

GRADUATE PROGRAM MANUAL

for

**MEng, MSc, and PhD in MECHANICAL ENGINEERING and
ENGINEERING MANAGEMENT**

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Preamble

The purpose of this manual is to provide graduate students, staff and faculty members with a statement of the rules and policies for graduate study in the Department of Mechanical Engineering (“the Department”). It is most relevant to graduate students pursuing any of an MEng, MSc or PhD in either of Mechanical Engineering or Engineering Management.

The information contained herein is meant to supplement the University of Alberta 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 the Department. The Department’s rules, policies and timelines for admission and promotion may be more stringent than those of the Faculty of Graduate Studies and Research (“FGSR”) and are fully described below. On the other hand, none of the material below is meant to contravene the rules and policies of FGSR or the University as stated in the Calendar. In the event of a discrepancy, the Calendar shall be considered the authoritative document.

All graduate students within the Department require either a thesis (MSc, PhD) or capstone project (MEng) supervisor. Given the particular importance of the graduate student/supervisor relationship, some guidelines for the conduct of supervisors and graduate students are also included below. Graduate students experiencing difficulty in the administration of their program are encouraged to consult with the Associate Chair Graduate (“ACGrad”). Early resolution of conflicts or misunderstandings is clearly beneficial to all involved. Other sources of assistance are also briefly outlined.

Also included in this document are guidelines for the duties of MSc/PhD teaching assistants (“TAs”) and instructors. These guidelines are included to help both faculty members and students understand their respective pedagogical roles. Of course, the range of possible TA assignments is broad and therefore a TA who is assigned to a particular course should consult with the instructor of that course as soon as possible to clarify the expected duties and responsibilities.

In this manual, information that pertains specifically to the Engineering Management program shall appear in **red**. Information that pertains specifically to the Mechanical Engineering program shall appear in **blue**.

[EngM] 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 program is open to students from all engineering disciplines. For administrative purposes, the program is housed in the Department of Mechanical Engineering, but it is not limited to students with a mechanical engineering background. Although the ACGrad is the ultimate authority for the program, faculty colleagues whose research/teaching includes topics related to engineering management may provide assistance and advice. Indeed, and from time to time, the ACGrad may delegate responsibility

for administration of the Engineering Management program (admission, course approvals, etc.) to one of these faculty colleagues.

Graduate students requiring additional information over and above what is presented below are encouraged to read/consult

- The FGSR Graduate Program Manual,
- The International Centre,
- The Centre for Teaching and Learning (CTL),
- The Collective Agreement of the Graduate Students' Association ("GSA"),
- The Graduate Student Ombudperson, and/or
- The Copyright Office.

1. ADMISSION, PROMOTION, PROBATION AND LENGTH OF PROGRAM

1.1 Admission

1.1.1 All applicants are expected to hold or shortly receive a Bachelor's Degree in engineering (or a closely aligned field) from a recognized university. The minimum Grade Point Average ("GPA") required for admission to the MEng program is 3.5/4. The minimum GPA required for admission to either of the MSc or PhD programs is 3.0/4. Under exceptional circumstances (e.g. a significant record of high-impact work in industry), applicants with below-minimum GPAs may be considered, however, such cases are expected to be rare. Subject to the approval of the ACGrad and FGSR, MSc and PhD applicants might also be admitted to the Department on a qualifying or probationary basis e.g. when they can demonstrate the potential to perform at a high-level notwithstanding inferior academic performance from the past.

1.1.2 In general, a thesis-based Master's degree is required for admission to the PhD program. Under exceptional circumstances, admission without a Master's degree may be considered, particularly for scholarship-level students. Students who intend to pursue doctoral studies and have a Bachelor's degree will normally be enrolled in the MSc program. After one year in the MSc program, a student may be allowed to transfer to the PhD program. This decision is not automatic and requires above-average performance plus a strong recommendation from the student's supervisor/supervisory committee and the ACGrad. Admission to the PhD program after a Master's degree is obtained only by application.

1.1.3 International applicants for whom the language of instruction of previous degree(s) was not English must also complete either of the TOEFL or IELTS tests. The Department's minimum TOEFL score is 93 and the minimum IELTS score is 6.5.

1.1.4 Admission to either of the MSc or PhD programs does not guarantee that financial support will be available. (Department-based support is not offered to MEng students.)

1.2 Promotion

1.2.1 To continue in the graduate program, the minimum cumulative GPA on graduate-level courses is 3.0 for MEng and MSc students and 3.3 for PhD students. The cumulative GPA is evaluated at the end of each academic term. Students falling below this minimum will be placed on academic probation in the following term, during which they must raise their cumulative GPA above the appropriate minimum level.

