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# **GRADUATE PROGRAMS AND GUIDELINES**

*(for students who began a program in May 2016 or later)*

Department of Mathematics and Statistics  
Queen's University

July 2016

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# 1 Degrees Offered

The Department offers degrees from two Councils of the School of Graduate Studies, the Engineering and Applied Science Council (hereafter abbreviated EA&S Council) and the Science Council in the Faculty of Arts and Science. These programs within these two Councils will be referred to as “Engineering and Applied Science” (hereafter abbreviated “E&AS”) and “Science”, respectively. The choice as to which program a student will enrol is made largely on the basis of their research interests, although there may be other factors as discussed below. Within each Council, the Department offers Master's and Doctoral degrees.

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. Other components 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 is a primarily a course work degree. 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.

For students who plan to continue their graduate studies to include a Doctorate, note that the courses taken during an Master's can most often be counted towards the course requirement for a Doctoral degree in our department.

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

### 1.1.1 Degree requirements: E&AS, Pattern I MASc

This degree is designated MASc (Master's of Applied Science). The requirements are:

1. a minimum of 4 one term graduate courses (see Section 2.2.1 for transferring courses from other universities);
2. at least one course must be taken from the Department's core graduate courses (see Section 2.2.2);
3. all required courses must be passed, a pass being at least a B-;
4. a thesis (see Section 1.1.5).

While the E&AS Council MASc guidelines allow students to take one 400 level undergraduate courses as part of their course requirement, the Department will only allow undergraduate courses to count towards the degree in exceptional circumstances.

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

This degree is designated MSc and has the following requirements:

1. a minimum of 4 one term graduate courses (see Section 2.2.1 for transferring courses from other universities);

2. at least one course must be taken from the Department's core graduate courses (see Section 2.2.2);
3. all required courses must be passed, a pass being at least a B-;
4. a thesis (see Section 1.1.5).

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

#### Specialisation in Mathematics

This degree is designated MSc, and is exactly the same degree as the Science, Pattern I degree.

The requirements for this degree are:

1. a minimum of 7 one term graduate courses (see Section 2.2.1 for transferring courses from other universities);
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

As with the Science, Pattern II (Mathematics) degree, this degree is designated MSc, and is the same as the Science, Pattern I degree.

The requirements for this degree are:

1. a minimum of 7 one term graduate courses (see Section 2.2.1 for transferring courses from other universities);
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

As with the Science, Pattern II (Mathematics) degree, this degree is designated MSc, and is the same as the Science, Pattern I degree.

The requirements for this degree are:

1. a minimum of 8 one term graduate courses (see Section 2.2.1 for transferring courses from other universities);
2. of the 8 courses, 6 will be the following: EPID 801, EPID 804, EPID 823, STAT 862, STAT 886, and MATH 896<sup>1</sup>;
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 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 Pattern II Master's degrees

Many students who enrol in a Pattern II Master's degree intend to continue their studies here in the doctoral program. For this reason alone — but also to ensure the integrity of the degree in general — it is important that the course selection for these degrees be made appropriately. 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. No more than one third of courses taken should be double numbered 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.

The selection of courses made by each student in September is subject to the approval of the student's supervisor and of the Graduate Coordinator. 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.

For students who are considering staying in the Department for their Doctoral degree, the courses taken during the Pattern II Master's can be used to fulfil the Doctoral course requirement. For this reason it is advisable to choose courses in a manner consistent with the Doctoral course requirements; see Section 1.2.3.

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

As part of the degree requirements for the E&AS, Pattern I MASc degree and the Science, Pattern I MSc degree, a 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 also demonstrate excellent scientific writing

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<sup>1</sup> There is a difference between the CHE and STAT requirements for the Biostatistics specialization. STAT 853 is intended to be taken by CHE graduate students enrolled in the joint biostatistics program.

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 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 should 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](#).

**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. select a tentative date and time for the oral examination;
2. in consultation with the student, select the Internal Examiner and the Internal/External Examiner;
3. propose for the Graduate Coordinator's approval the members of the Examining Committee (see ;
4. confirm the availability of the Internal and the Internal/External examiners at this date and time;
5. inform the Graduate Coordinator (or Assistant) of this date and time.

