, the role of the supervisor, the preferred means of communication, the availability or non-availability of funding, and scholarly practices and outputs.” A copy of the signed document must be provided to the Senior Graduate Program Assistant within one month of the start of the student’s program.

7.2 Academic Integrity and Ethics Training

Ethics and academic integrity training is mandatory for all newly-admitted U of A graduate students who started their program on or after September 1, 2004.

Each student is required to successfully complete the University-wide WebCT course and ENGG 600. MSc students must complete these courses before submitting thesis and PhD students before taking the candidacy exam:

1. University wide e-class GET course
The course covers the following topics: conflict of interest, graduate student-faculty relationships, intellectual property and credit, conflict resolution, and integrity and scholarship. Students will receive certification of 5 credit hours upon completion of the entire session.
2. Registration in ENGG 600 – Engineering Ethics and Integrity
This course will be scheduled for winter terms. Graduate students should register for this on Bear Tracks.

In exceptional circumstances, such as full-time employment, a student may have difficulty attending the lectures of ENGG 600. The Associate Chair must approve any special arrangements in advance.

7.3 Professional Development

All graduate students admitted for September 2016 and onwards (optional for students admitted before September 2016) are required to complete an Individual Development Plan (IDP) and 8 hours of professional development (PD) activities.

Students are encouraged to identify activities and actions that align with their career goals, and address any skills gaps that they would like to strengthen. There are several ways to fulfill the activities requirement including attending professional development seminars offered by departments or classes integrated into existing courses. Unless noted, students will receive no more than four hours of credit from any single category of PD options, as listed below.

7.3.1 PD Categories

Students can complete professional development sessions in the following categories.

Professional Practice: This includes topics such as time management, project management, intercultural communication, being an effective team member, using strategic thinking skills, promoting creative thinking skills, and so forth. Sources for these topics are hosted by FGSR, MyGradSkills, Human Resources, and various on and off campus units.

Career Development: This includes topics related to life as a first year academic, teaching and researching at post-secondary institutions, resume writing, career forums, mentoring, preparing for a job interview and so forth. Sources for these topics are hosted by the Career Centre, FGSR, MyGradSkills, Skillsoft (under development), and various on and off campus units.

Entrepreneurship: This includes topics related to starting up a business, self-employment, and entrepreneur training campus. Sources for these topics are hosted by the ABCampus, TEC Edmonton, Career Centre, FGSR, Mitacs, Skillsoft (under development), and various on and off campus units.

Teaching: This includes topics related to teaching and can also be sessions considered for the Graduate Teaching and Learning program. Sources for these topics are hosted by the FGSR, MyGradSkills, Centre for Teaching and Learning, and various on and off campus units.

Skills Training: This includes training for safety sessions, learning additional software tools, attending workshops for skills outside the domain of their research.

Mentorship: Only formal mentorship programs that assist the student with career development can apply, such as programs offered by Career Centre, UAlberta Venture Mentoring, and Mentor-Up.

Internships: Students can meet the 8 hour requirement by participating in a registered internship program and identifying skills and attributes gained during this experience. Available programs include Mitacs Accelerate, Sustainability Scholars and the Graduate Student Internship Program.

7.3.2 What is not considered PD?

The following activities cannot be used to meet professional development requirement:

- Sessions also used towards meeting the ethics requirement
- Attending a research conference or society meeting
- Presenting a research talk or poster
- Giving a performance/concert
- Attending information sessions about University resources or programs

7.4 Wall Poster

It is a department requirement for M.Sc. and Ph.D. students to prepare and present a wall poster

on their thesis research before their oral defence. The format of the wall poster is specified by the Department. Instructions on the steps to be followed in creating a research poster in the desired format can be found on the department web site under the link to Graduate Studies in Mechanical Engineering and Engineering Management.

A copy of this wall poster will remain in the Department of Mechanical Engineering for display. Students must provide the Graduate Coordinator with an electronic copy of their poster. It is the student's responsibility to provide the supervisor with the hard copy of the poster to be displayed.

7.5 TA Orientation Classes

All students accepting a teaching assistantship from the Department of Mechanical Engineering must complete department approved Teaching Assistantship Orientation. This orientation is included in the Department's New Graduate Student Orientation session held in the first week of the semester. Failure to attend the orientation may result in the teaching assistantship being given to another student. In addition, you should take the opportunity to attend some of the training seminars offered regularly around campus. For example, seminars offered by the Center for Teaching and Learning (<http://www.ctl.ualberta.ca>) or by FGSR which regularly hosts a "Teaching Development Week" (see <http://www.gradstudies.ualberta.ca/>) which includes a series of teaching sessions for graduate students. We recommend that you attend as many of these sessions as possible.

