Graduate Student Handbook

Graduate Student Handbook – MSc and PhD in Mathematics, MSc and PhD in Statistics
Updated:September 2021

Note that the Graduate Calendar is the primary authority on graduate policy and in the event that the advice in this handbook differs from the Graduate Calendar the Graduate Calendar prevails.

This Handbook is aimed primarily at graduate students in the Mathematics MSc, the Statistics MSc, the Mathematics PhD program and the Statistics PhD program, staff in the Department of Mathematics and Statistics, and staff in the Faculty of Science. Note that there are separate handbooks for the CSE and MFM programs. If you are a student in one of these programs you should consult the relevant handbook.

Introduction

Welcome to the Department of Mathematics and Statistics! We are one of the top research departments in Canada and prominent internationally. Particular strengths in mathematics research include geometry and topology, mathematical biology, mathematical finance, mathematical logic and foundations, pure and applied partial differential equations, scientific computation and statistics. Our department also has excellent connections to other departments in Science (particularly Physics and Astronomy, Chemistry and Biology) as well as to the faculties of Engineering and business. (Mathematical trivia: John Charles Fields, who founded the Fields Medal, was born, raised and is buried in Hamilton https://en.wikipedia.org/wiki/John_Charles_Fields (https://en.wikipedia.org/wiki/John_Charles_Fields)!)

The Department of Mathematics and Statistics is housed in Hamilton Hall, which is one of the original six buildings constructed in 1929 when McMaster University moved from Toronto to Hamilton. It was originally the Faculty of Science building (including labs for Manhattan Project work during World War II). After several decades as the Student Union Building, in 2003 Hamilton Hall was renovated specially for the James Stewart Centre for Mathematics. The architects were KPMB, who won many awards for the renovation, including the Governor General's Gold Medal for Architecture, the Institute Honor Award from the American Institute of Architects, and the Architectural Record (Interiors) Award. See http://www.kpmb.com/project/james-stewart-centre-for-mathematics/ (http://www.kpmb.com/project/james-stewart-centre-for-mathematics/) for more information.

The primary goal of our program is to provide high quality training in mathematical research, enriching advanced courses and to build awareness and links with the broader scientific community. In particular, our extensive range of the weekly research group seminars, the Friday colloquium and the annual Britton and Nelson lectures allow you to hear and meet top international experts (including Fields medallists!). Our Department is also closely involved with the Fields Institute in Toronto and you will have the opportunity to take the graduate courses they offer as part of the regular thematic programs http://www.fields.utoronto.ca/activities/thematic. (http://www.fields.utoronto.ca/activities/thematic) The seminars, colloquium, special lectures and Fields lectures are advertised each week by email and on the website. *Note that all graduate students are expected to attend the weekly Colloquium.*

The Associate Chair (Graduate) and the entire Faculty are here to help ensure that you get the most out of your studies, and to prepare you for your future career. Don't hesitate to ask any one of us for advice or support.

This Handbook focuses on information specific to the graduate programs in Mathematics and Statistics. For important general information for graduate students in the Faculty of Science, including a link to the current Graduate Calendar, please see:

https://www.science.mcmaster.ca/graduate-studies/grad-helpful-links.html

(https://www.science.mcmaster.ca/graduate-studies/grad-helpful-links.html)

1. Contacts

Associate Chair (Graduate)
Ben Bolker (Acting)
bolker@math.mcmaster.ca, x23320, HH 314
The Graduate Chair is the first point of contact for any issues you might have.

Associate Chair (Statistics)
Paul McNicholas
mcnicholas@math.mcmaster.ca, (mailto:mcnicholas@math.mcmaster.ca,) x23419 HH 418
First point of contact for graduate students studying statistics.

Administrative Assistants for the Graduate Program

Hanadi Attar-Elbard
graduate@math.mcmaster.ca, x23062, HH 218
Hania Zahid
graduate@math.mcmaster.ca (mailto:graduate@math.mcmaster.ca) x 24582, HH218

Hanadi and Hania handle general administrative issues, can provide forms and help with organizing MSc defences.

Administrator

Julie Fogarty
fogarty@mcmaster.ca (mailto:fogarty@mcmaster.ca), x24580, HH 218
Julie handles financial issues and can answer questions about your funding.

Teaching Assistant Coordinator

Aaron Childs
childsa@mcmaster.ca (mailto:childsa@mcmaster.ca), x23426, HH 213
Aaron coordinates Teaching Assistant (TA) assignments.