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

1. inform the School of Graduate Studies about the date of the exam;
2. select the Head's Delegate.

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

1. provide each examiner, including the Head's Delegate, with a 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 1.5 – 2 hours, although this may well vary significantly.

Note that it is expected that the candidate will be asked to demonstrate basic mathematical and/or statistical knowledge that may be only peripherally related to their research. The onus is on the supervisor to ensure that this function of the examination is fulfilled, either by conducting appropriate questioning themselves, or by, prior to the oral examination, informing the members of the Examining Committee of this function of the examination. The Master's oral examination should not just be an examination of the candidate's research, but of the candidate. Independent of the voting of the Examining Committee, the Head's Delegate will be provided with a form to submit to the Graduate Coordinator indicating whether the exam was conducted appropriately by the Examining Committee.

**For more information.** For complete details on scheduling oral examinations and on the outcomes of an oral examination please refer to the [General Regulations](#) of the Calendar of the School of Graduate Studies.

### 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. However, consistent with the statement above, it is expected that the formatting of the document will coincide with that of good practice.

**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 (in the case of students in the Science Council) or an Internal/External Examiner from an Engineering department (in the case of students in the E&AS Council).

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

For students in E&AS 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](#).

**Responsibilities of student and supervisor 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. in consultation with the student, select the Examining Committee;
2. propose for the Graduate Coordinator's approval the members of the Examining Committee;
3. select a tentative date and time for the presentation;
4. confirm the availability of the Internal and the Internal/External examiners (when the latter comprises part of the Examining Committee) at this date and time;
5. inform the Graduate Coordinator (or Assistant) of this 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.

**The oral presentation.** The presentation will begin with the Chair inviting the candidate to give a presentation of duration 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.

Note that it is expected that the candidate will be asked to demonstrate basic mathematical and/or statistical knowledge that may be only peripherally related to their research. The onus is on the supervisor to ensure that this function of the presentation is fulfilled, either by conducting appropriate questioning themselves, or by, prior to the oral presentation, informing the members of the Examining Committee of this function of the presentation. The Master's oral presentation should not just be an examination of the candidate's research, but of the candidate. Inability of the candidate to properly demonstrate the requisite mathematical and/or statistical background is grounds for re-examination or failure of the oral presentation. Independent of the voting of the Examining Committee, the Chair will be provided with a form to submit to the Graduate Coordinator indicating whether the exam was conducted appropriately.

**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 than this then the outcome of the exam should be "Fail."

If the outcome of the exam is "Fail," then the Examining Committee should 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 programme 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 deliver a bound copy of the project report, incorporating any revisions arising during the oral presentation, to the Graduate Assistant before the degree requirements will be considered to be satisfied.

It is the responsibility of the Graduate Coordinator to notify the School of Graduate Studies of the outcome of the oral presentation.

**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<sup>2</sup>;
3. indicating to the candidate after the question period to leave the room;
4. informing the candidate of the Examining Committee's decision.

As noted above the chair must also comment on whether or not the exam was conducted appropriately by completing an examination report form.

Generally speaking, Pattern II oral presentations are more informal than Pattern I Master's or Doctoral thesis defences.

Should the student fail their oral presentation, the Chair should, 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.

## 1.2 Doctoral degrees

The Department offers Doctoral degrees from both the E&AS and Science Councils. The degree requirements are as follows.

### 1.2.1 Degree requirements: E&AS, PhD

The requirements are:

1. a number of courses should be taken to achieve the minimum of the following conditions:
  - a) a minimum of 9 one term graduate courses (MATH 800 cannot be counted as one of these courses) (see Section 2.2.1 for transferring courses from other universities);
  - b) a minimum of 4 one term graduate courses beyond the Master's;

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<sup>2</sup> 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.