8 GUIDELINES FOR THESIS SUPERVISORS AND M.Sc. AND Ph.D. STUDENTS

8.1 Supervisors

A supervisor's primary task is to provide an environment for the student that is conducive to research and in which the student can grow intellectually. This includes the following:

- (a) Provide appropriate guidance to the student on the nature of research and the standard expected, and be accessible to give advice and constructive criticism. At the beginning of the supervisory relationship, the student should be made aware of the normal expectations held by the supervisor and the department.
- (b) With the student, establish a realistic timetable for completion of various phases of the program.
- (c) Consider a graduate student as a "junior colleague in research".
- (d) Ensure that there are sufficient material and supervisory resources for each graduate student under supervision.
- (e) For doctoral students, work with the student to establish the supervisory committee within one year after the start of the program and ensure that it maintains contact and formally meets with the student at least once a year.
- (f) When going on leave or an extended period of absence, ensure that the student is adequately supervised by the provision of an acting supervisor (who should be a member of the supervisory committee).
- (g) Ensure that the student is aware of his/her guidelines (as listed below) and, when necessary, assist the student in meeting these.
- (h) Set up committee meetings and examinations after consultation and with full knowledge of the student. Students must be given sufficient advance knowledge of oral examinations (minimum 4 weeks).
- (i) It is the responsibility of the Department Chair or Associate Chair to nominate an external examiner, after consultation with the supervisor or the supervisory committee, and submit it to FGSR for approval two months before the final exam is scheduled.

The external examiner should not be contacting the supervisor directly regarding the thesis or making arrangements related to the examination.

The proposed external examiner must be in a position to review the thesis objectively and to provide a critical analysis of the work and the presentation. It is therefore essential that the external examiner not have a current or previous association with the student, the supervisor, or the department which would hinder this type of objective

analysis. For example, a proposed examiner who has recently been associated with the student as a research collaborator or co-author would not be eligible. A proposed external examiner must not have had recent association with the doctoral candidate's supervisor (as a former student, supervisor, or close collaborator, for instance.) A proposed external examiner should not normally be nominated more frequently than once every two years. External examiners are nominated by the Department and approved and invited by FGSR. Supervisors who are in doubt about the eligibility of a potential external examiner are urged to call the Associate Dean in the FGSR to review the case before the nomination is submitted to FGSR.

8.2 Graduate Students

All graduate students should make themselves aware of the contents of the graduate portions of the University Calendar. Graduate students take full responsibility for their own programs (course and program requirements, meeting program milestones, etc.) In addition:

- a) All thesis-based graduate students must meet with their supervisory committee at least once per year. One of these meetings will be designated by the supervisory committee as the 'main meeting'. Immediately following the 'main meeting', a completed Annual Report of the Supervisory Committee must be submitted to the Associate Chair (Graduate Program) via the Senior Graduate Program Assistant.
- b) All graduate students must maintain open communication with their supervisor and Associate Chair (Graduate Program) concerning any problem either real or perceived.
- c) All graduate students must maintain regular meetings with the supervisor and ensure that the supervisor is kept regularly apprised of all progress made and/or any concerns with the program.
- d) All graduate students should strive to make research results accessible (beyond their appearance in a thesis) to an appropriate audience.
- e) All graduate students should remain informed of all relevant deadlines for possible scholarship applications and seek advice and assistance, from the Department, as appropriate.
- f) All department keys must be returned upon completion of the degree.

8.3 Thesis Requirements

- a) Arrangements and expenses for thesis preparation, including typing, production of photographs and tables, and duplicating are the responsibility of the student. Instructions regarding thesis format and methods of thesis reproduction are found on the FGSR website at the following link:
<http://www.gradstudies.ualberta.ca/degreesuperv/thesis/prepare.htm>.

- b) It is the responsibility of the student to follow the requirements of the FGSR for the preparation and submission of your thesis. These requirements are found on the FGSR website under Degree Requirements and Supervision, Thesis Requirements.
<http://www.gradstudies.ualberta.ca/degreesuperv/thesis/prepare.htm>

9 THE UTILIZATION OF GRADUATE TEACHING ASSISTANTS

9.1 Policy on TA Assignments

9.1.1 The Function of a Graduate Teaching Assistant

The function of a Graduate Teaching Assistant (TA) is to provide assistance for faculty in a way that makes a significant contribution to the faculty member's teaching efforts and that makes an optimum contribution to the education of the student.

To accomplish this purpose the TA should be given the maximum amount of authority and responsibility that can be associated with their duties. Due to the number of available positions and the duties required within the Department, some TAs will basically function as markers in some courses. However, in many courses an arrangement between the TA and the individual instructor allows the TA to accept responsibility for certain functions such as proctoring, marking, laboratory supervision, and occasional lecturing. Other duties may be assigned with the agreement of the instructor, the department chair or Associate Chair and the graduate student. Guidelines related to marking of final examination are provided in Section 23.5.3 of University Regulations.

9.1.2 Basis for Assigning Graduate Teaching Assistants

Graduate teaching assistantships are assigned by the department Chair (or designate) in the following manner:

- a) Each term the number of assistantships is decided based on teaching requirements and departmental resources.
- b) Students in their first term of graduate studies will not normally be provided with TA support. The Department makes an exception for PhD students who have completed an MSc in Mechanical Engineering from the University of Alberta.
- c) TA allotment will be strongly dictated by the matrices identified in the Graduate Activity Report. Preference is given to experienced TAs who have received a favorable evaluation in previous terms.
- d) Where possible, a mix of experienced and new TAs will be assigned to each lab.
- e) TA assignments are made on a term-by-term basis. Inadequate performance in a term may result in the loss of an assignment for subsequent term(s).

Students on academic probation will NOT be considered for a TA as long as they remain on academic probation.

9.2 The Responsibilities of the Graduate Teaching Assistant

9.2.1 Marking

Teaching Assistants may be required to assist with marking assignments, short quizzes, grading laboratory reports, proctoring exams and compiling grade statistics. Guidelines related to marking of final examination are provided in Section 23.5.3 of University Regulations. It is expected that TAs will adhere to the University Regulations.