Graduate Committee for 2021-2022

Ben Bolker (Chair), Stan Alama, Noah Forman, Jean Pierre Gabardo, Pratheepa Jeganathan, Siyuan Lu, Paul McNicholas, Jenna Rajchgot, Eric Sawyer, Patrick Speissegger, Franc Cameron, Gail Wolkowicz, Hari Kunduri and Nicholas Kevlahan

This committee advises on changes to the Departmental graduate program and deals with general issues relating to the operations of the program.

School of Graduate Studies

Gilmour Hall 212
askgrad@mcmaster.ca (mailto:askgrad@mcmaster.ca), x23679
General information about graduate studies and policies at McMaster.

2. When You Arrive

Come to the front desk in the Departmental Office (HH 218) for the following:

- A key for your office (you need to provide a $20 refundable deposit)
- Health and safety package
- Desk assignment
- Computer account and email
- Mail box assignment

- Other orientation information

International (visa) students must go to the School of Graduate Studies with your study permit.

International students should refer to the information at https://gs.mcmaster.ca/graduate-student-life/international-students (https://gs.mcmaster.ca/graduate-student-life/international-students) and at https://iss.mcmaster.ca/ (https://iss.mcmaster.ca/) for information about study permits, Social Insurance Number, health coverage and general information about living in Hamilton.

If you have *not* already submitted your official transcripts you must bring them to graduate administrative assistant (Hanadi Attar-Elbard) in a sealed envelope so she can forward them to the School of Graduate Studies.

MSc (thesis) and PhD students: make an appointment to meet with your supervisor.

MSc (project) students: make an appointment to meet with the Associate Chair (Graduate).

Orientation activities offered by the School of Graduate Studies are advertised here:
https://gs.mcmaster.ca/news-events/event-series

Note that all graduate students must pass the School of Graduate Studies online courses SGS 101 (Academic Research Integrity and Ethics) and SGS 201 (Accessibility for Ontarians with Disabilities Act). These can be completed very easily and quickly, but you cannot graduate until you have passed them, so please attempt them as soon as possible.Information on enrolling in SGS 101 and 201 and other courses is available here:https://gs.mcmaster.ca/academic-services/how-enroll (https://gs.mcmaster.ca/academic-services/how-enroll)

You are expected to apply for all **scholarships** for which you are eligible (based on your academic record and immigration status). The main awards are the NSERC CGS-Masters and CGS-Doctoral and the OGS awards. Please look out for emails giving deadlines and the application procedures. The School of Graduate Studies also hosts an NSERC information session.

All graduate students must **activate their @mcmaster.ca email address** and check their email on a regular basis - **this is the email address that will be used for all communication with students.**

3. Program Committee

The Associate Chair (Graduate) works with the Graduate Committee to manage and develop the program. Decisions include curriculum changes (courses to add or remove), changes in course content and degree requirements.
If you have suggestions for improving the program, you can speak to the Associate Chair (Graduate) or any member of the Committee. Please send your course suggestions by the end of the Fall term.

4. Annual Events

Graduate Day (first week of September). This is a daylong series of events for new and returning graduate students. There are orientation sessions as well as information on your teaching assistantship duties in the Department. The day is capped off with a Welcome reception with faculty. This is an opportunity to meet your fellow students and the faculty. Each faculty member gives a brief overview of his or her research. There is always free pizza and pop!

Britton Lectures. This is series of four lectures by an internationally renowned mathematician that has been held annually since 1978. There is also a reception at the University Club. The list of exceptional past Britton lecturers and the themes of their talks are available here:
https://www.math.mcmaster.ca/index.php/events/seminars-colloquia/britton-lectures.html (/index.php/events/seminars-colloquia/britton-lectures.html)These lectures were made possible by a generous endowment by former faculty member Dr Ron Britton.

Evelyn Nelson Lectures – an annual lecture held since 1991 on foundations of mathematics to honour the memory of former faculty member Evelyn Nelson. The list of past lectures is given here:
https://www.math.mcmaster.ca/index.php/events/seminars-colloquia/evelyn-nelson-lectures.html (/index.php/events/seminars-colloquia/evelyn-nelson-lectures.html)

Qualifying Exams: held twice each academic year, in January and May (see information about the Qualifying Exam below).