- c) at least 3 courses must be taken from the Department's core graduate courses (see Section 2.2.2);
  - d) the student must attain a grade of at least B+ in all core courses used to meet their degree requirements, and attain an average of at least A- in these courses (see Section 2.2.2);
  - e) the student must pass all other required courses (pass means achieve a grade of at least B-) and attain an average of at least A- over all courses taken to meet their degree requirements;
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: Science, PhD

The requirements are:

1. a number of courses should be taken to achieve the minimum of the following conditions:
  - a) a minimum of 9 one term graduate courses (MATH 800 cannot be counted as one of these courses) (see Section 2.2.1 for transferring courses from other universities);
  - b) at least 3 (in the case of Applied Mathematics or Statistics students) or four (in the case of Pure Mathematics students) courses must be taken from the Department's core graduate courses (see Section 2.2.2);
  - c) the student must attain a grade of at least B+ in all core courses used to meet their degree requirements, and attain an average of at least A- in these courses (see Section 2.2.2);
  - d) the student must pass all other required courses (pass means achieve a grade of at least B-) and attain an average of at least A- over all courses taken to meet their degree requirements;
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 double numbered 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.

These guidelines are intentionally vague. The selection of courses made by each student at the beginning of their degree 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 2.2.4 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 should 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 students 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 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 academic year, in May and January. Students beginning in September must take their exam in May of the following year while students beginning in January must take their exam 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<sup>3</sup> will be drawn from a list which will be available to all students eight months in advance of the examinations along with a list of textbooks that support the questions. Questions will cover advanced undergraduate and first year graduate courses.

**Evaluation of Exams.** Exams will be evaluated by the departmental Graduate Committee. Each question will be marked as pass or fail. The student must demonstrate a good understanding of how to answer the question to receive a pass for that question. In order to pass an exam, students must pass four of the six questions. 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.

**Scheduling.** Exams will be scheduled such that no student will be required to write both exams in one day. Each exam will be offered only once during each exam period in May and January. Exam dates 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. remind new students and their supervisor(s) of the qualifying exams requirement by the end of the student's first month of registration;
3. select the questions for each core exam;
4. set the exam dates and notify the students at least 15 days in advance of those dates;
5. mark the exams and inform the students of the outcome of each exam.

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

1. decide upon the exams that the student should be required to take;
2. inform the graduate committee by the beginning of their 8<sup>th</sup> month in the program the exams the student will take.

### 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 programme. 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 2.2.7 for details concerning the timing of the Thesis Prospectus Exam, and consequences of not taking it in a timely manner.

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<sup>3</sup> Questions selected for an examination could have minor modifications made so as to avoid the possibility of a particular calculation being memorized.

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

1. to evaluate the 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. That is to say, there is no reason whatsoever for a student to delay in taking the Thesis Prospectus Exam.

**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 should 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 replaced with an examiner who has the 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. propose for the Graduate Coordinator's approval the members of the Examining Committee;
2. select a tentative date and time for the Exam;
3. confirm the availability of the Examining Committee at this date and time;
4. inform the Graduate Coordinator (or Assistant) of the above by ensuring that a copy of the PhD Thesis Prospectus Examining Committee Selection and Scheduling Form is submitted.

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

1. provide each examiner, including the Chair, with a copy of the report.

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 the required paperwork to report the outcome of the exam.

**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. Has the candidate exhibited that they are able to carry out the proposed research?

3. Was the candidate's research proposal well 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.”

Note that, except in the case of the last question, the evaluation is to be applied to both the written research proposal and the oral presentation and subsequent questioning.

The outcome of the exam will then be a “Pass” if the outcome is “Satisfactory” in response to the three 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 obviously 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 should withdraw from the Doctoral programme;
2. the student should be given an opportunity to repeat the Thesis Prospectus Exam;
3. the student should be required to revise and resubmit their research proposal for approval by the examining committee.

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 2.3.4 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 should 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 in 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 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. 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 should hold a full appointment in the Department of Mathematics and Statistics.

It is the responsibility of the supervisor, in consultation with the student, to propose for the Graduate Coordinator's approval the Internal Examiner, the Internal/External Examiner, and the External Examiner. 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 should 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](#)). In addition to this, supervisors must not have published with the external examiner within the last five years. The Head's Delegate will be chosen by the Graduate Coordinator. An impartial Chair will be selected by the School of Graduate Studies.