1.2.2 Regardless of degree program, the passing grade for graduate students registered is C+.

1.3 Academic Probation

1.3.1 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 ACGrad may recommend to FGSR whether the student's program should be changed (e.g. MSc to MEng). Alternatively, the ACGrad may recommend to FGSR that the student be required

to withdraw. A PhD student who enters into academic probation after the first semester, must typically meet the minimum cumulative GPA by taking three graduate courses with the weights of 3 units each (not including THES 90X). The courses in question should be decided upon consultation with the ACGrad.

1.4 Length of Program

1.4.1 FGSR has established the following time limits for degree completion, measured from the time of admission:

- PhD – six years
- MSc – four years
- MEng – six years

The extended time limit in case of the MEng program is to accommodate the high number of part time students. In the special case of a Master's student who is reclassified as a PhD student, all degree requirements must be fulfilled within 6 years from when they first registered in the Master's program.

1.4.2 Program extensions may be granted, based on an application by the student to FGSR, with written justification. Note, however, that an extension is not guaranteed. It is the responsibility of the student to request any program extension.

1.4.3 Note, finally, that MSc and PhD financial support in the form of TAs or Research Assistantships (RAs) is not guaranteed for the duration of one's graduate program.

2. REGISTRATION PROCEDURES

2.1 Within 1 month of beginning their programs, all MSc and PhD students must meet with their supervisor(s) and complete the "First Meeting" paperwork, which is designed to make new students aware of responsibilities, regulations and expectations. Students enrolled in the MEng program (or MSc and PhD students lacking a supervisor upon entry) should instead meet with the ACGrad or his/her designate. MSc and PhD students are strongly encouraged to contact their supervisor(s) in advance of such a meeting to discuss graduate course selection. In this respect, note that not all graduate courses listed in the University Calendar are offered every year. It is the responsibility of each student to ensure that his/her program satisfies the expectations of his/her supervisor(s) and the requirements of FGSR and the Department. Note, in particular, that any students receiving financial support from the Department are expected to maintain full-time registration status.

2.2 Students that experience difficulty in a course are encouraged to discuss their concerns with the instructor, the ACGrad and/or their supervisor(s). Withdrawing from a course requires the completion of a course withdrawal form, which must be reviewed and approved by the ACGrad.

3. APPOINTMENT OF SUPERVISOR

3.1 All full time MSc and PhD students should secure a supervisor (or supervisors) within their first four and eight months of study, respectively. Part time students need only identify a supervisor or supervisors when they are due to commence their thesis-based research. Finally, MEng students are encouraged to select a supervisor (and capstone project) once their coursework is substantially complete. 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 ACGrad or his/her designate. Regardless of program type and unless permission is obtained from the ACGrad, at least one of the supervisors should reside in the Department.

3.2 It is the responsibility of the supervisor or supervisors to notify the Graduate Program Assistant once a supervisory arrangement has been made so that the appropriate FGSR forms may be completed. Students are encouraged to verify that such paperwork has been completed. If a supervisor has not been officially appointed to a full time MSc or PhD student by the appropriate time, the student in question will be required to meet with the ACGrad. If a supervisor cannot be found within the Department, the ACGrad may recommend a change of degree program and/or a termination of applicable funding.

3.3 A complete supervisory committee must be established for PhD students within their first year in the program.

4. DEGREE REQUIREMENTS

4.1 Course Requirements

4.1.1 A "graduate course" is one that is listed in the graduate section of the University Calendar. The Department offers a limited number of introductory graduate courses (MEC E 5XX, ENG M 5XX) as well as specialized graduate courses at the 600- and 700-levels. The ACGrad should be consulted before registering in any course not specifically listed as a graduate course. Courses at or below the 400-level are typically not recognized for credit in graduate programs. Course substitution (i.e., to receive credit from a normally ineligible course) or program modification requires the prior written approval of the ACGrad.

MEng Program

- Students must complete a minimum of nine three-credit courses or equivalent, i.e. 27 credits of course work. They must also complete ENGG 600, ENGG 601, ENGG 602 and a capstone project (MEC E 910) approximately equivalent to three credits. To avoid the payment of additional fees, students are encouraged to enroll in MEC E 910 only in the academic term in which they plan to formally submit their capstone project.
- The ACGrad and/or project supervisor can, upon review of the student's transcripts, experience and performance, require additional courses in excess of the 27 credit minimum. These additional requirements can include courses at the undergraduate or graduate level.
- A maximum of three courses can be taken in any combination from MEC E 5XX, MEC E 7XX and ENG M 7XX.

