# GRADUATE PROGRAMS AND GUIDELINES

Department of Mathematics and Statistics
Queen's University

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# 1 Degrees Offered

The Department offers master's and doctoral degrees from two Councils of the School of Graduate Studies and Postdoctoral Affairs, the Faculty of Arts and Science and Smith Engineering

The purpose of this section is to describe the various graduate degrees offered by the department, and to outline the major components of these degrees and the procedural matters surrounding these components. The schedules, procedures and policies of the various degrees are described in Section 2.

## 1.1 Master's degrees

There are two types of Master's degrees offered. These are distinguished based on the relative balance between course work and research. The "Pattern I" Master's has a comparatively small course requirement and a research component consisting of a thesis. It typically takes 16-24 months to complete, although shorter durations are possible. The "Pattern II" Master's requires more courses and a research component consisting of a project. It is typically completed in 12 months with courses being taken in the Fall and Winter terms, and a research project being undertaken in the Spring/Summer term.

Let us give the requirements for the various Master's degrees.

### 1.1.1 Degree requirements: Smith Engineering, MASc

This degree is designated MASc (Master's of Applied Science) and has the following requirements:

1. a minimum of 4 one term graduate courses (see Section **2.2.1** for details about including graduate courses from previous studies);
2. all courses must be regular lecture courses; no reading/seminar course substitutions are allowed;
3. MATH 800 cannot be one of the 4 required courses;
4. at least one course must be taken from the Department's core graduate courses (see Section **2.2.2**);
5. only one combined undergraduate/graduate course is allowed;
6. all required courses must be passed, a pass being at least a B-;
7. a thesis (see Section **1.1.5**).

See Section **1.1.4** for general remarks on suitable selection of courses for this degree.

### 1.1.2 Degree requirements: Arts and Science, Pattern I MSc

This degree is designated MSc (Master's of Science) and has the following requirements:

1. four one term graduate courses (see Section 2.2.1 for details about including graduate courses from previous studies);
2. all courses must be regular lecture courses; no reading/seminar course substitutions are allowed;
3. MATH 800 cannot be one of the 4 required courses;
4. at least one course must be taken from the Department's core graduate courses (see Section 2.2.2);
5. all required courses must be passed, a pass being at least a B-;
6. a thesis (see Section 1.1.5).

See Section 1.1.4 for general remarks on suitable selection of courses for this degree.

### 1.1.3 Degree requirements: Arts and Science, Pattern II MSc

**Specialisation in Mathematics**

This degree is designated MSc (Master's of Science) and has the following requirements:

The requirements for this degree are:

1. seven one term graduate courses (see Section 2.2.1 for details about including graduate courses from previous studies);
2. one of the courses must be MATH 800, the seminar course;
3. only one of the required term lecture courses can be substituted with a reading/seminar course;
4. at least two courses must be taken from the Department's core graduate courses (see Section 2.2.2);
5. all required courses must be passed, a pass being at least a B-;
6. a research project (see Section 1.1.6).

See Section 1.1.4 for general remarks on suitable selection of courses for this degree.

**Specialisation in Statistics**

This degree is designated MSc (Master's of Science) and has the following requirements:

The requirements for this degree are:

1. seven one term graduate courses (see Section 2.2.1 for details about including graduate courses from previous studies);
2. at least one course must be taken from the Department's core graduate courses (see Section 2.2.2);
3. only one of the required term lecture courses can be substituted with a reading/seminar course;
4. all required courses must be passed, a pass being at least a B-;
5. a research project (see Section 1.1.6).

See Section 1.1.4 for general remarks on suitable selection of courses for this degree.

**Specialisation in Biostatistics**
This degree is designated MSc (Master's of Science) and has the following requirements:

The requirements for this degree are:

1. eight one term graduate courses (see Section **2.2.1** for details about including graduate courses from previous studies);
2. of the 8 courses, 6 will be the following: EPID 801, EPID 804, EPID 823, STAT 862, STAT 886, and MATH 896[1]; the remaining two electives should include at least one course from this department. If there is not a suitable elective from the department's offerings, the student and their supervisor may make a formal request to the Graduate Coordinator for permission to take both electives out of the department.
3. only one of the required term lecture courses can be substituted with a reading/seminar course;
4. all required courses must be passed, a pass being at least a B-;
5. a practicum which will involve a four month placement working on a project pertaining to some aspect of biostatistics applications or a methodological research project affiliated with the work of the supervisor; students must write a report on their practicum and make a presentation to an examining committee.

See Section **1.1.4** for general remarks on suitable selection of courses for this degree.

### 1.1.4 Course selection for Master's degrees

The selection of courses made by each student is subject to the approval of the student's supervisor and of the Graduate Coordinator. While the Department does not wish to set down hard rules governing the selection of courses, the following are guidelines to aid students in their course choices:

1. Course selection should be made with the objective of achieving exposure to other branches of mathematics and/or statistics.
2. When appropriate, the selection of required courses should include no more than one third combined undergraduate/graduate courses (i.e. courses offered jointly with undergraduate courses).
3. The course selection should represent a depth of knowledge commensurate with a holder of a master's degree in mathematics or statistics.

Many students who enrol in a Master's degree intend to continue their studies here in the doctoral program. Courses taken during the Master's degree can be used to fulfill the course requirement for the doctoral degree. For this reason, students should review Section **1.2.3**, Course Selection for Doctoral degrees, prior to making the course selection for their Master's degree.

In the unlikely event that the student, the supervisor, and the Graduate Coordinator disagree on suitable course selection, the matter will be decided by the Graduate Committee.

[1] There is a difference between the Public Health Sciences and Mathematics and Statistics requirements for the Biostatistics specialization. STAT 853 is intended to be taken by Public Health Sciences graduate students enrolled in the joint biostatistics program.

### 1.1.5 The Master's thesis and thesis defence

As part of the degree requirements for the MASc and Pattern I MSc degrees the student must write a thesis.

**The thesis**. The objective of a Master's thesis is that it demonstrate that the candidate is capable of producing original and independent work. The candidate must also show themselves to be familiar with the literature in the area of their research, and with the techniques and ideas related to this research area. The student must demonstrate excellent scientific writing abilities, both in terms of using commonly accepted formatting for scientific documents and in terms of presenting material in a manner acceptable to the scientific community.

We refer to the section on thesis formatting in the regulations of School of Graduate Studies and Postdoctoral Affairs for information concerning formatting of the thesis.

**The Examining Committee.** The Examining Committee will be comprised as follows:

1. the supervisor(s);
2. an Internal Examiner who is a member of the Department;
3. an Internal/External Examiner from another department on campus (if a suitable examiner from another department cannot be found then another member of the Department of Mathematics and Statistics may be nominated);
4. a Head's Delegate who is a member of the Department and serves as the non-voting Chair for the examination.

At least one member of the Examining Committee must hold a full appointment in the Department of Mathematics and Statistics.

In cases where the student's research is of an interdisciplinary nature, the Internal/External examiner should be selected on the basis of their ability to evaluate the contribution to the discipline outside the Department's areas of expertise. The Head's Delegate will be chosen by the Graduate Coordinator. When selecting examiners, supervisors are reminded of the Senate Policy on Conflict of Interest and Conflict of Commitment.

**Responsibilities of student, supervisor, and Graduate Coordinator in the run up to the oral examination.** The oral examination of a Master's thesis is scheduled by the supervisor through the Graduate Coordinator and Graduate Assistant.

It is the responsibility of the supervisor to do the following at least 15 working days before the oral examination:

1. set a tentative date and time for the oral examination;
2. select the Internal Examiner and the Internal/External Examiner;
3. propose for the Graduate Coordinator’s approval, the selected members of the examining committee by completing and submitting to the Graduate Assistant, the departmental Master’s Thesis Examining Committee Selection and Scheduling form found on our website under Departmental Forms;
4. confirm the availability of the Internal and the Internal/External examiners at the proposed date and time;
5. inform the Graduate Assistant that all examiners have agreed to the proposed examination date and time.

It is the responsibility of the student to do the following at least 10 working days before the oral examination:

1. provide each examiner with a copy of the thesis;
2. provide the Graduate Assistant with a copy of the thesis;
3. Provide the Graduate Assistant with a copy of the Permission of Co-Authors Form.