10 FINANCIAL SUPPORT

10.1 Eligibility and Sources

The Engineering Management Program and the Department of Mechanical Engineering do not provide financial assistance to M.Eng. students, except in exceptional circumstances. They endeavour to provide financial support to as many M.Sc. and Ph.D. graduate students as possible. Sources of funding that may be available to the department include:

- a) Graduate Teaching Assistantships
- b) Graduate Research Assistantships from research grants and contracts held by individual faculty members.

The Department has a limited number of Teaching and Research Assistantships. Decisions of financial support from the Department cannot be made until budgets for the coming academic year are finalized. This is normally at the end of April or in early May of each year.

Assistantships from grants and contracts held by individual faculty members are obtained through application to the faculty member. Most faculty members support students whom they are supervising through their research funds.

The rate of remuneration for assistantships is similar from all sources. The Graduate Students' Association negotiates the pay scale for university sponsored teaching and research assistantships. Individual faculties and faculty members attempt to follow these rates, but at times limited grant and contract monies can result in lower compensation. The Department of Mechanical Engineering has guidelines for minimum levels of compensation for domestic and international students.

Other sources of funding include:

- c) Research Travel Support (FGSR); and
- d) Scholarships (Administered by the FGSR and the Faculty of Engineering)

The scholarships and assistance available to graduate students are listed in the Awards section of the Calendar. Also consult FGSR application for general awards (available from the Senior Graduate Program Assistant). Students are responsible for preparing applications for funding from these sources. Note that there are usually separate departmental and FGSR deadlines for receipt of applications.

10.2 Time Limits for Funding and Length of Program

10.2.1 Funding

Funding is normally available only to full-time students registered in thesis-based programs.

For M.Sc. students the department limits the total time over which a student can expect to

receive financial support from sources (a), (b), and (c) mentioned above to 20 months following entry to the program. This time may be extended by up to 4 months upon application to the Department Chair. Note that the time is measured from when the student begins the Master's program, not from when they begin to receive any financial support.

For PhD students, the limit for sources (a) and (b) is 3 years from the time a student begins a PhD program.

10.2.2 Length of Program

The FGSR sets time limits on the overall length of thesis-based Master's and Doctoral programs. These are 4 and 6 years, respectively, measured from when the student is first admitted to the program. In the special case of a Master's student who is reclassified as a provisional doctoral candidate, all degree requirements must be fulfilled within 6 years from when they first registered in the Master's program.

Requests for program extensions must be strongly justified and approved by FGSR.

Appendix A - Oral Examination Procedures (MSc)

The make-up of the Examination Committee consists of the following:

- Minimum of three committee members which must include the supervisor/supervisory committee
- At least two must be 'U of A Faculty Examiners'
- At least one must be an 'arm's length examiner'
- All members must attend the examination
- Must be chaired by a faculty member from inside the department

For complete details on committee membership and definitions of 'U of A Faculty Examiners' and 'arm's length examiner' please refer to the FGSR Graduate Program Manual.

Notes:

1. The 'presentation component' of the oral examination is open to the university community. The examination committee chair is the moderator.
2. For MSc students, the thesis supervisor(s) and chair of the oral examination committee are NOT the same person.
3. The FGSR must receive the MSc Examination Notice at least three weeks in advance of the exam date
4. The examiners must be provided a copy of the thesis at least three weeks in advance of the exam date.

TIME	ACTION BY EXAMINATION COMMITTEE CHAIR
When the supervisor requests the oral examination	Go over the candidate's academic record and ensure that the degree requirements have been met.
Immediately after publication of the Notice of Oral exam (at least 3 weeks for MSc)	<p>Check that the room is booked and that appropriate notices have been distributed to announce the (open) seminar component of the examination to the university community.</p> <p>See the supervisor(s) and ask him/her to prepare a summary of the candidate's academic record for the oral. Make sure the supervisor has the file.</p>
1 week before the exam	Arrange to see the candidate and explain the procedures to be followed. The candidate is expected to present a summary of his/her work (20 - 25 minutes). The presentation should outline the problem investigated, the methods used and the results obtained. Remember that the committee has read the thesis and that the purpose of the presentation is for the committee and general audience to hear the student's interpretation of his/her achievements and to give the student the opportunity to present his/her research and become more at ease in the room.
On the day of the examination, in the examination room	<p>Chair acts as moderator. Begin the presentation promptly (you may wish to post a notice: 'exam in progress - do not enter' on the closed door once the presentation begins. This will avoid interruption).</p> <p>Welcome the audience, introduce the candidate and ask the candidate to go ahead with a 20-25 minute presentation. Do not allow questions from audience during the presentation. However members of the examining committee may be permitted to ask short questions only, for clarity, during the presentation. Once the presentation is complete invite questions from the audience (5-10 minutes. Following this question and answer session, adjourn the presentation and ask the non-committee members to leave.</p>

Following the presentation, in the examination room (committee members only)	<p>Introduce everyone, if necessary, and welcome them. State purpose of meeting.</p> <p>Summarize these procedures for the benefit of everyone.</p> <p>Ask candidate to leave.</p>
Next 5-10 minutes	<p>Ask the supervisor(s) to summarize the student's academic record pertaining to the degree being sought so that the committee members are assured that the course requirements have been met</p> <p>Ask candidate to return.</p>
Time variable	<p>Question time – normally two rounds of questions.</p> <p>Round one: (Explain to members of the committee that they must await their turn - the candidate and the questioner should not be disturbed by interruptions), approx. 10 min. each. Start with external examiners, then go to departmental examiners, then supervisor(s) last. (Chair prompts, if necessary, if an area hasn't been covered.)</p>
	Round two: if necessary, same order.
5 minutes	Ask the candidate if he/she wishes to say anything else.