- [MecE] At least five of the courses must be MEC E courses.
- [EngM] At least five of the courses must be ENG M courses.
- No reading courses can be credited towards the degree 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 ACGrad.
- A capstone project approximately equivalent to one three-credit course is required for the MEng degree. Students are responsible for securing a capstone supervisor and should do so based on common research interests. Working with this supervisor, a capstone topic must be identified. The ACGrad may be consulted for assistance in identifying an appropriate capstone supervisor.

[MecE] MBA/MEng - Joint Program

The Faculty of Business and the Faculty of Engineering offer a program of joint study, which enables students to earn both the Master of Business Administration (MBA) and MEng degrees after two calendar years of full-time study.

The requirements for the MBA/MEng joint degree are laid out in the University Calendar section 205.9.5. In brief, students are required to take a minimum of five three-credit graduate courses in Engineering (excluding ENG M courses). Of these, at least three must be MEC E courses; the remaining two courses must be acceptable to the Department. At most two of the five courses can be 500-level MEC E courses. No reading courses may be credited towards the minimum course requirements for the MEng program. Students are required to complete a capstone project as summarized above.

MSc program

- Students must complete a minimum of five three-credit courses, i.e. 15 credits of course work. They must also complete ENGG 600, ENGG 601, ENGG 602 then complete and orally defend a thesis deemed acceptable to the Department and FGSR.
- The ACGrad and/or thesis supervisor(s) can, upon review of the student's transcripts, experience and performance, require additional courses in excess of the 15 credit minimum. These additional requirements can include courses at the undergraduate or graduate level.
- [MecE] At least three of the courses must be MEC E courses. Either a maximum of one MEC E 700-level course and one MEC E 500-level course, or two MEC E 700-level (and no MEC E 500-level) courses can be credited. Finally, one of the courses must be a "foundational" course selected from the following list: MEC E 615, 620, 630, 639, 640, 650, 663, 671, 673, 680, 681, 683, 690.
- [EngM] At least three of the courses must be ENG M courses.
- No reading courses can be credited towards the degree 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 ACGrad.

PhD Program

- Students already holding an MSc must complete a minimum of five three-credit courses, i.e. 15 credits of course work.
- Students who do not hold an MSc must normally complete a minimum of 10 three-credit courses, i.e. 30 credits of course work. In exceptional cases, i.e. with the written support of the supervisory committee and where the student's cumulative GPA exceeds 3.5, he/she may petition the ACGrad to reduce this course load requirement from 10 to eight. Any reduction of course load must still take into account the regulations outlined below, e.g. PhD students are never exempt from having to complete MEC E 680.
- Students must also complete ENGG 600, ENGG 601, ENGG 602 then complete and orally defend a thesis deemed acceptable to the Department and FGSR. (As described below, completion of a PhD thesis also requires successful completion of a candidacy exam after approximately two years in the PhD program.)
- The ACGrad, thesis supervisor(s), supervisory committee and/or candidacy exam committee can, upon review of the student's transcripts, experience and performance, require additional courses in excess of the minimums specified above. These additional requirements can include courses at the undergraduate or graduate level.
- [MecE] The majority of the courses must be MEC E courses.
- [MecE] One course must be MEC E 680.
- [MecE] For students already holding an MSc, a maximum of one MEC E course can be credited at the 700-level; no MEC E courses at the 500-level can be credited. For students who do not hold an MSc, the following restrictions apply: (i) a maximum of two 700-level MEC E courses plus one 500-level MEC E course, or, (ii) three 700-level MEC E courses and no 500-level MEC E courses.
- No reading courses can be credited towards the degree 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 ACGrad.

4.1.2 All of the programs described above require the successful completion of ENGG 600, ENGG 601 and ENGG 602. Students are encouraged to complete the former two classes as early as possible within their program of study.

4.2 Full Time vs. Part Time Enrolment

4.2.1 Students who are admitted to any thesis-based program and who initially register full-time must maintain full-time registration for the duration of their program. Students with full-time status will have increased access to scholarships, bursaries, student loans, and travel funds.

4.2.2 The University defines "full time" as enrolment with a total of 9 credits of course weight. A typical course has a weight of 3 credits. Any total number of credits less than 9 units per term defines the student as "part time". See the sub-section "THES 90X Courses" below for information on using THES 90X courses to maintain full time enrolment.