It is the responsibility of the Graduate Coordinator (or Graduate Assistant) to do the following at least 10 working days before the oral examination:

1. select the Head's Delegate;
2. provide the School of Graduate Studies and Postdoctoral Affairs with the oral examination particulars by submitting the appropriate thesis scheduling form;
3. provide the Head's Delegate with a copy of thesis and the necessary forms to report the outcome of the examination.

**The oral examination.** The oral examination will begin with a presentation by the candidate of approximately 20 minutes. There will then follow a period of questions by the Examining Committee. The examination may typically take between 1.5 – 2 hours, although this may well vary significantly.

More details may be found under Thesis in the General Regulations of the School of Graduate Studies and Postdoctoral Affairs.

**The duties of the Head's delegate.** For the oral examination the Head's Delegate serves as non-voting Chair of the Examining Committee. The Head's delegate oversees the thesis defence by, for example:

1. indicating to the student the expected duration of their presentation;
2. indicating the ordering of Examining Committee during the question period[2];
3. indicating to the candidate after the question period to leave the room;
4. informing the candidate of the Examining Committee's decision;
5. completing the thesis result form after the defence and submitting this form to the Graduate Assistant.

### 1.1.6 The Master's project and project presentation

As part of the degree requirements for the Pattern II MSc degree, a student must write a report for their research project and give a presentation on this report.

**The project report.** With the report the student should exhibit a capacity for independent inquiry and a knowledge of the literature, techniques, and ideas in their research field. The student must also demonstrate excellent scientific writing abilities, both in terms of using commonly accepted formatting for scientific documents and in terms of presenting material in a manner acceptable to the scientific community.

The formatting of project reports need not follow the thesis guidelines of the School of Graduate Studies and Postdoctoral Affairs. However, consistent with the statement above, it is expected that the formatting of the document will coincide with that of good practice.

[2] The standard ordering is essentially from the person who is most distant from the candidate's research to the person who is closest. Sometimes this will be ambiguous, in which case an arbitrary decision should be made. In any case, the supervisor(s) ask questions last.

**The Examining Committee.** The Examining Committee will be comprised as follows:

1. the supervisor(s);
2. an Internal Examiner who is a member of the Department and who will also serve as Chair;
3. an Internal Examiner from the Department or another department on campus.

At least one member of the Examining Committee must hold a full appointment in the Department of Mathematics and Statistics.

For students whose research is of an interdisciplinary nature, one of the Internal Examiners should be replaced with an examiner who has the ability to evaluate the contribution to the discipline outside the Department's area of expertise. When selecting examiners, supervisors are reminded of the Senate Policy on Conflict of Interest and Conflict of Commitment.

**Responsibilities of student, supervisor and graduate coordinator in the run up to the oral presentation.** The oral presentation is scheduled internally by the Graduate Coordinator (or Assistant).

It is the responsibility of the supervisor to do the following at least 15 working days before the oral presentation:

1. set a tentative date and time for the presentation;
2. select the members of the Examining Committee;
3. propose for the Graduate Coordinator's approval, the selected members of the examining committee by completing and submitting to the Graduate Assistant, the departmental Master's Project Examining Committee Selection and Scheduling Form found on our website under Departmental Forms;
4. confirm the availability of the examiners at the proposed date and time;
5. inform the Graduate Assistant that all examiners have agreed to the proposed examination date and time.

It is the responsibility of the student to do the following at least 10 working days before the oral presentation:

1. provide each examiner with a copy of the report.

It is the responsibility of the graduate coordinator to do the following at least 10 working days before the oral presentation:

1. select the examiner who will double as chairperson;
2. provide the chairperson with the necessary paperwork to report the results of the presentation.

**The oral presentation**. The presentation will begin with the Chair inviting the candidate to give a presentation of approximately 20 minutes. There will then follow a period of questions by the Examining Committee. The exam may typically last for 1 hour, although this may well vary significantly.

**Outcomes of the oral presentation.** After the questioning the candidate will be asked to leave the room. The Examining Committee will then discuss the quality of the research report and of the candidate's presentation. The Examining Committee will then vote on the outcome of the exam. There are two possible outcomes: "Pass" and "Fail." The decision is made by a majority vote of the Examining Committee. A tie will be taken as "Fail."

It is possible that an outcome of "Pass" be delivered with the understanding that minor revisions to the project report will have to be made. These revisions must be of a nature that the responsibility for their being made can be given solely to the supervisor(s). If the revisions are more substantial, then the outcome of the exam must be "Fail."

If the outcome of the exam is "Fail," then the Examining Committee must submit a written report to the Graduate Committee explaining the reasons for the outcome. The report can be written by the Chair alone, but all members of the Examining Committee should contribute to and approve the final report. In their report the Examining Committee can suggest revisions to the project report if they feel that it is feasible to rewrite and re-present the report. The Examining Committee might also recommend that it is infeasible to rewrite and re-present the report. The final decision as to whether the student will (1) be asked to withdraw from the program or (2) be given another chance to write and present their report will be left to the Graduate Committee. Should the presentation take place a second time, the same Examining Committee will evaluate the report and the presentation. The outcome of this second presentation will be final, subject to possible appeal by the student.

It is the responsibility of the student to provide an electronic copy of the project report, incorporating any revisions arising during the oral presentation, to the Graduate Assistant before the degree requirements will be considered satisfied.

It is the responsibility of the Graduate Coordinator to notify the School of Graduate Studies and Postdoctoral Affairs that the degree requirements have been satisfied.

**The duties of the Chair.** For the oral presentation the Chair serves as Chair and voting member of the Examining Committee. As voting member of the Examining Committee, the duties of the Chair are the same as those of the other members of the Examining Committee, i.e., to question the candidate and assess the research report and oral presentation. In addition, the Chair conducts the presentation by, for example:

1. indicating to the student the expected duration of their presentation;
2. indicating the ordering of Examining Committee during the question period[3];
3. indicating to the candidate after the question period to leave the room;
4. informing the candidate of the Examining Committee's decision.

Generally speaking, a project presentation is more informal than a thesis defence.

Should the student fail their oral presentation, the Chair must, as indicated above, submit a written report to the Graduate Committee representing the views of the Examining Committee as to why the student failed. This report need not be long.

[3] The standard ordering is essentially from the person who is most distant from the candidate's research to the person who is closest. Sometimes this will be ambiguous, in which case an arbitrary decision should be made. In any case, the supervisor(s) ask questions last.

## 1.2 Doctoral degrees

### 1.2.1 Degree requirements: Smith Engineering, PhD

The requirements are:

1. Nine one term graduate courses (see Section **2.2.1** for details about including graduate courses from previous studies) which achieve the following conditions:
    a) a minimum of 3 one term graduate courses beyond the Master's degree of which at most one may be a combined undergraduate/graduate course;
    b) at least 3 courses must be taken from the Department's core graduate offerings (see Section **2.2.2**);
    c) a maximum of 3 courses may be reading/seminar courses but cannot include MATH 800; exceptions may be made for participants in special courses offered off campus (i.e. The Fields, PIMS or CRM)
    d) the student must pass all required courses (pass means achieve a grade of at least B-) and attain an average of at least A- in the 9 courses;
2. the qualifying exams (see Section **1.2.5**);
3. the thesis prospectus exam (see Section **1.2.6**);
4. the thesis (see Section **1.2.7**).

See Section **1.2.3** for general remarks on suitable selection of courses for this degree. Also see the Graduate Councils and Committees for Council-specific procedures.

### 1.2.2 Degree requirements: Arts and Science, PhD

The requirements are:

1. Nine one term graduate courses (see Section **2.2.1** for details about including graduate courses from previous studies) which achieve the following conditions:
    a) at least 3 (in the case of Applied Mathematics or Statistics students) or 4 (in the case of Pure Mathematics students) courses must be taken from the Department's core graduate offerings (see Section **2.2.2**);
    b) a maximum of 3 courses may be reading/seminar courses but cannot include MATH 800; exceptions may be made for participants in special courses offered off campus (i.e. The Fields, PIMS or CRM)
    c) the student must pass all required courses (pass means achieve a grade of at least B-) and attain an average of at least A- in the 9 courses;
2. the qualifying exams (see Section **1.2.5**)
3. the thesis prospectus exam (see Section **1.2.6**);
4. the thesis (see Section **1.2.7**).