DECISION

Ask the candidate to leave. Ask each member of the committee:

- a. Is the candidate's general knowledge in field of his/her thesis sufficient for the awarding of the degree? If reservations are expressed, determine a suitable procedure for the candidate to meet this requirement.
- b. Is the thesis:
 - i. Acceptable as is?
 - ii. Acceptable with revisions?
 - iii. Requiring major revisions? (results is “adjourned” or “fail”)
 - iv. Not acceptable? (results is “adjourned” or “fail”)

The decision of the examining committee will be based both on the content of the thesis and on the student's ability to defend it. The final examination may result in one of the following outcomes:

- Adjourned
- Pass
- Pass subject to revisions
- Fail

There is no provision for a final examination to be "passed subject to major revisions".

If the Examining Committee fails to reach a decision, the department will refer the matter to the Dean, FGSR, who will determine an appropriate course of action.

EXPLANATION OF DECISIONS

Adjourned: An adjourned examination is one that has been abandoned officially. A majority of examiners must agree to an outcome of Adjourned. The final examination should be adjourned in the following situations:

- The revisions to the thesis are sufficiently substantial that it will require further research or experimentation or major reworking of sections, or if the committee is so dissatisfied with the general presentation of the thesis that it will require a reconvening of the examining committee. In such circumstances the committee cannot pass the student, and must adjourn the examination.
- The committee is dissatisfied with the student's oral presentation and defence of the thesis, even if the thesis itself is acceptable with or without minor revisions.
- Compelling, extraordinary circumstances such as a sudden medical emergency taking place during the examination.
- Discovery of possible offences under the Code of Student Behaviour after the examination has started.

If the examination is adjourned, the committee should:

- Specify in writing to the student, with as much precision as possible, the nature of the deficiencies and, in the case of revisions to the thesis, the extent of the revisions required. Where the oral defence is unsatisfactory, it may be necessary to arrange some discussion periods with the student prior to reconvening the examination.
- Decide upon a date to reconvene. If the date of the reconvened examination depends upon the completion of a research task or a series of discussions, it should be made clear which committee members will decide on the appropriate date to reconvene. This new examination must be held within six months of the initial examination.
- Make it clear to the student what will be required by way of approval before the examination is reconvened (e.g. approval of the committee chair or supervisor, approval of the entire committee, or of select members of the committee).
- Specify the supervision and assistance the student may expect from the committee members in meeting the necessary revisions.
- Advise the FGSR in writing of the adjournment and the conditions.
- When the date is set for the adjourned final examination, the department will notify the Dean of FGSR. Normally, a Pro Dean attends the examination.

Pass: All or all but one of the examiners must agree to an outcome of Pass. If the student passes the examination, the department should submit a completed Thesis Approval/Program Completion form to the FGSR. If one of the examiners fails the student, that examiner does not have to sign this form. The form is available on the FGSR website (see Forms Cabinet).

Pass Subject to Revisions: All or all but one of the examiners must agree to an outcome of Pass Subject to Revisions. The student has satisfactorily defended the thesis but the revisions to the thesis are sufficiently minor that it will not require a reconvening of the examining committee.

If the examining committee agrees to a “Pass subject to revisions” for the student, the chair of the examining committee must provide in writing, within five working days of the examination, to the Dean, FGSR, the graduate coordinator, and the student:

- the reasons for this outcome,
- the details of the required revisions,
- the approval mechanism for meeting the requirement for revisions (e.g., approval of the examining committee chair or supervisor, or approval of the entire examining committee, or select members of the committee), and
- the supervision and assistance the student can expect to receive from committee members.

The student must make the revisions within six months of the date of the final examination. Once the required revisions have been made and approved, the department should submit a completed Thesis Approval/Program Completion form to the FGSR indicating "pass subject to revisions". If one of the examiners fails the student, that examiner does not have to sign the form. If the required revisions have not been made and approved by the end of the six months deadline, the outcome of the examination is a Fail.

Fail: All or all but one of the examiners must agree to an outcome of Fail. If the examination result is a Fail, no member of the examining committee signs the Thesis Approval/Completion form.

When the outcome is a Fail, the committee chair will provide the reasons for this decision to the graduate coordinator. The department will then provide this report, together with its recommendation for the student's program, to the Dean of FGSR and to the student.

An Associate Dean, FGSR will normally arrange to meet with the student and with the graduate coordinator before acting upon any department recommendation that affects the student's academic standing.

AFTER THE DECISION

1. Re-admit candidate and explain the decision of the committee. In the event of an unfavorable decision, some tact will be required. The supervisor may wish to quickly outline the decision before the student is readmitted to the examination room. Modifications to the thesis which are typographical in nature should be given to the candidate for incorporation into the thesis.
2. The student should bring the Thesis Approval/Program Completion form to the exam and Part 2 will be completed by the examining committee at the end of the in camera discussion. The committee chair signs on behalf of the external reader if the reader does not attend the doctoral exam.
3. Supervisor(s) normally withhold their signature(s) pending completion of minor corrections at the discretion of the committee.
4. Thank everybody and close the exam.