4.2.3 Part time registration is usually reserved for students who cannot spend the majority of their time on thesis research due to job commitments or some other exceptional circumstances. The students in question are usually ineligible to receive TA and RA funding. Any student wishing to enroll as a part time student must inform his/her supervisors and the ACGrad prior to beginning his/her graduate program.

4.3 Residency Requirement

4.3.1 The MEng has no residency requirement. The MSc requires two academic terms of full time attendance at the University. The PhD requires [EngM] one and [MecE] two academic years of full time attendance, respectively, for degrees in Engineering Management and Mechanical Engineering.

4.4 Continuous Enrolment

4.4.1 All students, whether full time or part time, are required to register at least once in any academic year i.e. September - August period. Students in thesis-based programs, whether full time or part time, must register in a course each term, THES 90X or otherwise. Failure to register in any academic year will be interpreted by FGSR as a withdrawal from the program; the student will then 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 academic privileges when not taking any other courses.

4.5 THES 90X Courses

4.5.1 Students in thesis-based programs will often take fewer than three courses per term but will be required to maintain full time registration status. Such students should register in THES 90X where X = 3, 4, 5 ... 9 is the weighting unit. For example, THES 909 carries a credit weight of nine and should be selected when the student is not enrolled in any courses for the academic term in question. Note also that FGSR requires a minimum quantum of THES 90X registration. For instance, the MSc program requires a minimum enrolment of 24 credits in course and THES 90X weight. Hence, an MSc student taking six three-credit courses would require six credits of THES 90X registration. Note finally that students must be registered in THES 90X for the term in which they submit their thesis.

4.5.2 MEng students cannot register in THES 90X. Any MEng student taking fewer than three courses per term (Fall and Winter semesters) is therefore classified as part time.

4.6 Transfer and Advanced Credit

4.6.1 Requests for transfer and/or advanced credit must be approved by FGSR. For thesis-based and course-based programs, respectively a maximum of two and three courses can be applied. Recall, however, that the student may be required to take more than the minimum number of courses as outlined above.

5 EXAMINATION REQUIREMENTS

5.1 MEng Program

5.1.1 Completion of the capstone project requires submission of a capstone report. Guidelines on report preparation are available from the Faculty of Engineering (i.e. see the document titled “Faculty of Engineering Master’s of Engineering Capstone or Project Report Guidelines”). Two readers, including the capstone supervisor, must approve the MEng project report (typically by signing a report completion form). There is no oral defense. One copy of the project report signed by the two readers must be provided to the Graduate Program Assistant prior to graduation for retention by the Department.

5.2 MSc Program

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

5.3 PhD Program

5.3.1 PhD students must pass an oral candidacy examination and an oral thesis defense. The main features of these exams are as follows:

- The candidacy exam will normally be scheduled between 18 and 24 months (but no more than 36 months) after the student begins his/her program of study. The exam should occur after the course work is substantially complete and some progress has been made on the topic of research. The purpose of the candidacy exam is to ensure that the student has adequate preparation to proceed with the thesis research.
- The purpose of the oral defense is to ensure that the thesis research is of high quality, that the student carried out the work, that the student understands and can interpret the results and that the thesis is written in a clear and concise manner.

Further information on the candidacy exam and thesis defense can be found in Appendix B and C, respectively.

6 OTHER REQUIREMENTS

6.1 Formal First Meeting with Supervisor

6.1.1 For MSc and PhD students admitted for September 2016 and onwards, FGSR requires formal documentation of the first meeting between a student and his/her supervisor(s). The purpose of this meeting is 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 Graduate Program Assistant within 1 month of the start of the student's program.

6.2 Academic Integrity and Ethics Training

6.2.1 Ethics and academic integrity training is mandatory for graduate students. As such, students are required to successfully complete a University-wide WebCT course and ENGG 600. Further information is as follows:

1. University-wide WebCT course (GET or Graduate Ethics Training) --
This online course covers various topics, including conflict of interest, graduate student-faculty relationships, intellectual property and credit, conflict resolution, and integrity and scholarship. Students will receive certification of five credit hours upon successful completion.
2. ENGG 600 – Engineering Ethics and Integrity
This course carries 0.5 credit weight; registration is through BearTracks. In exceptional circumstances, e.g. full time employment outside of the Edmonton area, a student may have difficulty attending the lectures of ENGG 600 if given on a weekly basis. The ACGrad must approve special arrangements in this case.