See Section **1.2.3** for general remarks on suitable selection of courses for this degree.

### 1.2.3 Course selection for Doctoral degrees

In order to ensure the integrity of the degree we offer the following guidelines for course selection.

1. No more than one third of courses taken should be combined undergraduate/graduate courses (i.e., courses offered jointly with undergraduate courses).
2. Course selection should be made with the objective of achieving exposure to multiple branches of mathematics and/or statistics.
3. The course selection should represent a depth of knowledge commensurate with a holder of a doctoral degree in mathematics or statistics. This can be achieved, for example, through specialized seminar courses or reading courses.

The selection of courses made by each student at the beginning of their degree is made using the departmental PhD Course Selection Form found on our website under Departmental Forms and is subject to the approval of the student's supervisor and of the Graduate Coordinator, with the Graduate Coordinator having the right of final approval. If a dispute concerning course selection should arise, the student's Supervisory Committee (see Section **1.2.4**) will be consulted to provide input.

Changes in the course selection are inevitable, and when a change of course is proposed, the student must submit their entire course selection for re-evaluation as it is the overall course selection that is important, not the individual courses taken. The Graduate Assistant will supply students with the appropriate paperwork.

We refer to Sections **2.1.3** and **2.2.7** further details of Doctoral course selection.

### 1.2.4 The Supervisory Committee

The Supervisory Committee is comprised as follows:

1. the supervisor(s);
2. two faculty who are members of the Graduate School, and normally members of the Department.

At least one member of the Supervisory Committee must hold a full appointment in the Department of Mathematics and Statistics. In cases where the student's research is of an interdisciplinary nature, one of the members of the Supervisory Committee might be selected on the basis of their ability to evaluate the contribution to the discipline outside the Department's areas of expertise.

The function of the Supervisory Committee is as follows:

1. to provide advice on the background preparation needed (required courses) for the student's area of specialization;
2. to serve as possible advisors, in either broad or specific terms as appropriate, as the student engages in their research;
3. to meet with the student twice per year to discuss and monitor the research progress of the student;
4. to possibly (but not necessarily) serve on the student's Examining Committee for the Thesis Prospectus Exam and thesis defence;
5. to be involved in the event that problems arise during the course of the student's studies; in the event that a student's progress seems to have become derailed, the first course of action suggested by the Graduate Coordinator should be for the Supervisory Committee to meet with the student to assess the situation.

### 1.2.5 The Qualifying Exams

The Qualifying Exams are written exams covering core areas of mathematics and statistics. The student, in consultation with their supervisor(s), will select two core areas from a list of five, on which to be tested. The core areas are: Analysis; Algebra and Number Theory; Probability; Statistics; Geometry and Topology.

The exams will be offered twice per year, in May and January. Students beginning in September or May must take their exams in May of the following year while students beginning in January must take their exams by the following January.

**The Objectives of the Qualifying Exams.** The objectives of the exams are to assess both the candidate's knowledge of their broad research area and their competence in the core areas of mathematics and/or statistics related, possibly only peripherally, to their research.

**The Exams.** Each exam will consist of six questions and will last three hours. Questions will cover advanced undergraduate and first year graduate courses. Questions will be drawn from an exam bank[4] which will be available to doctoral students by the end of their first month of initial registration in the program.

**Evaluation of Exams.** Exams will be evaluated by a specialist in the core area with the departmental Graduate Committee having final say on the result of each exam for each student. In order to earn full marks for a question the student must answer the entire question correctly. In order to pass an exam, the student must receive full marks for four of the six questions or achieve a score of 5/6 through partial marks. Students who fail one or both exams will have one opportunity to rewrite the exam(s) at the next offering. Students must pass both selected exams to satisfy this requirement. No student shall be given more than two opportunities to pass any one qualifying exam.

**Scheduling.** Each exam will be offered only once during each exam period in May and January. Exams will be scheduled such that no student will be required to write both exams in one day. Exams will normally be held the third week of May and the third week of January when necessary. Exam dates and times will be announced at least fifteen working days in advance.

**Responsibilities of Graduate Committee, student and supervisor with regard to the Exams.**
It is the responsibility of the Graduate Committee to do the following:

1. review and update the exam bank by the end of August, annually;
2. provide core course instructors with the exam bank and remind them that there should be a correlation between the topics covered in a core course and the corresponding section of the exam bank;
3. remind new students and their supervisor(s) of the qualifying exams requirement and provide students with a link to the exam bank by the end of the student's first month of registration;
4. select the questions for each core exam;
5. set the exam dates and notify the students at least 15 days in advance of those dates;
6. arrange for the exams to be marked by a specialist in each core area, review the marked exams and inform the students of the outcome of each exam.

[4] Questions selected for an examination could have minor modifications made so as to avoid the possibility of a particular calculation being memorized.

It is the responsibility of the student and supervisor to do the following:

1. decide upon the two exams that the student will be required to write;
2. inform the Graduate Coordinator by the end of the first term in the program the exams the student will write by completing and submitting to the Graduate Assistant, the departmental PhD Qualifying Examinations Selection Form found on our website under Departmental Forms.

### 1.2.6 The Thesis Prospectus Exam

All doctoral students must take the Thesis Prospectus Exam, normally within 24 months of initial enrolment in the doctoral program. It is important that students take their Thesis Prospectus Exam on schedule since the writing and presentation of the report serve to focus the student and supervisor on the research project. See Section **2.2.10** for details concerning the timing of the Thesis Prospectus Exam, and consequences of not taking it in a timely manner.

**Objectives of the Thesis Prospectus Exam.** The Thesis Prospectus Exam has the following objectives:

1. to evaluate the quality, significance and feasibility of the candidate's proposed research;
2. to evaluate the competence of the candidate to carry out the proposed research.

**The Research Proposal**. The research proposal should be written in a manner consistent with the objectives noted above. There is a great deal of freedom available in achieving this end, however, a good research proposal might contain the following components:

1. an introduction which describes the research area, gives the important results relevant to, and/or to understanding the context of, the candidate's research;
2. background material;
3. a clear description of the problem the thesis will address and an explanation of why this problem is important;
4. a description of the proposed methodology for solving the problem and some justification as to why the methodology might be expected to meet success;
5. any preliminary results obtained by the time of the Exam.

The actual length of the report can vary widely, consistent with the report meeting its objectives. One of the issues a student may address is how much background material to include in the report. To assess this, the student should make a decision about the sort of reader the report is written for, and to write the report consistent with this.

The student must also demonstrate excellent scientific writing abilities, both in terms of using commonly accepted formatting for scientific documents and in terms of presenting material in a manner acceptable to the scientific community.

Note that it is not necessary that the research proposal present any original research. It is far more important that the student take the Exam in a timely manner than that they have made tangible progress towards the completion of their thesis.

**The Examining Committee.** The Examining Committee for the Thesis Prospectus Exam will be comprised as follows:

1. the supervisor(s);
2. two faculty who are members of the Graduate School, and normally members of the Department;
3. the Graduate Coordinator or a representative from the Department who will serve as an impartial (e.g., non-voting) Chair.

At least one member of the Examining Committee must hold a full appointment in the Department of Mathematics and Statistics.

In cases where the student's research is of an interdisciplinary nature, one of the Internal Examiners should be selected on the basis of their ability to evaluate the contribution to the discipline outside the Department's area of expertise.

**Responsibilities of student, supervisor, and Graduate Coordinator in the run up to the Exam.** It is the responsibility of the supervisor to do the following at least 15 working days before the Thesis Prospectus Exam:

1. select a tentative date and time for the exam;
2. select the two voting members of the Examining Committee;
3. propose for the Graduate Coordinator's approval, the members of the Examining Committee by completing and submitting to the Graduate Assistant, the departmental PhD Thesis Prospectus Examining Committee Selection and Scheduling form found on our website under Departmental Forms;
4. confirm the availability of the Examining Committee at the proposed date and time;
5. inform the Graduate Assistant that all examiners have agreed to the proposed examination date and time.

It is the responsibility of the student to do the following at least 10 working days before the Thesis Prospectus Exam:

1. complete the SGSPA Thesis Prospectus Pre-examination Form; the Graduate Assistant will provide this.
2. provide each examiner with a copy of the Research Proposal.
3. provide the Graduate Assistant with a copy of the Research Proposal.