**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 Assistant) through the School of Graduate Studies.

It is the responsibility of the supervisor to do the following at least 30 working days before the oral examination by completing the [PhD Thesis Examining Committee Selection and Scheduling Form](#):

1. propose for the Graduate Coordinator's approval the members of the Examining Committee;
2. select a tentative date and time for the oral examination;
3. confirm the availability of the Internal and the Internal/External examiners at this date and time;
4. inform the Graduate Coordinator (or Assistant) of this 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 the Graduate Assistant, the School of Graduate Studies and each examiner with an electronic copy of the thesis with an offer to provide a hard copy should that be what an examiner prefers;

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;
2. inform the School of Graduate Studies of the oral examination by submitting the appropriate form;
3. provide the Chair, once appointed, 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.

Note that it is expected that the candidate will be asked to demonstrate basic mathematical and/or statistical knowledge that may only be peripherally related to their research. The onus is on the supervisor to ensure that this function of the examination is fulfilled, either by conducting appropriate questioning themselves, or by, prior to the oral examination, informing the members of the Examining Committee of this function of the examination. The Doctoral oral examination should not just be an examination of the voting of the Examining Committee, the Head's Delegate will be provided with a form to submit candidate's research, but of the candidate. Independent of the voting of the examining committee, the Head's delegate will be provided with a form to submit to the Graduate Coordinator indicating whether or not the candidate's mathematical and/or statistical background was adequately tested during the examination.

**For more information.** For complete details on scheduling oral examinations and on the outcomes of an oral examination please refer to the [General Regulations](#) of the Graduate Calendar.

## 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 should be a 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 programme 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.

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 2.2.3.

#### 2.1.2 Timetable for Pattern II Master's

The Pattern II programme 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.

Funding will not be available for Pattern II students beyond the first year of registration in the programme; 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. 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.

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 programme, the student and supervisor will have formed the student's Supervisory Committee. See Section [1.2.4](#) for a description of the selection and role of the Supervisory Committee.

**Course selection.** By the end of their first year, 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 names. 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 [2.2.4](#). The 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 [2.2.4](#).

**Fulfilment of course requirements.** It is expected that a student will have fulfilled their course requirements after 20 months in the programme. For students who come into the Doctoral programme 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 after 8 months in the programme. Students are welcome to 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.** The qualifying exams are described in Section [1.2.5](#). These exams should be passed within 17 months of enrolment in the Doctoral program.

**Thesis Prospectus Exam.** 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 programme. See Section [2.2.7](#) for a discussion of the consequences of significant delay in taking the Exam.

**Thesis research.** After passing their Thesis Prospectus Exam, a student can be expected to work full-time (commensurate with TA or teaching duties) towards their Doctoral research. It is hoped that most students will complete their degree within 48 months of enrolment in the Doctoral programme.

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 [2.2.3](#).

## **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 programme.

### **2.2.1 Using courses from previous degrees**

It is possible to use graduate courses, taken either 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. For Doctoral degrees, these would additionally be subject to our

course requirement guidelines. A student taking an approved Science Council, Pattern II Master's degree from our department should, under normal circumstances, encounter no problems having the 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 E&AS, this decision may be additionally scrutinized by the School of Graduate Studies. 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 appropriate 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, the core course instructor for that year, and the Graduate Coordinator.

In order to pass a core course a student must obtain a minimum mark of 50% on the final exam *and* a grade of B- in the course. Moreover, doctoral students taking any core course as part of their degree requirement must earn a grade of B+ and achieve an overall average of A- in those core courses (see Sections 1.2.1 and 1.2.2). This means that Master's students planning to continue in the Doctoral programme must meet the latter core requirements in order to have these courses count towards their Doctoral degree course requirement.

### 2.2.3 Progress reports

Students enrolled in a Pattern I Master's or a Doctoral degree are expected to submit annual reports on their activities. A copy of the report form can be obtained from our website under [Departmental Forms](#). 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 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 reports are not onerous for the student; it should be possible for the student to fill one out in at most 15 minutes. The reports are not onerous for the supervisor; the supervisor need only sign their name indicating that the student's stated activities are accurate and that their progress is satisfactory. Thus there are no obstructions to these reports being submitted.