Symposium Day (June): MSc (project) students give oral presentations on their projects in mid June.

5. Degree Specific Information

Applicants for admission to the Mathematics or Statistics MSc will be considered if they have a B+ average in the two final years of an honours Bachelor's degree in Mathematics or Statistics, or in a related area. We expect students to have taken a sufficient number (approximately ten) third and fourth year mathematics or statistics courses. Two strong reference letters must also be provided in support of applications.
Successful applicants will normally have contacted a faculty member who has indicated their interest in supervising the applicant.

Students with a degree in engineering, science, health sciences, or social sciences will be considered, provided they have a B+ average with sufficient mathematics and statistics background. Students coming from other areas may be required to take additional undergraduate courses to make up any deficiencies. . Please contact the Associate Chair (Graduate) if you are unsure whether your background is sufficient.

Applicants for admission to the PhD should normally have an MSc from a Canadian university and two strong letters of reference. Applicants without a Canadian MSc should apply to the MSc; you may apply to transfer to the PhD after one year (see section d below).

Full information about the application procedure is available here:

https://www.math.mcmaster.ca/index.php/graduate-studies/application-procedure.html (/index.php/graduate-studies/application-procedure.html)

- **Math MSc (Project)**

  The candidate must complete a minimum of **seven one-term graduate courses**, one of which is required to be Mathematics 790 (Major Research Project). This selection must include no fewer than four 700-level courses in Mathematics. Of the remaining courses, up to two relevant one-term graduate courses from outside mathematics may also be taken for credit.

At most two one-term 600-level courses (cross-listed fourth year undergraduate courses) may be counted towards the course requirements.
Students considering doctoral work should complete two of the two-term course sequences from Algebra 701/702, Analysis 721/722 (alternated with MATH 723 (Functional Analysis)), and Applied Math 741/742.
You must have your course selection approved at the start of each term by your supervisor and/or the Associate Chair (Graduate).
The full list of graduate courses is given in the Graduate Calendar. A list of the graduate courses actually offered each year is published here: https://www.math.mcmaster.ca/index.php/graduate-studies/graduate-courses.html (/index.php/graduate-studies/graduate-courses.html)Note that some courses are offered in alternate years, for example, the course sequences math 731/732, (Algebraic Topology I and II), and math 761/762 (Geometric Topology/Differential Geometry), as are math 745 (Topics in Numerical Analysis) and math 749 (Mathematical and Computational Fluid Dynamics).

You will not normally have a supervisor when you arrive. Until you find a supervisor for your Math 790 project the Associate Chair (Graduate) is your supervisor. You need to find a project supervisor by the end of November and the Associate Chair (Graduate) can help you. Once you have found a supervisor you must let the Associate Chair (Graduate) know the name of your supervisor and the title of your project. A course outline will be distributed for Math 790 at the beginning of the year with complete information about the project. Students make a written report on their project and give an oral presentation at the Symposium Day in June. Examples of previous projects and available projects can be viewed here. (/graduate/graduate-courses/math-790-information.html)

You should meet regularly with your project supervisor (once a week is typical) and respond promptly to emails from your supervisor. Be sure to discuss your supervisor's expectations regarding meetings and response times as early as possible.
Advice on ensuring a good relationship with your supervisor is available here: (https://gs.mcmaster.ca/sites/default/files/resources/supervisory_relationshipjuly_222016.pdf)https://gs.mcmaster.ca/app/uploads/2020/02/supervisory_relationshipjuly_222016.pdf (https://gs.mcmaster.ca/app/uploads/2020/02/supervisory_relationshipjuly_222016.pdf)

The duration of the MSc (project) is normally 10-12 months.