It is the responsibility of the Graduate Coordinator (or Graduate Assistant) to do the following at least 10 working days before the Thesis Prospectus Exam:

1. appoint an impartial chair;
2. remind the committee of the Thesis Prospectus objectives;
3. provide the chair with a copy of the Research Proposal and the required paperwork to report the outcome of the exam;
4. forward the completed Thesis Prospectus Pre-examination Form to the School of Graduate Studies and Postdoctoral Affairs.

**The Exam itself.** The Exam will begin at the appointed time with the Chair, after introductions if necessary, asking the candidate to withdraw from the examination room. Upon the candidate leaving the room, the Chair will remind the Examining Committee of the objectives of the Exam. The Examining Committee will then discuss how they individually and as a group will contribute to achieving the Exam's objectives. This discussion could take many acceptable forms. One form might involve the Chair querying the members of the Examining Committee on the questions they are considering putting to the candidate. For this reason, it is advised that members of the Examining Committee be prepared to discuss their questioning before coming to the Exam.

After the Examining Committee has discussed how they will achieve the Exam's objectives, the Chair will invite the candidate to give a presentation of duration approximately 20-30 minutes. There will then follow a period of questions by the Examining Committee. The Chair is welcome to ask the candidate questions, but there is no expectation that they do so. The duration of the Exam might typically be 2 hours, but this may well vary significantly.

**Outcomes of the Thesis Prospectus Exam.** After the questioning, the candidate will be asked to leave the room. The Examining Committee will discuss the candidate's research proposal and their performance during the Exam.

After the discussion, each voting member of the Examining Committee, excluding the Chair, will then vote “Satisfactory” or “Unsatisfactory” on each of the following points:

1. Is the candidate's proposed research at the doctoral level in this Department in terms of its quality and significance?
2. Did the candidate exhibit that they are able to carry out the proposed research?
3. Did the candidate adequately present and defend their research proposal and its underlying assumptions and methodology and if applicable, any results and conclusions.
4. Is the candidate's research proposal professionally and satisfactorily written?

For each of these points, a “Satisfactory” or “Unsatisfactory” will be assessed on the basis of a majority vote. A tie will be taken as “Unsatisfactory.”

The outcome of the exam will then be a “Pass” if the outcome is “Satisfactory” in response to the four questions. The outcome of the exam will be a “Fail” if the outcome is “Unsatisfactory” in response to any one of the questions.

In the event that the outcome of the exam is a “Fail” the Chair will be responsible for submitting to the Graduate Committee, within 48 hours of the completion of the Exam, a report on why the committee arrived at this outcome. It is only necessary for the Chair to submit a report, but the members of the Examining Committee should be consulted in its preparation and should approve the final version of the report. The report should, therefore, represent the consensus view of the Examining Committee. Any member of the Examining Committee is welcome to submit a dissenting report to the Graduate Committee.

The report might also contain recommendations along the following lines:

1. the student be required to revise and resubmit their research proposal for approval by the examining committee.
2. the student be required to repeat the Thesis Prospectus Exam;
3. the student be required to withdraw from the Doctoral program;

The final decision regarding the action to be taken will be made by the Graduate Committee. No student shall be given more than two opportunities to pass the Thesis Prospectus Exam, i.e., there shall be at most one opportunity for re-examination of the candidate.

See Section **2.3.5** for a description of the appeal procedure for the Thesis Prospectus Exam.

**The duties of the Chair**. The Chair is a non-voting member of the Examining Committee, but still plays an important role in the Exam. The Chair may, for example, question the candidate if they wish. As indicated above, the Chair will also guide the questioning of the Exam where this is deemed appropriate. It is also the responsibility of the Chair to ensure that in the period preceding and following the examination of the candidate, the Examining Committee explicitly addresses the Thesis Prospectus Exam objectives. The voting procedure is designed to make this easier. As is clear from the discussion above, it is important that the Thesis Prospectus Exam serve its objectives, and the Chair plays an important part is seeing that this is achieved.

The Chair also conducts the Exam by, for example:

1. indicating to the student the expected duration of their presentation;
2. indicating the ordering of Examining Committee during the question period;
3. indicating to the candidate after the question period to leave the room;
4. informing the candidate of the Examining Committee's decision.

### 1.2.7 The Doctoral thesis and thesis defence

As part of the degree requirements for the Doctoral degree a student must write a thesis.

**The thesis.** A Doctoral thesis must be comprised of original research of sufficient quality to merit publication in a reputable journal. The student must also demonstrate excellent scientific writing abilities, both in terms of using commonly accepted formatting for scientific documents and in terms of presenting material in a manner acceptable to the scientific community.

We refer to the section on thesis formatting in the regulations of School of Graduate Studies and Postdoctoral Affairs for information concerning formatting of the thesis.

**The Examining Committee.** The Examining Committee will be comprised as follows:

1. the supervisor(s);
2. an Internal Examiner who is a member of the School of Graduate Studies and Postdoctoral Affairs at Queen's University who may or may not be a member of the Department;
3. a Head's Delegate who is a member of the Department;
4. an Internal/External Examiner from another department on campus;
5. an External Examiner from outside the university (it is expected that external examiners hold tenure or tenure track appointments at a research university).

There will also be an impartial (e.g., non-voting) external Chair for the examination.

At least one member of the Examining Committee must hold a full appointment in the Department of Mathematics and Statistics.

In cases where the student's research is of an interdisciplinary nature, the Internal/External examiner should be selected on the basis of their ability to evaluate the contribution to the discipline outside the Department's areas of expertise.

Supervisors are reminded that members of the examining committee must be at arm's length from the student and the thesis content so as not to be in conflict of interest with the student (see Senate Policy on Conflict of Interest and Conflict of Commitment.). In addition to this, supervisors must not have published with the external examiner within the last five years.

**Responsibilities of student, supervisor, and Graduate Coordinator in the run up to the oral examination.** The oral examination of a Doctoral thesis must be scheduled by the Graduate Coordinator (or Graduate Assistant) through the School of Graduate Studies and Postdoctoral Affairs.

It is the responsibility of the supervisor to do the following at least 30 working days before the oral examination:

1. set a tentative date and time for the oral examination;
2. select the following three members of the Examining Committee as noted above: 1.an Internal Examiner; 4. an Internal/External Examiner; 5. an External Examiner;
3. propose for the Graduate Coordinator's approval, the three selected members of the examining committee by completing and submitting to the Graduate Assistant, the departmental PhD Thesis Examining Committee Selection and Scheduling Form found on our website under Departmental Forms;
4. confirm the availability of the three selected examiners on the proposed date and time;
5. inform the Graduate Assistant that all examiners have agreed to the proposed examination date and time.

It is the responsibility of the student to do the following at least 25 working days before the oral examination:

1. provide each examiner, including the Head's delegate, with an electronic copy of the thesis;
2. provide the Graduate Assistant with an electronic copy of the thesis;
3. provide the School of Graduate Studies (thesis@queensu.ca) with an electronic copy of the thesis;
4. Provide the Graduate Assistant with a copy of the Permission of Co-Authors Form.

It is the responsibility of the Graduate Coordinator (or Graduate Assistant) to do the following at least 25 working days before the oral examination:

1. select the Head's Delegate and inform the student and supervisor who will serve in this capacity;
2. find an impartial Chair from another department on campus[5];
3. provide the School of Graduate Studies and Postdoctoral Affairs with the oral examination particulars by submitting the appropriate thesis scheduling form;
4. provide the Chair with an electronic copy of the thesis.

**The oral examination.** The oral examination will begin with a presentation by the candidate of duration approximately 20 minutes. There will then follow a period of questions by the Examining Committee. The examination may typically take between 2 – 3 hours, although this may well vary significantly.

**For more information.** More details may be found under Thesis in the General Regulations of the School of Graduate Studies and Postdoctoral Affairs.

[5] The School of Graduate Studies and Postdoctoral Affairs allows for the Head's delegate to serve as Chair at a PhD defence. Our department prefers to use this option only in the exceptional case when an external Chair cannot be found.

# 2 Schedules, procedures, and policies

For the various degrees offered by the department the major elements and the procedures surrounding them are described in Section 1. Below we discuss some of the secondary procedural matters that the student and the faculty members involved with the graduate program will/might have to attend to.