After all examiners and supervisor(s) have signed, the form should be returned to the Department to be completed by the Senior Graduate Program Assistant and signed by the Associate Chair (Graduate). One copy of the form will be kept for Department file and original sent to the FGSR.

ADDITIONAL COMMENTS

1. Most oral examinations take 2-3 hours. Make sure room booking time is adequate.
2. Make sure the candidate knows that the supervisor(s) probably would not have called the oral if he/she does not think the candidate is ready.
3. Let the candidate use what audio-visual aids are necessary to him/her. The candidate probably knows best because it is his/her work (or should be!).
4. Try to foster an atmosphere of relaxed confidence.
5. Let the student answer the questions!

Appendix B - Candidacy Examination (PhD students only)

The Candidacy examination should be taken as early as possible in the student's program. At this time, most course work should be completed and the student should have spent several months performing literature search, defining the research topic, etc. The exam should be between 18 and 24 months after the student first starts the program. FGSR requires that the exam be held not less than six months prior to taking the final oral examination. Once the candidacy exam is passed, the department sends a notice to the FGSR indicating successful completion of the candidacy. The date will be reflected on the student's transcript.

The purpose of the candidacy examination is to assess the student's knowledge "of the discipline and of the subject matter relevant to the thesis" and the student's "ability to pursue and complete original research at an advanced level". The department has historically taken a broad view as to what constitutes the "discipline." Students can be expected to answer questions on a broad range of topics within the scope of mechanical engineering. Students should discuss this with their supervisor well before the exam is to be taken in order to be well prepared.

During the candidacy examination, only minimal attention should be given to the work done on the thesis. However, the student is required to give a 20 - 25 minute presentation on the proposed research topic. This presentation will be open to the university community. In addition, the student must prepare a **minimum one-page typed summary of his/her research topic (with a recommended maximum of 20 pages)** to be given to all committee members at least one week before the examination. The student should also inquire as to the general nature of the questions to be expected from the committee members. The first round of questions will be concerned with general topics and will test the student's general knowledge of the discipline. The second and subsequent rounds of questioning will be concerned with topics related to the candidate's area of research and his/her ability to carry the research through to completion. At this stage the supervisory committee should ask questions that test the viability of the thesis proposal.

Examining Committee Structure

The make-up of the Examination Committee consists of the following:

- Minimum of five committee members and must include the supervisory committee
- At least three must be 'U of A Faculty Examiners'
- At least two must be 'arm's length examiners'
- All members must attend the examination
- Must be chaired by a faculty member who is not the supervisor (or co-supervisor) but is a member of the student's home department. If the chair is not a member of the examining committee (FGSR encourages this arrangement) the chair does not vote.
- All members must attend the exam

The Chair may participate in the questioning, but does NOT vote on the final decision. The Chair is responsible for the conduct of the exam and moderating the presentation and the discussion. For complete details on committee membership and definitions of 'U of A Faculty Examiners' and 'arm's length examiner' please refer to the FGSR Graduate Program Manual.

TIME	ACTION BY EXAMINATION COMMITTEE CHAIR
When the supervisor requests the oral examination	Go over the student's academic record and ensure that they have completed most, if not all, of the formal course requirements.
Immediately after publication of the Notice of Oral exam (at least 3 weeks prior to the examination)	<p>Check that the room is booked and that appropriate notices have been distributed to announce the (open) seminar component of the examination to the university community.</p> <p>See the supervisor(s) and ask him/her to prepare a summary of the candidate's academic record for the oral. Make sure the supervisor(s) has the file.</p>
About 1 week before the exam	Arrange to see the candidate and explain the procedures to be followed. The candidate is expected to present a summary of his/her work (20-25 minutes), completed and proposed. This will give the student a chance to become accustomed to addressing the committee and provide a starting point for questioning. Make sure the candidate is well-prepared
On the day of the examination, in the examination room	<p>Chair acts as moderator. Begin the presentation promptly (you may wish to post a notice: 'exam in progress - do not enter' on the closed door once the presentation begins. This will avoid interruption).</p> <p>Welcome the audience, introduce the candidate and ask the candidate to go ahead with a 20- 5 minute presentation. Do not allow questions from the audience during the presentation. However, members of the examination committee may be permitted to ask short questions only, for clarity, during the presentation. Once the presentation is complete, invite questions from the audience (5 - 10 minutes). Following this question and answer session, adjourn the presentation and ask the non-committee members to leave.</p>
<p>Following the presentation, in the examination room (committee members only) (first 5 minutes)</p> <p>First five minutes</p>	<p>Introduce everyone, if necessary, and welcome them. State purpose of meeting.</p> <p>Summarize these procedures for the benefit of everyone.</p>

	Ask student to leave.
Next 5-10 minutes	Ask the supervisor(s) to summarize the student's academic record pertaining to the degree being sought so that the committee members are assured that the course and other examination requirements have been met. Ask student to return.
Oral Questioning	Round one: (Explain to members of the committee that they must await their turn - the candidate and the questioner should not be disturbed by interruptions), approx. 10 min. each. Start with external examiners, then go to departmental examiners, then supervisor(s) last. The Chair may prompt, if necessary, if an area hasn't been covered. Round two: repeat same order. Round three: if necessary, same order.
5 minutes	Ask student if he/she wishes to say anything else.