- **Math MSc (Thesis)**

The candidate must complete a minimum of **six one-term graduate courses**. This selection must include no fewer than four 700-level courses in Mathematics. Students considering doctoral work should complete two of the two-term course sequences from Algebra 701/702, Analysis 721/722 (alternated with MATH 723 (Functional Analysis)), and Applied Math 741/742. Of the remaining courses, up to two relevant one-term graduate courses from outside mathematics may also be taken for credit. At most two one-term 600-level courses (cross-listed fourth year undergraduate courses) may be counted towards the course requirements.
You must have your course selection approved at the start of each term by your supervisor.
The full list of graduate courses is given in the Graduate Calendar. A list of the graduate courses actually offered each year is published here: https://www.math.mcmaster.ca/index.php/graduate-studies/graduate-courses.html (/index.php/graduate-studies/graduate-courses.html)Note that some courses are offered in alternate years, for example, the course sequences math 731/732, (Algebraic Topology I and II), and math 761/762 (Geometric Topology/Differential Geometry), as are math 745 (Topics in Numerical Analysis) and math 749 (Mathematical and Computational Fluid Dynamics).
The candidate must also **submit a thesis** written under the supervision of a faculty member and based on original research. The thesis is defended at an **oral examination**.
Information about how to prepare your written thesis: (https://gs.mcmaster.ca/sites/default/files/resources/guide_for_the_preparation_of_masters_and_doctoral_theses-_december_2016.pdf)https://gs.mcmaster.ca/app/uploads/2019/10/guide_for_the_preparation_of_masters_and_doctoral_theses-_december_2016.pdf

(https://gs.mcmaster.ca/app/uploads/2019/10/guide_for_the_preparation_of_masters_and_doctoral_theses-_december_2016.pdf)
You should meet regularly with your supervisor (once a week is typical) and respond promptly to emails from your supervisor. Be sure to discuss your supervisor's expectations regarding meetings and response times as early as possible.
Advice on ensuring a good relationship with your supervisor is available here:
https://gs.mcmaster.ca/app/uploads/2020/02/supervisory_relationshipjuly_222016.pdf (https://gs.mcmaster.ca/app/uploads/2020/02/supervisory_relationshipjuly_222016.pdf)

(https://gs.mcmaster.ca/sites/default/files/resources/supervisory_relationshipjuly_222016.pdf)The duration the MSc (thesis) is normally 20 months.

- **Statistics MSc**

The **Coursework Option** requires completion of **eight one-term graduate courses** (four compulsory and four elective courses). The seminar course is the research component for this option. The degree requirements are normally completed in two or three academic terms.
The **Thesis Option** requires completion of **six one-term graduate courses** (three compulsory and three elective courses) and a thesis. Equivalent in work to two one-semester courses, the thesis is written under the supervision of a faculty member in the program on a topic of mutual interest to the student and supervisor. The thesis is defended in an oral exam. The degree requirements are normally completed in four academic terms.
Courses are classified as required, elective, and special topics courses. Two of the required courses cover the basic theoretical concepts that are considered essential for all students. Another required course develops a broad knowledge of statistics through attendance at research seminars. The elective courses are traditional statistics courses covering a sufficient variety of topics to offer students a choice based upon their individual interests. Approved courses from other graduate programs may be taken as elective courses for graduate credit.
The following are the required courses:

- Stats 752 / Linear Models and Experimental Designs (one one-term course)
- Stats 743 / Foundations of Statistics (two one-term courses)
- Stats 770 / Statistics Seminar
- Stats 771 / Statistical Research Project (required for course work option)
  For Stats MSc Thesis option, besides the thesis, three additional courses are required, which could be:
- Three 700-level Stats courses; or
- Two 700-level courses plus one 600-level Stats course; or
- One 700-level Stats course plus two 600-level Stats courses
  A variety of elective courses are available to cater to individual interests. One area of specialization is health and medical statistics, with theses supervised by biostatisticians from the Faculty of Health Sciences, who are faculty members in the program and who, usually, are associate members in the Department of Mathematics and Statistics. Through courses and thesis work students learn about modern methodologies and conduct research on current health problems. Students interested in a broader area of applied or theoretical statistics may obtain training in one or more of the following areas: applied statistics, classification, clustering, comparative inference, computational statistics, economics, environmetrics, evolutionary computation, nonlinear models, nonparametric methods, order statistics, reliability, stochastic models in biology, statistical methods in genetics, the bootstrap and other resampling methods, time series analysis, and quality control. Students interested in business or industrial applications may arrange to do their thesis work off-campus.

- **MSc Students Transferring To The PhD**

There are **three ways** to transfer from the MSc to the PhD. Each option requires that you have identified a supervisor willing to supervise your PhD research.

- Transfer directly to the PhD program **without completing an MSc** by first registering for the thesis option and then submitting an application for transfer after 12 to 20 months.

- Transfer to the PhD and **complete the MSc after the transfer**
- **Complete the MSc** and then transfer.