## 2.1 Timetables for various degrees

We outline the schedules for the various graduate degrees offered by the Department. It is not expected that all students will follow these schedules exactly, but the schedules are intended to indicate normal progress. Significant deviation from the normal schedule will be considered cause for concern and can eventually lead to the Graduate Committee making a recommendation for a student's withdrawal on grounds of unsatisfactory academic performance.

### 2.1.1 Timetable for Pattern I Master's

The Pattern I program is normally completed within 16-24 months of initial registration. Typically a student will register for the degree in September and, during the subsequent Fall and Winter terms, fulfil their course requirements. For the remainder of their degree the student will be engaged in research under the direction of their supervisor.

In order that students complete their degree in a timely manner, careful attention should be paid by both student and supervisor that a tractable research problem be arrived at early on.

A student in good standing who will not complete their program requirements by the end of their sixth term and who can demonstrate how they will progress toward degree completion within an additional year will be granted up to a three term extension to complete their program. Requests for an extension beyond the ninth term of study must be submitted and approved by the School of Graduate Studies and Postdoctoral Affairs. Please see Extension of Time Limits in the General Regulations of the School of Graduate Studies and Postdoctoral Affairs calendar.

Note that there are possible funding implications for students who are unable to complete their degree in a timely manner; see Section 2.4.2.

For reporting of progress, see Section 2.2.6.

### 2.1.2 Timetable for Pattern II Master's

The Pattern II program is normally completed in 12 months. Typically a student will register for the degree in September and, during the subsequent Fall and Winter terms, fulfil their course requirements. In the subsequent Spring/Summer term the student will carry out their research project, directed by their supervisor.

Unlike the Pattern I degree where there may be substantial variation in the time for different students to complete their degree, the Pattern II degree is really intended to be a 12 month degree. For this reason it is important that the student and supervisor quickly arrive at a research project that can be carried out in the four month period available.

A student in good standing who will not complete their program requirements by the end of their third term and who can demonstrate how they will progress toward degree completion within an additional year will be granted up to a three term extension to complete their program. Requests for an extension beyond the sixth term of study must be submitted and approved by the School of Graduate Studies and Postdoctoral Affairs. Please see Extension of Time Limits in the General Regulations of the School of Graduate Studies and Postdoctoral Affairs calendar.

Funding will not normally be available for Pattern II students beyond the first year of registration in the program; see Section **2.4.2**.

### 2.1.3 Timetable for Doctoral degrees

The time taken for the completion of a Doctorate can vary widely from student to student, depending on many factors. However, it is hoped that most students will complete their degree within 48 months of enrolment in the Doctoral program. Because of the nature of Doctoral research, there may well be measurable periods of time where a student is not making tangible progress on their research. This is expected. However, great care must be exercised by the student and supervisor to see that the student's progress does not get derailed. We refer to Section **2.4.1** for a discussion of the role of the supervisor in keeping a student on track.

A student in good standing who will not complete their program requirements by the end of their twelfth term and who can demonstrate how they will progress toward degree completion within an additional year will be granted up to a three term extension to complete their program. Requests for an extension beyond the fifteenth term of study must be submitted and approved by the School of Graduate Studies and Postdoctoral Affairs. Please see Extension of Time Limits in the General Regulations of the School of Graduate Studies and Postdoctoral Affairs calendar.

In order to track a Doctoral student's progress, the following benchmarks have been set.

**Selection of Supervisory Committee.** By the end of the first term in the program, the student and supervisor will propose a Supervisory Committee for approval by the Graduate Coordinator. See Section **1.2.4** for a description of the selection and role of the Supervisory Committee. The PhD Supervisory Committee Selection Form for recording the proposed supervisory committee is available from our website under Departmental Forms.

**Course selection**. By the end of their first year in the program, a student, in consultation with their supervisor or Supervisory Committee, will propose, for approval by the Graduate Coordinator, a selection of courses that will be used to fulfil the course requirements for the doctoral degree. This selection of courses will be made on the basis of the discussion in Section **1.2.3**. For courses to be taken in the second year of studies and beyond, it is possible the student will not know exact course numbers or titles. In such cases, a student should provide as much detail as possible about the courses that will be used to fulfil the course requirement. The exact course numbers can be changed when they become known; see Section **2.2.7**. The PhD Course Selection Form for recording the choice of courses is available from our website under Departmental Forms.

More information of the selection of courses can be found in Section **1.2.**

**Fulfilment of course requirements.** By the end of the 5$^{th}$ term in the program it is expected that a student will have fulfilled their course requirements. For students who come into the Doctoral program having completed many graduate courses (for example, students having completed a Pattern II Master's degree from the Department), the course requirement should be fulfilled within 8 months of initial registration in the program. Students can, with the appropriate approvals, take courses after they have fulfilled their course requirements, but they are advised that doing this may significantly distract them from their research. Perhaps auditing courses in these cases is a good alternative.

**Qualifying Exams**. By the end of their first term in the program, the student will select the two core areas on which to be tested and inform the Graduate Coordinator of their selections. Students beginning in September or May must take their exams in May of the following year while students beginning in January must take their exams by the following January. Students who fail one or both exams will have one opportunity to rewrite the exam(s) at the next offering. Thus, students who begin their doctoral program in September or January must satisfy this degree requirement by the end of their

17th month in the program while students who begin their studies in May must satisfy this degree requirement by the end of their 21st month in the program. The PhD Qualifying Examinations Selection Form is available from our website under Departmental Forms.

The qualifying exams are described in Section **1.2.5**.

**Thesis Prospectus Exam.** At least 15 days in advance of the expected exam date, the student, in consultation with their supervisor or Supervisory Committee, will propose the Thesis Prospectus Examining Committee for approval by the Graduate Coordinator. The Thesis Prospectus Exam is described in detail in Section **1.2.6**. This exam should be taken within 24 months of enrolment in the Doctoral program. See Section **2.2.10** for a discussion of the consequences of significant delay in taking the Exam. The PhD Thesis Prospectus Examining Committee Selection and Scheduling Form is available from our website under Departmental Forms.

**Thesis research/defence.** After passing their Thesis Prospectus Exam, a student can be expected to work full-time (commensurate with TA or TF ) towards their Doctoral research. At least 30 days in advance of the expected defence date the student, in consultation with their supervisor or Supervisory Committee will propose the Thesis Examining Committee for approval by the Graduate Coordinator. The Thesis Defence is described in detail in Section **1.2.7**. The PhD Thesis Examining Committee Selection and Scheduling Form is available from our website under Departmental Forms.

Note that there are possible funding implications for students who are unable to complete their degree in a timely manner; see Section **2.4.2**.

For reporting of progress, see Section **2.2.6**.

## 2.2 Procedural matters

In this section details are given concerning various procedural issues that will or might arise during a student's time in the program.

### 2.2.1 Using courses from previous degrees

It is possible to use graduate courses, taken in our own department as part of another graduate degree or taken at another university, to satisfy course requirements. For Master's degrees, obtaining permission to use these courses would be subject to the regulations of the School of Graduate Studies and Postdoctoral Affairs. For Doctoral degrees, these would additionally be subject to our course requirement guidelines. A student taking a Master's degree from our department should, under normal circumstances, encounter no problems having courses taken during that degree count towards the Doctoral course requirement. The decision as to whether courses taken from other universities can be used to fulfil the course requirement is made on a course-by-course basis by the Graduate Coordinator. For students in Smith Engineering , this decision may be additionally scrutinized by the School of Graduate Studies and Postdoctoral Affairs. Refer to Section **2.2.2** regarding obtaining an exemption for one or more core courses.

### 2.2.2 Core courses

It is expected that recipients of graduate degrees in mathematics or statistics will have detailed knowledge of certain basic graduate level concepts. To aid our students in obtaining this knowledge the department requires that students take a certain number of core courses. The core course requirements for Master's students are stated in Section **1.1** and for Doctoral students in Section **1.2**.

Doctoral students may have taken equivalents of some core courses during a Master's degree at another university. In such cases the student may request a core course exemption by filling out the PhD Core Course Exemption Request Form which can be found on our website under Departmental Forms. An exemption for a core course must be approved by the student's supervisor and the Graduate Coordinator in consultation with previous and/or current core instructors if necessary.