6.2.2 MSc students must complete the above requirements before thesis submission; PhD students must complete these requirements within the first 36 months of their program and preferably before the candidacy exam.

6.3 Professional Development

6.3.1 All graduate students admitted September 2016 and later are required to complete an Individual Development Plan (IDP) and 8 hours of professional development (PD) activities. Students admitted September 2017 and later must enrol in ENGG 601, a non-credit course during which the IDP is developed and related topics discussed. Students must then register in ENGG 602, a second non-credit online course that will serve as an online repository for PD hours completed. In selecting PD opportunities, students are strongly encouraged to visit <https://www.engineering.ualberta.ca/en/GraduateStudents/ProfessionalDevelopment.aspx> then identify activities and actions that align with their career goals and/or address any skills gaps that they would like to strengthen. PD categories are as follows:

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 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 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.

Note that there are a variety of activities that are not considered appropriate to the fulfillment of the PD hours requirement, including:

- 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

If ambiguity exists, students are encouraged to consult with their supervisor(s) and/or the ACGrad.

6.3.2 The timeline to complete the IDP is 12 and 18 months for Master's students and PhD students, respectively. PD hours must be completed before submission of the thesis in case of MSc students and before program completion in case of MEng students. PhD students must complete their PD hours within the first 36 months of their program.

6.4 TA Orientation Classes

6.4.1 All MSc and PhD students accepting a Departmental TA must first complete a Department-approved TA Orientation session. This training is typically included in the Department's New Graduate Student Orientation session held in the first week of the Fall and Winter semesters. Failure to attend the orientation will result in the cancellation of TA assignment(s). In addition, students are encouraged to attend some of the training seminars offered regularly on campus. These include seminars offered by the Center for Teaching and Learning

(<http://www.ctl.ualberta.ca>) or FGSR, which regularly hosts a “Teaching Development Week” (see <http://www.gradstudies.ualberta.ca/>).

7 GUIDELINES FOR THESIS SUPERVISORS AND MSc AND PhD STUDENTS

7.1 Supervisors

7.1.1 A supervisor’s primary tasks are to provide supervision of the overall academic program and 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 1 year after the start of the program and ensure that it maintains contact and formally meets with the student at least once per 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.
- (i) In case of PhD students preparing for their final defense, provide suitable recommendations to the ACGrad for the selection of an External examiner (see Appendix C for additional information).

7.2 Graduate Students

7.2.1 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 such a ‘main meeting,’ a brief report summarizing the contents of the meeting and the progress of the student should be submitted to the Graduate Program Assistant. At least one ‘main meeting’ must be held before the Candidacy Exam.
- b) All graduate students must maintain open communication with their supervisor and ACGrad 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 reproduction 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 and related resources must be returned upon completion of the degree.

7.3 Thesis Requirements

7.3.1 It is the responsibility of the student to follow the requirements of the FGSR for thesis preparation and submission. 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>.

8 THE UTILIZATION OF GRADUATE TEACHING ASSISTANTS

8.1 The Function of a TA

8.1.1 The 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.

8.1.2 To accomplish this purpose, the TA should be given the maximum reasonable authority and responsibility that can be associated with his/her duties. Due to the number of available positions and the duties required within the Department, some TAs will serve as graders. However, in many courses an arrangement between the TA and the individual instructor allows the TA to accept responsibility for functions such as proctoring, marking, laboratory supervision, seminar instruction, occasional lecturing and the compilation of student statistics. Other duties may be assigned with the agreement of the instructor, the Department Chair or ACGrad and the student. Note, in particular, that guidelines related to marking of final examination are provided in Section 23.5.3 of University Regulations.

8.2 Basis for Assigning TAs

8.2.1 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 or Engineering Management from the University.
- 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 assignment(s) for subsequent term(s).

8.2.2 Students on academic probation cannot be considered for a TA so long as they remain on academic probation.

9 FINANCIAL SUPPORT

9.1 Eligibility, Sources and Duration

9.1.1 Except in rare and exceptional circumstances, MEng and part time students of any program do not receive financial support. Sources of support for MSc and PhD students typically include TAs and RAs, the latter being derived from research grants and contracts held by individual faculty members. Due to the scarcity of funding, students should not expect more financial support than what is outlined in their Offer Letter.

9.1.2 The rate of remuneration for assistantships is similar from all sources. The GSA negotiates the pay scale for university-sponsored teaching and research assistantships. Individual faculties and faculty members attempt to follow these rates subject to the availability of funding. Additional funding may be secured in the form of

- a) Research Travel Support from FGSR, and
- b) Scholarships.