DECISION

The candidacy examination must be held within three years of the commencement of the program in accordance with the FGSR Graduate Program Manual.

The candidacy examination must be passed no less than six months prior to taking the final examination.

Students must demonstrate to the satisfaction of the examining committee that they possess:

- a. an adequate knowledge of the discipline and of the subject matter relevant to the thesis;
- b. the ability to pursue and complete original research at an advanced level; and
- c. the ability to meet any other requirements found in the department's published policy on candidacy examinations.

The candidacy examination may result in one of the following outcomes:

- Adjourned
- Pass
- Conditional pass
- Fail and repeat the candidacy
- Fail with a recommendation to terminate the doctoral program or for a change of category to a master's program.

If the Examining Committee fails to reach a decision, the department will refer the matter to the Dean, FGSR, who will determine an appropriate course of action.

EXPLANATION OF DECISIONS

Adjourned: A majority of examiners must agree to an outcome of Adjourned. The candidacy examination should be adjourned in the event of compelling, extraordinary circumstances such as a sudden medical emergency taking place during the examination or possible offences under the Code of Student Behaviour after the examination has started.

Pass: All or all but one of the examiners must agree to an outcome of Pass. If the student passes the candidacy examination, the department should complete the Report of Completion of Candidacy Examination form and submit it to the FGSR. This form is also available in the Forms Cabinet on the FGSR website under "Records".

Conditional Pass: A majority of examiners must agree to an outcome of Conditional Pass. If the candidacy examining committee agrees to a conditional pass for the student, the chair of the examining committee will provide in writing within five working days to the Dean, FGSR, the graduate coordinator and the student:

- the reasons for this recommendation,
- the details of the conditions,
- the timeframe for the student to meet the conditions,

- the approval mechanism for meeting the conditions (e.g. approval of the committee chair or supervisor, or approval of the entire committee, or select members of the committee), and
- the supervision and assistance the student can be expected to receive from committee members.

Conditions are subject to final approval by the Dean, FGSR.

At the deadline specified for meeting the conditions, two outcomes are possible:

- All the conditions have been met. In this case, the department will complete the Report of Completion of Candidacy Examination form and submit it to the FGSR; or
- Some of the conditions have not been met. In this case, the outcome of the candidacy examination is a Fail, and the options below are available to the examining committee. Note that the options are different after a failed second candidacy examination.

Fail: If the candidacy examining committee agrees that the student has failed, the committee chair will provide the reasons for this recommendation to the department. The graduate coordinator will then provide this report, together with the department's recommendation for the student's program, to the Dean, FGSR, and to the student.

For failed candidacy examinations, an Associate Dean, FGSR, normally arranges to meet with the student and others as required before acting upon any department recommendation.

The options available to the examining committee when the outcome of a student's candidacy exam is "Fail" are:

- **Repeat the Candidacy:** A majority of examiners must agree to an outcome of Fail and Repeat the Candidacy. If the student's first candidacy exam performance was inadequate but the student's performance and work completed to date indicate that the student has the potential to perform at the doctoral level, the examining committee should consider the possibility of recommending that the student be given an opportunity to repeat the candidacy exam. Normally, the composition of the examining committee does not change for the repeat candidacy exam. If the recommendation of a repeat candidacy is formulated by the examining committee and approved by the FGSR, the student and graduate coordinator are to be notified in writing of his or her exam deficiencies by the chair of the examining committee. The second candidacy exam is to be scheduled no later than six months from the date of the first candidacy. In the event that the student fails the second candidacy, the examining committee shall recommend one of the remaining two options to the department.
- **Change of Category to a Master's Program:** All or all but one of the examiners must agree to an outcome of Fail and Change of Category to a Master's Program. This outcome should be considered if the student's candidacy examination performance was inadequate and the student's performance and work completed to date indicates that the student has the potential to complete a master's, but not a doctoral, program; or
- **Termination of the Doctoral Program:** All or all but one of the examiners must agree to an outcome of Fail and Terminate the Doctoral Program. If the student's performance

was inadequate, and the work completed during the program is considered inadequate, then the examining committee should recommend termination of the student's program.

AFTER THE DECISION

1. Re-admit candidate and explain the decision of the committee. In the event of an unfavorable decision, some tact will be required. The supervisor may wish to quickly outline the decision before the student is readmitted to the examination room.
2. In the event of a pass decision: Discuss the possible avenues of research to pursue. Outline possible deficiencies and the recommended action to clear those deficiencies. Further courses and/or reading matter may be suggested. If the deficiencies are judged significant, ensure that the supervisory committee and student agree on the mechanism for determining that the student clears the deficiencies.
3. In the event of a fail decision: Discuss the Departmental recommendation for the student's program. If the recommendation is to repeat the candidacy, explain the procedure discussed previously in the footnote to that option. Further courses and/or reading matter may be suggested. This latter task might be left to the supervisor and/or supervisory committee.
4. Thank everybody and close the exam.

If successful, inform the department Graduate Assistant and the Report of Completion of Candidacy Examination will be completed and signatures obtained. The Department will forward to FGSR a notice indicating successful completion of the candidacy. The date will be reflected on the student's transcript.

If there were significant deficiencies send a memo to FGSR (copy to the student) outlining the steps to be taken; the Department will hold the form until the supervisory committee/Associate Chair notifies FGSR that the candidate has overcome the deficiencies.