### 2.2.3 Reading Courses

Students may, depending on the course requirement for their program as outlined in Sections **1.1** and **1.2**, take reading courses to augment the departmental offering of graduate courses. Reading courses are not supposed to replace or duplicate courses regularly offered by the department and are normally on more advanced and specialized topics. Reading courses may cover background material needed for a student's thesis research but the material covered in the reading course cannot form part of the thesis. Reading courses are offered as 900-level courses. The content of a reading course may consist of one or a combination of the following: (chapters of) a book; research papers; online resources, including online courses (see **2.2.5**). The format can be in the form of regular (at least once weekly recommended) meetings with the instructor, participation in a weekly seminar (including delivering a talk(s)), or attending an online course. The assessment may be in the form of regular assignments, final paper, final exam, giving talks at a seminar, or combination of some of these.

A reading course is contingent upon a faculty member's willingness to supervise such a course. Students interested in taking a reading course should approach a faculty member. The faculty member then completes and submits to the Graduate Assistant, the Graduate Course Credit Request Form found on our website under Departmental Forms. The proposal needs to be approved by the Graduate Coordinator.

### 2.2.4 Fields Academy courses

Students may take courses offered through the Fields Academy. Students interested in taking such a course for credit must first obtain the permission of their supervisor and the Graduate Coordinator. Unless the host university for a course offered through the Fields Academy requires that students register through the Ontario Visiting Graduate Students (OVGS) program, students taking Fields Academy courses will register in MATH 901 - Research Institute Course at Queen's. MATH 901 will be treated as a reading course as described in Section **2.2.3** with the exception that the assessment will be provided by the instructor of the course and recorded as Pass or Fail.

### 2.2.5 Online Courses

In exceptional cases students may take online courses at other universities or summer schools organized by research institutes (e.g. The Fields, PIMS, CRM) for credit when such courses will benefit the student's education. Students interested in taking such a course for credit must first obtain the permission of their supervisor and the Graduate Coordinator. Internally, such a course will normally be treated as a reading course described in **2.2.3** and a faculty member in the department (usually the supervisor) will be responsible for providing adequate assessment in the course.

### 2.2.6 Progress reports

Students enrolled in a Pattern I Master's or a Doctoral degree must submit annual reports on their activities. Beginning in their second year, after the qualifying exams have been taken, doctoral students will also be required to meet with each member of their supervisory committee twice per year, to discuss their progress. Students will be contacted by the Graduate Assistant for progress reports. These reports are intended to serve three objectives:

1. to cause the student to reflect on what they have done in the past year;
2. to cause the supervisor and supervisory committee, in the case of a PhD student, to consider whether the student's progress has been satisfactory, both with respect to their obligation as supervisors and the student's obligation as a student;
3. to inform the Graduate Coordinator of the outcome of the preceding reflections and considerations.

The annual reports are not onerous for the student; it should be possible for the student to fill one out in at most 15 minutes. These reports are not onerous for the supervisor; the supervisor need only sign their name indicating that the student's stated activities are accurate and provide comments if appropriate on the student's progress. Likewise, the biannual supervisory committee report forms are not onerous for either the student or the supervisory committee members. Thus, the expectation is that these reports will be submitted in a timely manner.

Extreme delinquency in submitting progress reports is cause for the Graduate Coordinator to be concerned about a student's progress. At the very least, a delay in submitting a progress report will cause the Graduate Coordinator to schedule a meeting of the student with their Supervisory Committee to consider the student's activities. In extreme cases where the Graduate Coordinator is for a prolonged period not aware of a student's activities, and a student continues to avoid reporting their progress, the Graduate Committee may recommend that the student withdraw from the program.

### 2.2.7 Approval of courses for Doctoral students

As indicated in Section **2.1.3**, a doctoral student will, by the end of the first year, submit a list of courses to satisfy the course requirement for the degree to the Graduate Coordinator for approval. We refer to Section **1.2.3** for a discussion of the guidelines to be followed when selecting courses. A student could very well change their mind about courses on the basis of course availability or a change of interest. There are no obstructions to doing this, per se. However, changes in the course selection must be compatible with the objectives of course selection as described in Section **2.1.3**. For this reason, when a change of course is proposed the student's entire course selection will be surveyed by the supervisor and Graduate Coordinator to see if the appropriate balance has been maintained. The Graduate Assistant will supply the paperwork needed to carry this through.

As mentioned in Section **1.2.3**, it is possible, although unlikely, that disputes might arise over what constitutes a suitable selection of courses. If the student, supervisor, and Graduate Coordinator are unable to agree on this, the Graduate Committee will be the final arbiter of whether a student's course selection is appropriate.

### 2.2.8 Failing a course

First a brief discussion about graduate courses. There are three ways a student can sign up for a graduate course: (1) as a primary course; (2) as a secondary course; (3) as an audit. By signing up for a course as primary it is considered required for the student's degree. More details may be found under Course Work Requirements in the General Regulations of the School of Graduate Studies and Postdoctoral Studies calendar.

To pass a graduate course means to get a grade of at least B-. Thus, anything less than a grade of B- in a graduate course means the course has been failed.

If a graduate student fails a primary course the Department may recommend to the School of Graduate Studies and Postdoctoral Affairs that:

1. The student be re-examined. This option is only available if the instructor is agreeable. In this case the instructor will assign a new grade which will replace the existing grade based upon the re-examination.
2. The student retake the course. In this case the failing grade will remain on the student's transcript and the grade from the second taking of the course will also appear.
3. The student replace the failed course with another appropriate course approved by the supervisor and Graduate Coordinator. In this case the failing grade will remain on the student's transcript and the grade from the replacement course will also appear.
4. The student be asked to withdraw from the program.

The Graduate Coordinator will discuss the student's performance with the instructor, the supervisor and the student before making a recommendation to the School of Graduate Studies and Postdoctoral Affairs.

If a student fails a secondary course, no action need be taken.

### 2.2.9 Qualifying Exams Procedures

In Section **1.2.5** the Qualifying Exams are discussed in detail including a description of the procedures surrounding the taking of these exams. Students must satisfy this requirement by the second exam sitting based on their program start date. A postponement in taking these exams will only be considered in cases of exceptional circumstance, such as illness.

### 2.2.10 Thesis Prospectus Exam procedures

The Thesis Prospectus Exam, including a description of the procedures surrounding the exam, is discussed in detail in Section **1.2.6**. These are the only procedures that need be referred to under the usual circumstance when the student successfully takes the Exam on time. Here we describe what happens in cases where a student delays taking their Thesis Prospectus Exam.

As has been mentioned in Sections **1.2.6** and **2.1.3**, it is expected that the Thesis Prospectus Exam will take place by the end of the 24th month of the student's time as a Doctoral student. It is extremely important that the Thesis Prospectus Exam take place in a timely manner. For this reason, the following measures will be taken to ensure that students do not delay excessively in taking their Thesis Prospectus Exam.

1. At the end of the 20th month (i.e., at the end of April of the student's second year, in the normal situation) the Graduate Coordinator will contact the student and supervisor to inform them that they have 4 months within which the Thesis Prospectus Exam must take place if it is to be taken during the accepted period.
2. If a student has not scheduled their Thesis Prospectus Exam by the end of their 24th month (i.e., by the end of August of the student's second year, in the normal situation) to take place in the subsequent month, the student and supervisor will be informed by the Graduate Coordinator that they are late in taking their Thesis Prospectus Exam. A meeting will be scheduled with the student, their Supervisory Committee, and the Graduate Coordinator to discuss the student's progress and set out a firm timetable for the taking of the Thesis Prospectus Exam.
3. After the student's 24th month has passed without their having taken their Thesis Prospectus Exam, the Graduate Coordinator will take measures to ensure that the weight of the circumstances are clearly communicated to the student and supervisor. These measures include, but are not limited to the following.

a) The Graduate Coordinator will keep in regular contact (as a guideline, every three weeks) with the student and supervisor to track the student's progress towards taking their Thesis Prospectus Exam. The Graduate Coordinator will ask the student for tangible evidence of the progress they are making.

b) All correspondence between the Graduate Coordinator and the student and supervisor in this matter will be saved. This means that all email correspondence will be kept, and might also mean that some of the correspondence is in written form, with a copy being included in the student's file. It is also recommended that the student and the supervisor maintain records of their correspondence to avoid possible misunderstandings.