Moreover, 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 programme.

#### **2.2.4 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 to the Graduate Coordinator for approval, a list of courses to be used to satisfy the course requirement for the degree. We refer to Section 2.1.3 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.

#### **2.2.5 Failing a course**

First a brief discussion about graduate courses as can be learned about in more detail from the section concerning [course work requirements](#) in the regulations of the School of Graduate Studies. 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.

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. See Section 2.2.2 for grade requirements for core courses for Doctoral students, or Master's students hoping to meet course requirements for subsequent Doctoral study.

If a graduate student fails a primary course then the failing grade is submitted to the School of Graduate Studies. Upon noticing that a student has failed a primary course, the School will then contact the Department to ask how the failing grade will be addressed. There are four possible outcomes.

1. The student can be asked to withdraw from the programme.
2. The student can be re-examined if the instructor is agreeable to this. In this case the instructor will assign a new grade which will replace the existing grade based upon the re-examination.
3. The student can 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.
4. The student can select another course to replace the failed one in the student's degree requirements. In this case the failing grade will remain on the student's transcript and the grade from the replacement course will also appear.

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

### 2.2.6 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 are expected to satisfy this requirement by their 17<sup>th</sup> month and thus, a delay in taking these exams will only be considered in cases of exceptional circumstance, such as illness.

### 2.2.7 Thesis Prospectus Exam procedures

In Section 1.2.6 the Thesis Prospectus Exam is discussed in detail, and there can be found a description of the procedures surrounding the taking of the Exam. 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 programme, 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 programme 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 programme 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 programme 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 unlikely event that this becomes necessary, we provide some information on Departmental procedures. In each case, a student dissatisfied with the outcome of the process after the above procedures have been carried out should refer to the section on [appeals against academic decisions](#) in the Calendar of the School of Graduate Studies.

### 2.3.1 Appeal of grades

If a student is not content with the grade they received in a graduate course, the first course of action is to immediately discuss the matter informally with the course instructor, possibly, but not necessarily, with the Graduate Coordinator being informed of the problem. 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 should 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, they should 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 in the in the School of Graduate Studies 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. See their [appeal regulations](#).

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

If a student is dissatisfied with the outcome of their Master's project presentation they should 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 is dissatisfied with 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 of their exam(s) they can, 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 is dissatisfied with the outcome of their Thesis Prospectus Exam they should advise the Graduate Coordinator within five working days of the Exam of their intention to appeal. In this correspondence should be clearly stated 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. See their [appeal regulations](#).

### **2.3.7 Disputes regarding matters of intellectual property**

It can arise during the course of academic research that disputes will 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. The School of Graduate Studies maintains an [intellectual property webpage](#) which outlines the issues involved. 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, as outlined on the [Academic Integrity website](#). It is essential that all students and faculty conduct themselves according to the core principles of Academic Integrity. A discussion of these principles as they relate to Graduate Programmes can be found at the [Academic Integrity](#) section of the School of Graduate Studies Calendar.

## **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 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 Master's students.**

1. The supervisor should advise the student in course selection, consistent with the objectives of the course requirements for the degree programme.
2. Should graduate courses in the area of the student's interest not be offered, the supervisor is responsible for offering a reading course or seminar course for the student's benefit.
3. 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.
4. 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](#).
5. Supervisors are expected to provide career advice and assistance to students as they approach graduation.

#### **Supervisor duties for Pattern II Master's students.**

1. The supervisor should advise the student in course selection, consistent with the objectives of the course requirements for the degree programme; see Section [1.1.4](#).
2. Should graduate courses in the area of the student's interest not be offered, the supervisor is responsible for offering a reading course or seminar course for the student's benefit.
3. When the student has met their course requirements, the supervisor should get the student immediately into their research project.
4. 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](#).

#### **Supervisor duties for Doctoral students.**

1. The supervisor should advise the student in course selection, consistent with the objectives of the course requirements for the degree programme; see Section [1.2.3](#).