All options require completion of six one-term graduate courses, taking and passing the **qualifying exam** (see section 5(d) below), submission of a research proposal, and a statement from the proposed supervisor.
Successful applicants may apply all accumulated credits to the PhD degree, but are still required to complete two one-term courses beyond the MSc once registered in the PhD program.
MSc students wishing to transfer must submit the following form with their request:
https://gs.mcmaster.ca/resources/request-for-change-in-a-graduate-students-status/ (https://gs.mcmaster.ca/resources/request-for-change-in-a-graduate-students-status/)

All MSc degrees awarded since 1961:
https://www.math.mcmaster.ca/index.php/graduate-studies/56-/msc-mathematics/607-degrees-awarded-msc-math.html (/graduate/graduate-student-handbook/56-/msc-mathematics/607-degrees-awarded-msc-math.html)https://www.math.mcmaster.ca/index.php/graduate-studies/graduate-degrees-awarded/57-/msc-statistics/608-degrees-awarded-msc-stats.html (/graduate/graduate-student-handbook/57-/msc-statistics/608-degrees-awarded-msc-stats.html)

- **PhD Mathematics**

The focus of the PhD program is original research done under the supervision of a faculty member (their "supervisor"). Students are normally admitted with a supervisor, although in exceptional cases it is possible to change supervisors.

Duties of PhD students

All PhD students must:

- Develop a **research program**.
- Complete the **course requirement**, which is a minimum **of two one-term graduate courses** in Mathematics at the 700 level beyond the MSc requirement.
- All candidates are required to pass the qualifying exam consisting of a written exam testing the breadth of knowledge and the comprehensive exam which is an oral exam testing the depth of knowledge in the proposed field of study. If the student passed the qualifying exam before entering the Ph.D. program or if they can otherwise demonstrate they possess the required knowledge, this will be recognized as equivalent to passing the qualifying exam.
- All graduate students must attend the weekly Department Colloquium, and students in the Ph.D. program are expected to participate in the seminar relevant to their field of study.
- Be jointly responsible with their supervisor for the organization of the (at least) annual **meetings of the supervisory committee** and the timely submission of the written report to the department.
- Write an acceptable **thesis** based on original research and present an **oral defence** of the thesis.

Supervision and the Supervisory Committee
Every PhD student must have a supervisory committee. This committee consists of the supervisor and two or three additional faculty members. The committee meets with the student **at least annually** to chart progress toward the degree. The supervisory committee members are chosen for their expertise relevant to your research and they are a very valuable resource.
The supervisory committee members also take part in the oral comprehensive exam (see below) and the thesis defence (see below).
You should meet regularly with your supervisor (once a week is typical) and respond promptly to emails from your supervisor. Be sure to discuss your supervisor's expectations regarding meetings and response times as early as possible.
The supervisory committee form:
https://science.mcmaster.ca/radgrad/images/GradResources/GradResources_supervisoryPhD.doc (https://science.mcmaster.ca/radgrad/images/GradResources/GradResources_supervisoryPhD.doc)Advice on ensuring a good relationship with your supervisor and guidelines on:

https://gs.mcmaster.ca/app/uploads/2020/02/supervisory_relationshipjuly_222016.pdf (https://gs.mcmaster.ca/app/uploads/2020/02/supervisory_relationshipjuly_222016.pdf) (https://gs.mcmaster.ca/sites/default/files/resources/supervisory_relationshipjuly_222016.pdf)https://gs.mcmaster.ca/sites/default/files/resources/graduate_work_supervision_guidelines_1.pd (https://gs.mcmaster.ca/sites/default/files/resources/graduate_work_supervision_guidelines_1.pdf)

Course Requirements

The **course requirement** for PhD students is a minimum of two one-term graduate courses beyond the Master's degree. This requirement is normally completed in the first year of study. Courses are chosen in consultation with the mathematics graduate advisor and/or the supervisory committee.
The full list of graduate courses is given in the Graduate Calendar. A list of the graduate courses offered each year:
https://www.math.mcmaster.ca/index.php/graduate-studies/graduate-courses.html (/index.php/graduate-studies/graduate-courses.html)Note that some courses are offered in alternate years, for example, the course sequences math 731/732, (Algebraic Topology I and II), and math 761/762 (Geometric Topology/Differential Geometry) are offered in alternate years, as are math 745 (Topics in Numerical Analysis) and math 749 (Mathematical and Computational Fluid Dynamics).