If the student is not successful in the examination, the department will inform FGSR in writing (copy to the student) of the outcome and the recommendations for the student's program.

ADDITIONAL COMMENTS

1. Most oral examinations take 2-3 hours. Make sure room booking time is adequate.
2. Make sure the candidate knows that the supervisor(s) probably would not have called the oral if he/she does not think the candidate is ready.
3. Let the candidate use what audio-visual aids are necessary to him/her. The candidate probably knows best because it is his/her work (or should be!).
4. Try to foster an atmosphere of relaxed confidence.
5. Let the student answer the questions!

Appendix C - Final Examination (PhD)

The make-up of the PhD Final Examination Committee is as follows:

- At least 5 committee members consisting of the supervisory committee and normally the addition of two other faculty members
- Normally all members are full-time faculty
- At least three members must be 'U of A Faculty Examiners'
- At least two members must be 'Arm's Length Examiners'
- One member must be an external examiner/reader from outside the University
- In addition to the external must have a minimum of one additional arm's length member at the examination who comes new to the examination (but may have served on the candidacy examining committee)
- Must be chaired by a faculty member who is not the supervisor but is a member of the student's home department. If the chair is not a member of the examining committee (FGSR encourages this arrangement), the chair does not vote.

Must have a minimum of five members in attendance at the exam. If a reader is used, five members must still be present at the examination. However, if teleconferencing is used for the external then only a minimum of four other members need to be appointed since there is active participation by the external. The basic element is to have a minimum of five members present. For complete details on committee membership and definitions of 'U of A Faculty Examiners' and 'arm's length examiner' please refer to the FGSR Graduate Program Manual.

Notes:

1. The 'presentation component' of the oral examination is open to the university community. The examination committee chair is the moderator.
2. For PhD students, the thesis supervisor(s) and chair of the oral examination committee are NOT the same person.

It is the responsibility of the Department Chair or Associate Chair to nominate an external examiner and submit the name to FGSR for approval. This important step must be initiated at least 3 months in advance of the proposed defence date. The external examiner should not be contacting the supervisor or student directly regarding the thesis or making arrangements related to the examination.

The external examiner shall receive the thesis from the department at least four weeks before the examination.

TIME	ACTION BY EXAMINATION COMMITTEE CHAIR
When the supervisor requests the oral examination notice	<p>Go over the candidate's academic record and ensure that the course requirements have been met.</p> <p>Check that the supervisor(s) has received approval for the External Examiner from the FGSR.</p>
Immediately after publication of the Notice of Oral exam (at least 3 weeks prior to the PhD Exam)	<p>Check that the room is booked and that appropriate notices have been distributed to announce the (open) seminar component of the examination to the university community.</p> <p>See the supervisor(s) and ask him/her to prepare a summary of the candidate's academic record for the oral. Make sure the supervisor has the file.</p>
About 1 week before the exam	<p>Arrange to see the candidate and explain the procedures to be followed. The student should meet with committee members (but NOT the external examiner) before the defence to see if there are any particular areas of concern.</p> <p>The candidate should be prepared to present a summary of his/her work (maximum 30 minutes). The presentation should outline the problem investigated, the methods used and the results obtained. Remember that the committee has read the thesis and that the purpose of the summary is for the general audience and the committee to hear the student's interpretation of his/her achievements and also to give the student a chance to talk and become more at ease in the room.</p>
On the day of the examination, in the examination room	<p>Chair acts as moderator. Begin the presentation promptly (you may wish to post a notice: 'exam in progress - do not enter' on the closed door once the presentation begins. This will avoid interruption).</p> <p>Welcome the audience, introduce the candidate and ask the candidate to go ahead with a 25-30 minute presentation. Provide a 5 minute warning at 25 minutes, if necessary. Do not</p>

	allow questions from the audience during the presentation. However, members of the examination committee may be permitted to ask short questions only, for clarity, during the presentation. Once the presentation is complete, invite questions from the audience (5 - 10 minutes). Following this question and answer session, adjourn the presentation and ask the non-committee members to leave.
Following the presentation, in the examination room (committee members only) (first 5 minutes)	Introduce everyone, if necessary, and welcome them. State purpose of meeting.
Next 5-10 minutes	Summarize these procedures for the benefit of everyone. Ask candidate to leave. Ask the supervisor(s) to summarize the candidate's academic record pertaining to the degree being sought so that the committee members are assured that the course and other examination requirements have been met.
	Ask student to return.
Time variable	Question time - 2 or 3 rounds of questions
Round One	Explain to members of the committee that they must await their turn - the candidate and the questioner should not be disturbed by interruptions. Examiners have approximately 15 minutes each. Start with external examiners, then go to departmental examiners, then supervisor(s) last. The Chair may prompt, if necessary, if an area has not been covered
.	Round two: repeat same order. Round three: if necessary, same order.
5 minutes	Ask candidate if he/she wishes to say anything else.

DECISION

Ask the candidate to leave. Ask each member of the committee:

- a. Is the candidate's general knowledge in field of his/her thesis sufficient for the awarding of the degree? If reservations are expressed, determine a suitable procedure for the candidate to meet this requirement.
- b. Is the thesis:
 - i. Acceptable as is?
 - ii. Acceptable with revisions?
 - iii. Requiring major revisions? (results is “adjourned” or “fail”)
 - iv. Not acceptable? (results is “adjourned” or “fail”)

The decision of the examining committee will be based both on the content of the thesis and on the student's ability to defend it. The final examination may result in one of the following outcomes:

- Adjourned
- Pass
- Pass subject to revisions
- Fail

There is no provision for a final examination to be "passed subject to major revisions".