2. Should graduate courses in the area of the student's interest not be offered, the supervisor is responsible for offering a reading course or seminar course for the student's benefit.
3. 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. As a student progresses through their programme, the Supervisory Committee can provide guidance, at varying degrees of resolution, to the student.
3. Should academic problems arise with a student, the Supervisory Committee will become involved to counsel the student and to provide advice in the resolution of the problems.

**Department expectations for students.** Obviously there are standard expectations placed on students as they progress through their graduate degrees. These include satisfactory performance in graduate courses, discharging TA or teaching duties, keeping on schedule as concerns research, preparing for thesis examinations and the Thesis Prospectus Exam (for Doctoral students), etc. These are the sorts of “routine” activities that carry over from the student's days as an undergraduate.

Graduate students should be aware that there are provisions in 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. participate in the Graduate Student Seminar;
2. attend Departmental Colloquia and seminars of interest;
3. be active in their research group by sharing their activities with other students;
4. be active in the Department by engaging students in other research groups on topics of common interest;
5. serve on Departmental committees as required.

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 action is warranted, then the first step to be taken is a meeting with the student, the Supervisory Committee, and the Graduate Coordinator. At this meeting possible actions to be taken by the parties involved to rectify the problem can be addressed. After this initial step, 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 assistantship from their supervisor; (4) external funding agencies.

The Departmental policy on the duration of graduate student funding is as follows:

1. Pattern I Master's: 5 terms, i.e., until the end of April of the student's second year, in the typical case of the student starting their degree in September;
2. Pattern II Master's: 3 terms, i.e., until the end of August of the student's first year, in the typical case of the student starting their degree in September;
3. Doctorate: 4 years.

For Pattern II Master's degrees funding will not be extended beyond the specified duration. For Pattern I Master's or Doctoral students, funding may be extended beyond the specified duration. The decision to do so 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 in one additional term for Pattern I Master's students or one additional year for Doctoral students.

Normally funding will not be provided for students beyond the second year of a Pattern I Master's or the fifth year of a Doctorate.

## 3 Departmental Forms

### 3.1 Forms for Pattern I Master's students

#### 3.1.1 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. [\[Link\]](#)

#### 3.1.2 Request to schedule a Master's thesis examination

To be filled out when selecting the Examining Committee and date for a thesis defence. See Section 1.1.5 for details. [\[Link\]](#)

### 3.2 Forms for Pattern II Master's students

#### 3.2.1 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. (The form is the same as for Pattern I students, so is included in the forms for the Pattern I Master's students.) [\[Link\]](#)

#### 3.2.2 Math 800 credit request form

To be used to indicate the manner in which credit for Math 800 was obtained. [\[Link\]](#)

#### 3.2.3 Request to schedule a Master's project presentation

To be filled out when selecting the Examining Committee and date for a project presentation. See Section 1.1.6 for details. [\[Link\]](#)

### 3.3 Forms for Doctoral students

#### 3.3.1 Course selection form

To be filled out by Doctoral students by the end of their first month in the programme. See Sections 1.2 and 2.2 for details. [\[Link\]](#)

#### 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. [\[Link\]](#)

#### 3.3.3 Supervisory Committee selection form

To be filled out by Doctoral students by the end of their first month in the programme. See Section 1.2.4 for details. [\[Link\]](#)

#### 3.3.4 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. [\[Link\]](#)

### **3.3.5 Qualifying Exams Selection form**

To be filled out by Doctoral students in selecting the qualifying exams they will write. This should be done by the beginning of the 8<sup>th</sup> month in the program. See Section [1.2.5](#)

### **3.3.6 Thesis Prospectus Exam scheduling form**

To be filled out by Doctoral students in selecting an Examining Committee for and scheduling their Thesis Prospectus Exam. This should be done within 24 months of a student entering the programme. See Sections [1.2.6](#) and [2.2.7](#) for details. [[Link](#)]

### **3.3.7 Thesis defence scheduling**

To be filled out when selecting the Examining Committee and date for a thesis defence. See Section [1.2.7](#) for details. [[Link](#)]

## **3.4 Forms for faculty**

### **3.4.1 Graduate course credit request form**

To be filled out by a faculty member when offering a reading or seminar course for credit. [[Link](#)]