Qualifying and Comprehensive Exams

All candidates are required to pass the **qualifying exam** consisting of a written exam testing the breadth of knowledge and the **comprehensive exam** which is an oral exam testing the depth of knowledge in the proposed field of study. The Comprehensive Exam consists of two parts: the **Qualifying Exam** (normally taken at the MSc level by students who have transferred) and the **Oral Exam**.

Qualifying Exam

If the student passed the qualifying exam (or a part thereof) before entering the Ph.D. program or if they can otherwise demonstrate they possess the required knowledge, this will be recognized as equivalent to passing the qualifying exam (or part).
The Qualifying Exam is offered each academic year in January and May and should be completed within eight months of entering the graduate program (if not already completed as a MSc student). Students who do not successfully complete the comprehensive exam requirements within 16 months of entering the program may be asked to withdraw due to lack of progress.
All PhD students must pass one qualifying exam, which is a written exam covering basic material that is normally taught at the undergraduate level. Qualifying exams in Mathematics are offered in the following two areas (click on the relevant link for more information about the topics of each exam):

1. Pure Mathematics (/graduate/graduate-student-handbook/40-/114-syllabus-for-pure-mathematics-preliminary-exam.html)
2. Applied Mathematics (/graduate/graduate-student-handbook/40-/115-syllabus-for-applied-mathematics-preliminary-exam.html)

Students who do not pass the qualifying exam on their first attempt are permitted a second attempt at the same exam.

The qualifying exam is made up of two parts (Part A, core, and Part B, specialized material). To pass, student must answer four (out of 6) questions from part A and three (out of 4) questions from part B. All questions are weighted evenly. Students must:

- demonstrate a complete understanding ($\geq$ 8/10 points) of at least 3 problems (out of 6) in Part A,
- demonstrate a complete understanding ($\geq$ 8/10 points) of at least 2 problems (out of 4) in Part B,
- and obtain a total score of at least 42 points out of 70 (for the seven attempted problems).

The two parts may be passed separately. Students must take both parts on their first attempt. The maximum of two attempts for students in the Ph.D. program still applies; i.e., after their initial attempt Ph.D. students have one more chance where they can choose to re-take the full exam or take only the part that they failed previously. Students must declare which part(s) they are attempting; scores replace those from their previous attempt. Two hours will be allowed for Part A alone, 90 minutes for part B alone. The total-point requirement (42 points overall) may be satisfied by the combination of the two parts passed separately.

Information on the next offering of the **Math Qualifying Exam** can be found here (https://macdrive.mcmaster.ca/f/38256172bf5d4b7abd10/?dl=1).

Detailed information about the Qualifying exam, and sample exams from previous years:
https://www.math.mcmaster.ca/index.php/graduate-studies/40-/107-ph-d-comprehensive-examinations.html (/graduate/graduate-student-handbook/40-/107-ph-d-comprehensive-examinations.html)

Comprehensive Exam. All PhD students must pass an oral examination in the general area of their proposed research. The subject matter for the oral exam is based on a body of knowledge agreed upon by the student and their supervisor.The subject matter for this exam is based on a body of knowledge agreed upon by the student and their supervisor. The exam typically takes one of two forms:

- **Advanced topics**: An oral examination by the examining committee on advanced topics in the student's general research area. The examination topics should not be limited to graduate courses the student has taken.
- **Research proposal**: A 15-minute oral presentation by student, followed by questions from the examining committee. The student should explain the contribution their proposed research would make to the existing body of knowledge. The student should provide the committee with a 10-page written summary of their presentation, including a literature survey and a short research proposal, at least one week before the exam.
  The examining committee consists of three faculty members, including the supervisor, who is the chair of the examining committee. The examining committee will agree on a written description of the topics to be covered by the exam; the description should include suggested references (published papers and/or monographs) and should be communicated to the student at least four weeks in advance of the exam. The oral exam normally lasts about one hour, and should not exceed two hours. Students who do not pass the oral exam on their first attempt are permitted a second attempt at the same exam. The comprehensive exam should be taken after the qualifying exam, normally between the 12th and 20th month after the student begins doctoral-level work at McMaster University, with an upper limit of 24 months.