4. At any time after the end of the student's 25th month in the Doctoral program, if a student has not successfully taken their Thesis Prospectus Exam, the Graduate Coordinator can ask the Graduate Committee to approve a recommendation for the student's withdrawal from the Department's graduate program on the grounds of unsatisfactory academic performance. This possible eventuality will be communicated to the student at the meeting with the student, their Supervisory Committee, and the Graduate Coordinator that occurred at the end of the 24th month. If it is deemed appropriate, the student and supervisor will be periodically reminded of this eventuality, again with all correspondence being saved.

   It is recommended, therefore, that the student and supervisor exert all possible efforts to immediately take the Thesis Prospectus Exam. A lack of dedication to this objective could have disastrous consequences for the student.

5. If a student enters the 30th month (i.e., enters March in the third year, in the normal situation) of their enrolment in the Doctoral program without having successfully taken their Thesis Prospectus Exam, the Graduate Coordinator will immediately convene a meeting of the Graduate Committee and ask that the Committee approve a recommendation of the withdrawal of the student from the Department's graduate program on the grounds of unsatisfactory academic performance. This deadline and the attendant actions are not negotiable, and are only subject to modification in cases where there are significant extenuating circumstances of a non-academic nature.

Note that there is a very easy formula for avoiding the escalation of consequences appearing in the above sequence of deadlines: the student and supervisor need merely spend the summer of the student's second year preparing for the Thesis Prospectus Exam! It is strongly advised that they do just this.

## 2.3 Appeals and disputes

In the normal course of events it is not expected that a student will need to make use of any appeals processes. However, in the event that this becomes necessary, we provide some information on Departmental procedures. In each case, a student dissatisfied with the outcome after the departmental procedures have been carried out should refer to the section on Appeals Against Academic Decisions in the General Regulations of Calendar of the School of Graduate Studies and Postdoctoral Affairs.

### 2.3.1 Appeal of grades

If a student disagrees with the grade they receive in a graduate course, the first course of action is to immediately discuss the matter informally with the course instructor. The Graduate Coordinator does not necessarily need to be informed of the situation at this time. Should the student be unable to resolve the matter informally they may then resort to the following process.

1. A written request for a review of the grade should be made to the instructor, with a copy being sent to the Graduate Coordinator. This request must be made within ten working days of the grade being announced and must provide clear reasons for why the student wishes for the grade to be reviewed. Within ten working days of receiving the request, the instructor must reach a decision and communicate it to the student and Graduate Coordinator.
2. Should the student not be satisfied with the outcome of the previous decision and want to continue with the appeal process, they must, within five working days of receiving the instructor's decision, send a written request to the Graduate Coordinator for a review of the grade. Again, the reasons for making the request for review must be clearly stated. Within ten working days of receiving this second request, the Graduate Coordinator will reply with one of the following outcomes:
    a) the existing grade will stand;
    b) the grade should be modified;
    c) the student should be re-examined using an exam of the same format as the original.
3. No further appeals within the Department are available.

If the Graduate Coordinator is the instructor for the course, then the role of the Graduate Coordinator in the above is to be taken by the Department Head.

General policies on Appeal of an Assigned Grade in a Graduate Course can be found under the General Regulations in the in the School of Graduate Studies and Postdoctoral Affairs calendar.

### 2.3.2 Appeal of outcome of Pattern I Master's thesis exam

Appeals for the outcome of Master's thesis examinations are handled by the School of Graduate Studies and Postdoctoral Affairs. See Appeal of Thesis Examination Committee Decision under the General Regulations in the School of Graduate Studies and Postdoctoral Affairs calendar..

### 2.3.3 Appeal of outcome of Pattern II Master's project presentation

If a student wishes to appeal the outcome of their Master's project presentation they must inform the Graduate Coordinator in writing, and within two working days of the presentation, that they wish to have the outcome reviewed. The student should state clearly the reasons for requesting the review. If necessary, the Graduate Coordinator will solicit the Examining Committee for information regarding the decision (note that in the case of a failed presentation, a report will have been submitted to the Graduate Committee by the Examining Committee). The final decision regarding the appeal will be made by the Graduate Committee within five working days of receiving the appeal request from the student.

### 2.3.4 Appeal of outcome of Qualifying Exams

If a student wishes to appeal the outcome of one or both of their qualifying exams**,** the first course of action is to immediately, and within five working days of receiving the results, request a meeting with the Graduate Coordinator or her/his delegate. This meeting will take place within five working days of receiving the request. The Graduate Coordinator or his/her delegate will explain why the committee found the exam(s) unsatisfactory. Should the student still not agree with the results and want to continue with the appeal process of their exam(s) they must, within five working days of this meeting, request in writing, a formal review of their qualifying exam(s). This correspondence must clearly state the reasons for requesting a formal review of the exam(s). In this case, an Appeal Committee will be

struck to review the exam(s) in question. This committee will consist of the Graduate Coordinator or his/her delegate, and two other members of the department who are not members of the Graduate Committee or the student's supervisory committee. This committee will review the exam(s) and reply to the Graduate Committee with one of the following outcomes:

a) The existing result will stand

b) The result should be changed to a "pass"

In the case of a), if this was the student's first attempt they will be advised that the exam must be retaken at its next offering. However, if this was the student's second attempt, no further exam attempts are possible.

The Graduate Committee will advise the student of the results of the Appeal Committee. Every effort will be made to review the exam(s) and report to the student within ten working days of receiving the request.

No further appeals within the Department are available.

### 2.3.5 Appeal of outcome of Thesis Prospectus Exam

If a student wishes to appeal the outcome of their Thesis Prospectus Exam they must advise the Graduate Coordinator within five working days of the Exam of their intention to appeal. This correspondence should be clearly state the reasons for the appeal request. If necessary, the Graduate Coordinator will solicit the Examining Committee for information regarding the decision (note that in the case of a failed Exam, a report will have been submitted to the Graduate Committee by the Examining Committee). The final decision regarding the appeal will be made by the Graduate Committee within five working days of receiving the appeal request from the student.

### 2.3.6 Appeal of outcome of Doctoral thesis exam

Appeals for the outcome of doctoral thesis examinations are handled by the School of Graduate Studies and Postdoctoral Affairs. See Appeal of Thesis Examination Committee Decision under the General Regulations in the School of Graduate Studies and Postdoctoral Affairs calendar.

### 2.3.7 Disputes regarding matters of intellectual property

During the course of academic research disputes may arise as to the ownership of research outcomes, including, but not restricted to, matters such as copyright, patents, and ownership of data. It is important for students to understand their rights in such matters. See the School of Graduate Studies and Postdoctoral Affairs website for the Policy on Intellectual Property. We recommend that all students and supervisors understand these matters before they embark on any area of research where matters of intellectual property may become relevant.

### 2.3.8 Academic integrity

Integrity is essential in an academic environment. It is essential that all students and faculty conduct themselves according to the core principles of Academic Integrity. See the School of Graduate Studies and Postdoctoral Affairs website for the Policy on Academic Integrity.

## 2.4 Student support

Some facets of the Department's obligations towards graduate students are reviewed.

### 2.4.1 Students and supervisors

The relationship of a student with their supervisor is a very important one. Particularly, it is not possible to overstate the importance of the role played by the supervisor for doctoral students. The School of Graduate Studies provides a Guide to Graduate Supervision. However, here we outline some Departmental guidelines for this.

The Department expects that the supervisor serve as guide and mentor for their graduate students. In the subsequent four paragraphs, for each of the degrees offered by the Department we list some of the more tangible activities that a supervisor should undertake towards their students. The (equally important) intangible activities we leave for each supervisor to handle in their own way.

**Supervisor duties for Pattern I MSc and MASc students.**

1. The supervisor will advise the student in course selection, consistent with the objectives of the course requirements for the degree program.
2. While the student is taking courses, the student and supervisor should be meeting to discuss the student's subsequent research activities. It is important that the student hit the ground running when their research activities commence.
3. It is important that a graduate student learn to properly write scientific documents. This means that they must learn to write clearly, accurately, and following accepted practices for style and formatting. The onus for this falls largely on the supervisor. In particular, it is essential that, by the time a student submits the final version of their thesis before the thesis examination, the document clearly demonstrate that the student has mastered the art of scientific writing; see Section **1.1.5**.
4. Supervisors are expected to provide career advice and assistance to students as they approach graduation.