The scholarships available to graduate students are listed in the Awards section of the Calendar. Students are encouraged to communicate with the Graduate Program Assistant to ensure timely and accurate submission of any internal scholarship applications.

9.1.3 For MSc students, supervisor(s) and the Department typically limit the total time over which a student can expect to receive financial support to 24 months following entry to the MSc program. For PhD students, the associated limit is typically 3 to 4 years.

Appendix A - Oral Examination Procedures (MSc)

FGSR requires an examining committee consisting of at least three committee members, one (or more) of whom is at arm's length to the student. Unless otherwise directed by FGSR, the committee must include the student's supervisor or supervisors. In addition, the Department recommends

- An independent examination chair who does not serve as an examiner (and is, of course, not a supervisor). The chair may be internal or external to the Department but should be well qualified to moderate the examination by following applicable FGSR regulations.
- Two examiners from the Department.

Further details plus definitions (e.g. of an 'arm's length examiner') are provided in the FGSR Graduate Program Manual.

Further notes:

1. The 20-25 minute 'presentation component' of the oral examination is open to the university community. The examination committee chair serves as the moderator.
2. FGSR must receive the MSc Examination Notice at least 3 weeks in advance of the exam date.
3. The examiners must be provided a copy of the thesis at least 3 weeks in advance of the exam date.

TIME	ACTION BY EXAMINATION COMMITTEE CHAIR
When the supervisor requests the oral examination	Review 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 exam. Ensure the supervisor has the student's file and will bring this to the exam.</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>The 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</p>

	ask the non-committee members to leave.
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 finally the supervisor(s). (The chair prompts, if necessary, if an area hasn't been covered.)</p> <p>Round two: if necessary, same order.</p> <p>Round three: if necessary, same order.</p>
5 minutes	Ask the candidate if he/she wishes to make any final statements e.g. for the purpose of clarifying a previously given answer.

DECISION

Following the exam proper, the chair will ask the candidate to leave the room. He/she will then 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? (exam outcome is either “adjourned” or “fail”)
 - iv. Unacceptable? (exam outcome is either “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 their research. The final examination may result in one of the following outcomes:

- Adjourned
- Pass
- Pass subject to revisions
- Fail

An explanation of the above outcomes is provided below. Note, in particular, that a decision of Pass implies that the examination chair and each of the examiners is willing to add his/her signature to the FGSR Thesis Approval/Program Completion form. The student may still have minor corrections or revisions to make to his/her thesis, however, these do not necessitate further review by any of the examiners.

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 defense 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 defense 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 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 of FGSR, the ACGrad, 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 6 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 6 month deadline, the outcome of the examination is Fail.

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

When the outcome is Fail, the committee chair will provide the reasons for this decision to the ACGrad. 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 of FGSR will then normally arrange to meet with the student and with the ACGrad before acting upon any department recommendation that affects the student's academic standing.

AFTER THE DECISION

After the examination has reached its conclusion, the chair shall

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. If applicable, ask appropriate members to sign the Thesis Approval/Program Completion form. The committee chair signs on behalf of the external reader if the reader does not attend the exam. When the decision is 'Pass subject to revisions,' and subject to the discretion of the committee, supervisor(s) often withhold their signature(s) pending completion of the required revisions.
3. 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 Graduate Program Assistant and signed by the ACGrad.

ADDITIONAL COMMENTS

1. Most oral examinations take 2 to 3 hours.
2. The MSc student should recognize that his/her supervisor(s) probably would not have called the oral exam if he/she/they did not feel the student was prepared.
3. The exam chair should try to foster an atmosphere of relaxed confidence.
4. The exam chair should, to the maximum extent possible, allow the student answer the questions. His/her supervisor(s) may contribute additional feedback so as to redirect the student, but are not required to do so.

Appendix B - Candidacy Examination (PhD students)

The candidacy exam will normally be scheduled between 18 and 24 months (but no more than 36 months) after the student begins his/her program of study. (In the event that the candidacy exam cannot be completed with the first 36 months of the PhD program, the student is required to seek the approval of the ACGrad before submitting a Doctoral Program Requirement Extension request to FGSR.) The exam should occur after the course work is substantially complete and some progress has been made on the topic of research. 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.” Students can be expected to answer questions on a broad range of topics within the scope of mechanical engineering. Accordingly, students should discuss with their supervisor(s) possible lines of questioning in order to be well prepared.