The Written Thesis and the PhD Oral Defence
It is essential that a student submitting a PhD thesis follow the procedures described in the Graduate Calendar. In particular, note that authorization of the Supervisory Committee must be obtained **before** preparing the final version of the thesis, and that the format of the typed thesis should be exactly as specified in the "Guide for the Preparation of Theses" (linked below). The Supervisory Committee must also approve the final version of the thesis for submission.
Once approved by the Supervisory committee, the thesis is submitted to the School of Graduate Studies, which will then arrange the Oral Thesis Defence and appoint an external examiner, based on recommendations submitted by the Supervisory Committee. It is important that students submit their theses by the appropriate deadline given in the Graduate Calendar in order to be able to graduate at a particular convocation.

General information from the School of Graduate Studies about the PhD thesis, defence and submission process:
https://gs.mcmaster.ca/doctoral-degree (https://gs.mcmaster.ca/doctoral-degree)

Information about preparing the written thesis:
https://gs.mcmaster.ca/sites/default/files/resources/guide_for_the_preparation_of_masters_and_doctoral_theses-_december_2016.pdf
(https://gs.mcmaster.ca/sites/default/files/resources/guide_for_the_preparation_of_masters_and_doctoral_theses-_december_2016.pdf)

Information about the PhD oral defence process:
https://gs.mcmaster.ca/sites/default/files/resources/the_student_guide_to_the_phd_defence_process_0.pdf
(https://gs.mcmaster.ca/sites/default/files/resources/the_student_guide_to_the_phd_defence_process_0.pdf)

A list of all PhD degrees awarded since 1960:
https://www.math.mcmaster.ca/index.php/graduate-studies/58-/phd-mathematics/606-degrees-awarded-phd.html (/graduate/graduate-student-handbook/58-/phd-mathematics/606-degrees-awarded-phd.html)

- ## PhD Statistics

Admission
Applicants will be considered for admission to the Ph.D. program via one of three routes: following completion of an M.Sc. degree in Statistics (or in a related area) with GPA equivalent to at least B+; or following completion of a B.Sc. degree in Statistics (or in a related area) with GPA equivalent to at least B+ over the last two years of full-time study and demonstrated research potential; or by transferring from the M.Sc. program in Statistics. In all cases, a faculty member with supervisory privileges in the Ph.D. program must be willing to supervise a student before an offer of admission is made.

Course Requirements
Students who are granted admission having completed an M.Sc. degree in Statistics (or a related area) are required to take two 700 level (STATS or comparable) courses (total of 6 units) that have been approved by the supervisor. Students who are granted admission having completed a B.Sc. degree in Statistics (or a related area) are required to take four 700 level (STATS or comparable) courses (total of 12 units) that have been approved by the supervisor. Students who transfer into the Ph.D. program while also taking the M.Sc. in Statistics degree are required to take two 700 level (STATS or comparable) courses (total of 6 units) that have been approved by the supervisor. Students who transfer into the Ph.D. program in Statistics without taking the M.Sc. in Statistics degree must complete the course requirements for the M.Sc. in Statistics with a GPA of at least 10 and pass a transfer examination administered by the supervisory committee prior to transferring; however, for such students, no courses are required after transferring.

Comprehensive Exam
During their course of study, students will have to pass a comprehensive examination. The comprehensive examination will be in two parts. Part I is a written examination designed to test breadth of knowledge in Statistics. Part II is a written literature review, a research proposal, and an oral examination. Part I must be passed before Part II may be attempted. Students who are unsuccessful in their first attempt at Part I may repeat the exam once. Students who are unsuccessful in their second attempt at Part I will be required to withdraw from the program. Students who are unsuccessful in their first attempt at Part II may repeat the exam once. Students who are unsuccessful in their second attempt at Part II will be required to withdraw from the program.
Detailed information about the Comprehensive exam, and sample exams from previous years (/graduate/graduate-student-handbook/40-/2107-statistics-ph-d-comprehensive-exams.html):

Thesis and Defence
A thesis embodying the results of original research must be defended in a final oral examination.

Departmental Colloquia and Seminars
Regular attendance at relevant departmental colloquia and seminars is expected from all Ph.D. students.