If the Examining Committee fails to reach a decision, the department will refer the matter to the Dean, FGSR, who will determine an appropriate course of action.

EXPLANATION OF DECISIONS

Adjourned: An adjourned examination is one that has been abandoned officially. A majority of examiners must agree to an outcome of Adjourned. The final examination should be adjourned in the following situations:

- The revisions to the thesis are sufficiently substantial that it will require further research or experimentation or major reworking of sections, or if the committee is so dissatisfied with the general presentation of the thesis that it will require a reconvening of the examining committee. In such circumstances the committee cannot pass the student, and must adjourn the examination.
- The committee is dissatisfied with the student's oral presentation and defence of the thesis, even if the thesis itself is acceptable with or without minor revisions.
- Compelling, extraordinary circumstances such as a sudden medical emergency taking place during the examination.
- Discovery of possible offences under the Code of Student Behaviour after the examination has started.

If the examination is adjourned, the committee should:

- Specify in writing to the student, with as much precision as possible, the nature of the deficiencies and, in the case of revisions to the thesis, the extent of the revisions required. Where the oral defence is unsatisfactory, it may be necessary to arrange some discussion periods with the student prior to reconvening the examination.
- Decide upon a date to reconvene. If the date of the reconvened examination depends upon the completion of a research task or a series of discussions, it should be made clear which committee members will decide on the appropriate date to reconvene. This new examination must be held within six months of the initial examination.
- Make it clear to the student what will be required by way of approval before the examination is reconvened (e.g. approval of the committee chair or supervisor, approval of the entire committee, or of select members of the committee).
- Specify the supervision and assistance the student may expect from the committee members in meeting the necessary revisions.
- Advise the Dean of the department's Faculty following the procedures established for this purpose.
- Advise the FGSR in writing of the adjournment and the conditions.
- When the date is set for the adjourned final examination, the department will notify the Dean of the department's Faculty and the FGSR. Normally, a Pro Dean attends the examination.

Pass: All or all but one of the examiners must agree to an outcome of Pass. If the student passes the examination, the department should submit a completed Thesis Approval/Program Completion form to the FGSR. If one of the examiners fails the student, that examiner does not have to sign this form. The form is available on the FGSR website (see Forms Cabinet).

Pass Subject to Revisions: All or all but one of the examiners must agree to an outcome of Pass Subject to Revisions. The student has satisfactorily defended the thesis but the revisions to the thesis are sufficiently minor that it will not require a reconvening of the examining committee.

If the examining committee agrees to a "Pass subject to revisions" for the student, the chair of the examining committee must provide in writing, within five working days of the examination, to the Dean, FGSR, the graduate coordinator, and the student:

- the reasons for this outcome,
- the details of the required revisions,
- the approval mechanism for meeting the requirement for revisions (e.g., approval of the examining committee chair or supervisor, or approval of the entire examining committee, or select members of the committee), and
- the supervision and assistance the student can expect to receive from committee members.

The student must make the revisions within six months of the date of the final examination. Once the required revisions have been made and approved, the department should submit a completed Thesis Approval/Program Completion form to the FGSR indicating "pass subject to revisions". If one of the examiners fails the student, that examiner does not have to sign the form. If the

required revisions have not been made and approved by the end of the six months deadline, the outcome of the examination is a Fail.

Fail: All or all but one of the examiners must agree to an outcome of Fail. If the examination result is a Fail, no member of the examining committee signs the Thesis Approval/Completion form.

When the outcome is a Fail, the committee chair will provide the reasons for this decision to the graduate coordinator. The department will then provide this report, together with its recommendation for the student's program, to the Dean of the department's Faculty, the FGSR, and to the student.

An Associate Dean, FGSR will normally arrange to meet with the student and with the graduate coordinator before acting upon any department recommendation that affects the student's academic standing.

AFTER THE DECISION

1. Re-admit candidate and explain the decision of the committee. In the event of an unfavorable decision, some tact will be required. The supervisor may wish to quickly outline the decision before the student is readmitted to the examination room. Modifications to the thesis which are typographical in nature should be given to the candidate for incorporation into the thesis.
2. The student should bring the Thesis Approval/Program Completion form to the exam and Part 2 will be completed by the examining committee at the end of the in camera discussion. The committee chair signs on behalf of the external reader if the reader does not attend the doctoral exam.
3. Supervisor(s) normally withhold their signature(s) pending completion of minor corrections at the discretion of the committee.
4. Thank everybody and close the exam.

After all examiners and supervisor(s) have signed, the form should be returned to the Department to be completed by the Senior Graduate Program Assistant and signed by the Associate Chair (Graduate). One copy of the form will be kept for Department file and original sent to the FGSR.

ADDITIONAL COMMENTS

1. Most oral examinations take 2-3 hours. Make sure room booking time is adequate.
2. Make sure the candidate knows that the supervisor(s) probably would not have called the oral if he/she does not think the candidate is ready.
3. Let the candidate use what audio-visual aids are necessary to him/her. The candidate probably knows best because it is his/her work (or should be!).
4. Try to foster an atmosphere of relaxed confidence.
5. Let the student answer the questions!