Three weeks prior to the candidacy exam, the student must prepare and submit a research summary/plan. This document is typically 10 pages in length (the minimum and maximum length is one and 20 pages, respectively). 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 may be concerned with general topics and will test the student's general knowledge of the discipline. The second (and any subsequent) rounds of questioning may be concerned with topics related to the student's area of research and his/her ability to independently carry the research through to completion. At this stage, the examination committee should ask questions that test the viability of the thesis proposal.

FGSR requires an examining committee consisting of the three-member supervisory committee plus at least two additional examiners at arm's length to the student. There must also be an independent examination chair who does not serve as an examiner (and is, of course, not a supervisor). The chair may be internal or external to the Department but should be well qualified to moderate the examination by following applicable FGSR regulations.

Further details plus definitions (e.g. of an ‘arm's length examiner’) are provided in the FGSR Graduate Program Manual.

Further notes:

4. The 20-25 minute ‘presentation component’ of the oral examination is open to the university community. The examination committee chair serves as the moderator.
5. FGSR must receive the Candidacy Examination Notice at least 3 weeks in advance of the exam date.

TIME	ACTION BY EXAMINATION COMMITTEE CHAIR
When the supervisor requests the oral examination	Review 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 student's file and will bring this to the exam.</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>The 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 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>
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>

	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	Question time – normally two 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), approx. 10 min. each. Start with external examiners, then go to departmental examiners, then finally the supervisor(s). (The Chair may prompt, if necessary, if an area hasn't been covered.) Round two: if necessary, same order. Round three: if necessary, same order.
5 minutes	Ask the candidate if he/she wishes to make any final statements e.g. for the purpose of clarifying a previously given answer.

DECISION

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 of 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.

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 of FGSR, the ACGrad 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 of 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 FGSR; or
- Some or all of the conditions have not been met. In this case, the outcome of the candidacy examination is 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 ACGrad will then provide this report, together with the department's recommendation for the student's program, to the Dean of FGSR, and to the student.

For failed candidacy examinations, an Associate Dean of 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 ACGrad 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 6 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 PhD, 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 the termination of the student's program.

AFTER THE DECISION

After the examination has reached its conclusion, the chair shall

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, the chair shall ensure that the supervisory committee and student agree on the mechanism for determining when/how student clears the deficiencies.
3. In the event of a fail decision discuss the recommendation for the student's program. If the recommendation is to repeat the candidacy, explain the associated procedure to be followed. (Further courses and/or reading matter may be suggested.) This latter task may be delegated to the supervisor(s) and/or supervisory committee.
4. Thank everybody and close the exam.

The chair shall also inform the Graduate Program Assistant of the outcome of the candidacy examination. If appropriate, he/she shall return to the Graduate Program Assistant the Report of Completion of Candidacy Examination (with appropriate signatures from the examining committee). If the student is not successful in the examination, the chair shall inform FGSR in writing of the outcome and the recommendations for the student's program. A copy of this memo shall be provided to the student.

ADDITIONAL COMMENTS

1. Most oral examinations take 2 to 3 hours.
2. The PhD student should recognize that his/her supervisor(s) probably would not have called the candidacy exam if he/she/they did not feel the student was prepared.
3. The exam chair should try to foster an atmosphere of relaxed confidence.
4. The exam chair should, to the maximum extent possible, allow the student answer the questions. His/her supervisor(s) may contribute additional feedback so as to redirect the student, but are not required to do so.

Appendix C - Final Examination (PhD)

The final defense cannot occur within 6 months of the candidacy exam and must be held no more than 6 years from the time the student began his/her program of study.

FGSR requires an examining committee consisting of the three-member supervisory committee plus at least two additional examiners at arm's length to the student. Normally, all five examiners must be full time faculty members and one of the arm's length examiners must be from outside the University. There must also be an independent examination chair who does not serve as an examiner (and is, of course, not a supervisor). The chair may be internal or external to the Department but should be well qualified to moderate the examination by following applicable FGSR regulations.

Further details plus definitions (e.g. of an 'arm's length examiner') are provided in the FGSR Graduate Program Manual.

Notes:

1. The 25 minute 'presentation component' of the oral examination is open to the university community. The examination committee chair is the moderator.
2. Teleconferencing is often used, particularly for examiners external to the University. A maximum of two examiners may participate in the final defense via teleconferencing. If the External examiner is unable to participate either in person or via teleconferencing, he/she is classified as a Reader and must submit a detailed report outlining his/her review of the thesis. The designation of Reader does not diminish the importance of this individual's feedback nor the need for the candidate to satisfactorily address any points of concern. Note finally that the examination committee chair may sign on behalf of any examiners not physically present.