(/index.php/graduate-studies/58-/phd-mathematics/606-degrees-awarded-phd.html)

6. Skills Training And Other Resources

The School of Graduate Studies and the MacPherson Institute offer a wide range of **skills training** modules and workshops. Topics including Academic writing, academic job search, teaching and many others.Please try to take advantage of this opportunity to build up your skill set and set yourself up to succeed in your future careers.
https://gs.mcmaster.ca/graduate-student-life/skills-training
(https://gs.mcmaster.ca/graduate-student-life/skills-training)https://mi.mcmaster.ca/teaching-learning-certificates-of-completion/
(https://mi.mcmaster.ca/teaching-learning-certificates-of-completion/)The MacPherson Institute also offers opportunities for **community engagement**:
http://mcyu.ca/mcyu-in-the-city-facilitators/ (http://mcyu.ca/mcyu-in-the-city-facilitators/)

(http://mcyu.ca/mcyu-in-the-city-facilitators/)

7. Teaching Assistant (TA) Duties

Almost all graduate students work as teaching assistants (TAs). This is a paid position that is a part of your financial offer on admission. Typically, graduate students work 266 hours per year, although this amount varies. (Note that you *cannot* work more than 1005 hours in total, including your 266 hours.)

Your TA work is governed by the collective agreement (http://www.workingatmcmaster.ca/med/document/CUPE-Unit-1-(TA)-CBA---FINAL-24FEB2017-1-42.pdf) negotiated between the University and the TA union CUPE 3906 https://cupe3906.org/ (https://cupe3906.org/). This agreement is renegotiated regularly, and in the case that the information in this document disagrees with the collective agreement, it is the collective agreement that takes precedence.

You will be able to find out more about your TA duties during special sessions at Graduate Student Day, held annually in early September.

The Teaching Assistant Coordinator (see Contacts) is primarily responsible for assigning TA duties, which may include invigilating test and exams, marking assignments and tests, staffing the Math Help Centre, running tutorials or teaching some courses (primarily summer courses).

Assignment of TA duties

The TA Coordinator assigns TA duties to each TA at the beginning of each term based on the expressed preferences of the TA, the abilities and experience of the TA and the teaching needs of the Department. You may be assigned to several courses in a single term to fulfil your total TA hours. The precise nature of the work is determined by your supervisor (e.g. the Math Help Centre coordinator or the professor teaching the course).

TAs typically start with marking and/or working in the Math Help Centre. If a TA does well in the Math Help Centre they are likely to be assigned to run a tutorial, and if they do well running tutorials they could be asked to teach a course (although there are currently relatively few opportunities for TAs to teach a course).

If you are interested in running a tutorial or teaching a course you should let the TA Coordinator know in advance.

Evaluation and training

Regular feedback is an important part of becoming a good teacher. TAs running tutorials or teaching courses receive student evaluations, just like professors do.

If you are working in the Math Help Centre you can ask the Math Help Centre Coordinator for feedback and if you are TAing for a course you should ask the professor you are working for to sit in on one of your tutorials to provide feedback. The TA Coordinator can also provide feedback on your performance.

If you feel your English language skills (spoken or written) could be improved you should speak to the TA Coordinator or the Associate Chair (Graduate) about opportunities for ESL (English as a Second Language) training. Excellent English language skills are an asset not only for your TA work, but also for your thesis and your future career.

The MacPherson Institute also has many courses to help you improve your teaching skills https://mi.mcmaster.ca/teaching-development/ (https://mi.mcmaster.ca/teaching-development/) and you should be sure to take advantage of them.

A teaching letter is an essential part of an application for academic jobs (post-doctoral fellowships, tenure track positions) so you should ensure that that there is at least one faculty member who can write knowledgeably about your teaching.

Go Back

Academic Advising (http://www.science.mcmaster.ca/associatedean/)

Careers & Co-op (https://www.science.mcmaster.ca/scce/)

Community Engagement (https://www.science.mcmaster.ca/index.php/community.html)

Research (https://www.science.mcmaster.ca/index.php/research-new/welcome.html)

(/index.php)

Mailing Address

Department of Mathematics & Statistics
McMaster University
Hamilton Hall, Room 218 (https://www.google.ca/maps/dir//43.2631034,-79.9201192/@43.263203,-79.9202897,20.08z)
1280 Main Street West
Hamilton, Ontario, Canada
L8S 4K1

Contact Information

Office Hours:
8:30 a.m. - 12:00 p.m.
1:00 p.m. - 4:30 p.m.
Telephone Inquiries:
+1 (905) 525-9140 ext.27034 (tel://19055259140,27034)
Undergrad Email Inquiries:
undergrad@math.mcmaster.ca (mailto:undergrad@math.mcmaster.ca)