**Supervisor duties for Pattern II MSc students.**

1. The supervisor will advise the student in course selection, consistent with the objectives of the course requirements for the degree program.
2. When the student has met their course requirements, the supervisor should get the student immediately into their research project.
3. It is important that a graduate student learn to properly write scientific documents. This means that they must learn to write clearly, accurately, and following accepted practices for style and formatting. The onus for this falls largely on the supervisor. In particular, it is essential that, by the time a student submits the final version of their research report before the oral presentation, the document clearly demonstrate that the student has mastered the art of scientific writing; see Section **1.1.6**.
4. Supervisors are expected to provide career advice and assistance to students as they approach graduation.

**Supervisor duties for PhD students.**

1. The supervisor will advise the student in course selection, consistent with the objectives of the course requirements for the degree program.
2. While a significant portion of the responsibility for taking the Thesis Prospectus Exam lies with the student, the supervisor has an important role to play here as well. For example, the supervisor should review preliminary or partial drafts of the research proposal and provide feedback in a timely manner. The supervisor, should also follow-up with the student on reminders from the Graduate Coordinator, to prepare for or take the Thesis Prospectus Exam.
4. There are many different models for supervising a student while they carry out their thesis research, and it is not intended to suggest that any one model is the appropriate one. However, the supervisor should be sensitive to what is appropriate for a particular student and address any problems that might arise because of incompatibilities between the style of supervision provided and the style of supervision required by the student.
5. As the student nears completion of their Doctorate, it is extremely important that the supervisor play an active role in advising the student in career matters, and playing as active a role as possible in seeing that the student has viable options available to them upon graduation. The advice provided by the Doctoral supervisor is, in particular, very important for the student. Students engaged in Doctoral research can sometimes not be aware of what is demanded of them upon completion of their degree. The supervisor must address this.
6. It is important that a graduate student learn to properly write scientific documents, and this is particularly the case for Doctoral students. This means that they must learn to write clearly, accurately, and following accepted practices for style and formatting. The onus for this falls largely on the supervisor. In particular, it is essential that, by the time a student submits the final version of their thesis before the thesis examination, the document clearly demonstrate that the student has mastered the art of scientific writing; see Section **1.2.7**.

**Supervisory Committee duties for Doctoral students.**

1. The Supervisory Committee will advise the student in course selection.
2. The Supervisory Committee will meet with the student independent of one another and the supervisor twice per year to review the student's progress.
3. As a student progresses through their program, the Supervisory Committee can provide guidance, at varying degrees of resolution, to the student.
4. Should academic problems arise with a student, the Supervisory Committee will become involved to council the student and to provide advice in the resolution of the problems.

**Expectations for students.** There are standard expectations placed on students as they progress through their graduate degrees. These include being familiar with and following the guidelines set out in this document and following the policies, procedures and regulations of the School of Graduate Studies found in the Graduate Supervision Handbook and The School of Graduate Studies calendar.

Graduate students are responsible for making themselves aware that there are provisions in the guidelines of the School of Graduate Studies for students to be required to withdraw due to unsatisfactory performance. Supervisors should be aware that withdrawal on these grounds is to be regarded as a last resort to be undertaken only in the most extreme circumstances; we refer to Paragraph (c) in the School's regulations for Withdrawal on Academic Grounds.

In addition to the above there is the expectation that graduate students will contribute to the scholarly environment of the Department. There is no standard plan for carrying out this responsibility, but here are a few things that a graduate student might do:

1. be active in their research group by sharing their activities with other students;
2. be active in the Department by, for example, organizing reading and study groups for research as well as course studies;
3. attend Departmental Colloquia and seminars of interest;
4. participate in the Graduate Student Seminar;
5. serve on Departmental committees as required.
6. discharge teaching assistantship and teaching fellowship duties in a professional manner.

Students will find that their experience as a graduate student is significantly enhanced by being engaged with other graduate students and researchers in the Department.

**What to do when problems arise between student and supervisor.** It is an inevitable consequence of human nature that there will on occasion be problems that arise in the relationship between a student and their supervisor. Since the nature of these problems can admit no uniform characterisation, a uniform policy for dealing with these cannot be proposed. Instead we suggest the following. If a student or a supervisor is having difficulty in their relationship with the other, these difficulties should be discussed with the Graduate Coordinator. It is important that the Graduate Coordinator know early on when there are possible problems, even when no action may be warranted. If further action is warranted, each case will be handled in its own way, commensurate with the particular nature of the problem.

### 2.4.2 Funding

Student funding typically comes from one or more of four sources: (1) a Teaching Assistantship or Teaching Fellowship; (2) an Award and/or Fellowship from the School of Graduate Studies; (3) a research fellowship from their supervisor; (4) external funding agencies.

The conditions and duration of the total funding that can be expected are detailed in the funding offer to the student. The usual duration of graduate student funding is as follows:

1. Pattern I Master's: 6 terms, i.e., until the end of the student's second year;
2. Pattern II Master's: 3 terms, i.e., until the end of the student's first year;
3. Doctorate: 4 years.

For master's degrees funding will not normally be extended beyond the specified duration. For doctoral students, funding may be extended beyond the specified duration. The decision to extend funding will be based in part on the following factors:

1. a recommendation from the supervisor for continued support;
2. the ability of the supervisor to financially support the student;
3. the likelihood that the degree will be completed during the additional term of support.

# 3 Departmental Forms

Listed below is a summary of Departmental Forms.

## 3.1 Forms for Pattern I Master's students

### 3.1.1 Master's Annual Progress Report Form

To be filled out annually by Master's students. The request to submit the report will come from the Graduate Coordinator or Assistant.

### 3.1.2 Master's Thesis Examining Committee Selection and Scheduling Form

To be filled out when selecting the Examining Committee and date for a thesis defence. See Section 1.1.5 for details.

## 3.2 Forms for Pattern II Master's students

### 3.2.1 Master's Annual Progress Report Form

To be filled out annually by Master's students. The request to submit the report will come from the Graduate Coordinator or Assistant.

### 3.2.2 Math 800 Credit Request Form

To be used to indicate the manner in which credit for Math 800 was obtained. This form should be completed by the end of the first month of registration in the program.

### 3.2.3 Master's Project Examining Committee and Scheduling Form

To be filled out when selecting the Examining Committee and date for a project presentation. See Section 1.1.6 for details. This form should be completed at least 15 days in advance of the defence date.

## 3.3 Forms for Doctoral students

### 3.3.1 PhD Course Selection Form

To be filled out by Doctoral students by the end of their first year in the program. See Sections 1.2 and 2.2 for details.

### 3.3.2 Core Course Exemption Request Form

To be filled out when requesting an exemption from taking a core course on the basis of courses previously taken. See Section 2.2.2 for details. Requests for core exemptions must be made before the add/drop date of the term for which a core course exemption is being requested.

### 3.3.3 PhD Supervisory Committee Selection Form

To be filled out by Doctoral students by the end of their first term in the program. See Section 1.2.4 for details.

### 3.3.4 PhD Annual Progress Report Form

To be filled out annually by Doctoral students. The request to submit the report will come from the Graduate Coordinator or Assistant.

### 3.3.5 PhD Biannual Progress Report Form

To be reviewed and signed by each member of the supervisory committee, independent of one another, biannually by Doctoral students beginning in their second year. The request to submit this report will come from the Graduate Coordinator of Assistant usually in October

### 3.3.6 PhD Qualifying Examinations Selection form

This form should be submitted by the end of 5$^{th}$ month in the program. See Section **1.2.5** for details.

### 3.3.7 PhD Thesis Prospectus Examining Committee Selection and Scheduling Form

This form should be submitted 15 days in advance of the exam date. See Sections **1.2.6** and **2.2.10** for details.

### 3.3.8 PhD Thesis Examining Committee Selections and Scheduling Form

This form should be submitted at least 30 days in advance of the defence date. See Section **1.2.7** for details.

## 3.4 Forms for faculty

### 3.4.1 Course Credit Request Form for Reading and Seminar Courses

To be filled out by a faculty member when offering a reading or seminar course for credit.