It is the responsibility of the Department Chair or ACGrad to nominate an external examiner and submit the name to FGSR for approval. (Supervisor(s) should, of course, recommend suitable candidates for consideration.) This important step must be initiated at least 3 months in advance of the proposed defense date. The external examiner should not contact the supervisor or student directly regarding the thesis or regarding 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 close collaborator, for instance) and cannot have served as a supervisor's student or supervisor. Note, finally, that a proposed external examiner should not normally be nominated more frequently than once every 2 years. External examiners are nominated by the Department through the ACGrad and are then approved and invited by FGSR. Supervisors who are in doubt about the eligibility of a potential external examiner are urged to consult with an Associate Dean in FGSR to review the case before the nomination is

submitted to FGSR.

In order to safeguard the reputation of the University, the supervisor and the student, the supervisory committee must review the thesis before it is sent to either arm's length examiner. At this point, the Preliminary Acceptance of Thesis form should be completed and the thesis should be distributed to the remaining examiners. These examiners shall receive the thesis from the Department not less than 4 weeks before the examination.

TIME	ACTION BY EXAMINATION COMMITTEE CHAIR
When the supervisor requests the oral examination notice	Review the candidate's academic record and ensure that the course requirements have been met. Check that the supervisor(s) has received approval for the External Examiner from the FGSR.
Immediately after publication of the Notice of Oral exam (at least 3 weeks prior to the PhD Exam)	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. 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 student's file and will bring this to the exam.
About 1 week before the exam	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 defense to see if there are any particular areas of concern. The candidate should be prepared to present a summary of his/her work (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 summary is for the general audience and the committee to hear the student's interpretation of his/her achievements.
On the day of the examination, in the examination room	The 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). Welcome the audience, introduce the candidate and ask the candidate to go ahead with a 25 minute presentation. Do not allow questions from the audience during the presentation. However, members of the examination committee may be permitted to ask short

	<p>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)</p>	<p>Introduce everyone, if necessary, and welcome them. State purpose of meeting.</p> <p>Summarize these procedures for the benefit of everyone.</p>
<p>Next 5-10 minutes</p>	<p>Ask candidate to leave.</p> <p>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.</p> <p>Ask student to return.</p>
<p>Oral questioning</p>	<p>Question time – normally two or three 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.) Examiners have approximately 10-15 minutes each. Start with external examiners, then go to departmental examiners, then finally the supervisor(s). (The Chair may prompt, if necessary, if an area has not been covered.)</p> <p>Round two: same order.</p> <p>Round three: if necessary, same order.</p>
<p>5 minutes</p>	<p>Ask the candidate if he/she wishes to make any final statements e.g. for the purpose of clarifying a previously given answer.</p>

DECISION

Following the exam proper, the chair will ask the candidate to leave the room. He/she will then 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? (exam outcome is “adjourned” or “fail”)
 - iv. Not acceptable? (exam outcome 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

An explanation of the above outcomes is provided below. Note, in particular, that a decision of Pass implies that the examination chair and each of the examiners is willing to add his/her signature to the FGSR Thesis Approval/Program Completion form. The student may still have minor corrections or revisions to make to his/her thesis, however, these do not necessitate further review by any of the examiners.

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 defense 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 defense 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.

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 of FGSR, the ACGrad, 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 6 month deadline, the outcome of the examination is Fail.

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

When the outcome is Fail, the committee chair will provide the reasons for this decision to the ACGrad. The Department will then provide this report, together with its recommendation for the student's program, to the Deans of Engineering and FGSR, and to the student.

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

AFTER THE DECISION

After the examination has reached its conclusion, the chair shall

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. If applicable, ask appropriate members to sign the Thesis Approval/Program Completion form. The committee chair signs on behalf of the external reader if the reader does not attend the exam. When the decision is 'Pass subject to revisions,' and subject to the discretion of the committee, supervisor(s) often withhold their signature(s) pending completion of the required revisions.
3. 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 Graduate Program Assistant and signed by the ACGrad.

ADDITIONAL COMMENTS

1. Most oral examinations take 2 to 3 hours.
2. The PhD student should recognize that his/her supervisor(s) probably would not have called the candidacy exam if he/she/they did not feel the student was prepared.
3. The exam chair should try to foster an atmosphere of relaxed confidence.
4. The exam chair should, to the maximum extent possible, allow the student answer the questions. His/her supervisor(s) may contribute additional feedback so as to redirect the student, but are not required to do so.