Molecular Genetics
UNIVERSITY OF TORONTO

M.H.Sc. in Medical Genomics

Student Handbook

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YOUR M.H.Sc. PROGRAM AT A GLANCE

The program starts once a year and students are expected to move through the courses sequentially. This is a full-time program, there is no part-time option available. In the case of extenuating circumstances where you cannot attend a course in the sequence of the program, discuss this with the Program Director once an offer of admission has been made, or as soon as possible.

Note: Simultaneous registration in two full-time academic programs is a violation of the School of Graduate Studies rules.

OGANIZATIONAL STRUCTURE

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PROGRAM OVERVIEW

The Department of Molecular Genetics offers this professional Master's program alongside the thesis based M.Sc. and Ph.D. programs in Molecular Genetics and the professional Master of Science Program in Genetic Counselling (in collaboration with the Division of Clinical and Metabolic Genetics in the Department of Paediatrics of the Hospital for Sick Children and the Department of Obstetrics and Gynaecology at Mount Sinai Hospital, University of Toronto).

Duration of the Program

Students are expected to complete the program in 5 terms (fall, winter, summer, fall, winter). Students move through the courses as a cohort. The courses are offered once a year and are to be taken consecutively since the content is cumulative.
Failing a course and / or taking a leave of absence may increase the duration of the program (see below).

Grades

All courses in the program *except* for MMG3007Y (Practicum in Modern Genomics) and MMG3008Y (Clinical Practicum in Medical Genomics) are assigned an individual letter grade. MMG3007Y and MMG3008Y are taken as credit/no credit.
The minimal grade for passing a course is 70% (B-).

Letter Grade Scale	Numerical Scale of Marks
A+	90-100%
A	85-89%
A-	80-84%
B+	77-79%
B	73-76%
B-	70-72%
FZ	0-69%

Funding

Students in the professional Master's program do not receive a graduate student stipend.

All students are responsible for paying their tuition fees by the deadlines set by the University of Toronto. Students who are in arrears are not eligible to register with the School of Graduate Studies. Current tuition fee schedules are posted on the Student Accounts website under Divisional Tuition Fees for the School of Graduate Studies and on the provost website.
Tuition for Canadian citizens and permanent residents diverges from fees for international students.
Information about student support and loans can be found on http://www.future.utoronto.ca/finances.

Information on financial resources for professional graduate programs can be found on the School of Graduate Studies and on the Temerty Faculty of Medicine website.

After Graduation

Following successful completion of the professional Master's program in Medical Genomics, graduates will be qualified to immediately enter the job market, return to their former workplace or enter a new program of study.

This program is independent of the research based M.Sc./Ph.D. programs offered by the Department of Molecular Genetics, and there is no Ph.D. component in this program. While there is no automatic process for graduates to continue in a Ph.D. program, graduates from the M.H.Sc. are welcome to independently seek admission to a Ph.D. program at an institution of their choosing.

COURSES

M.H.Sc. in Medical Genomics Courses

MMG3001Y: Advanced Human Genetics
MMG3002Y: Biological Statistics
MMG3003Y: Genomic Methodologies
MMG3004Y: Communication of Genetic Information
MMG3005Y: Ethical and Legal Implications of Genomics
MMG3007Y: Clinical Practicum in Medical Genomics
MMG3008Y: Practicum in Modern Genomics
Short courses in Medical Genomics:

- MMG3201H - Graduate Professional Development
- MMG3202H - Next Generation Sequencing: Data generation
- MMG3203H - Next Generation Sequencing: Data analysis
- MMG3204H - Practical Applications of Genome Interpretation
- MMG3205H - Research Topics in Medical Genomics

Course Descriptions

FCE = Full Course Equivalent, corresponds to 6 hours of in-person contact time per week over one term, which may consist of a combination of lectures, tutorials, and labs.

MMG3001Y: Advanced Human Genetics, 2 FCE

This two-term course brings all students to a common knowledge base and introduces advanced concepts including, but not limited to:

- Major aspects of Mendelian inheritance and single gene disorders
- Quantitative trait genetics
- Complex and polygenic disorders
- Epigenetics
- Pharmacogenomics and personalized medicine
- Cancer genetics

Students learn human genetics from the perspective of phenotype / clinical presentation toward genotype in addition to a focus on molecular genetics and underlying mechanisms of human disease. Class time includes working through clinical and diagnostic case studies, and students will have ample opportunities to engage with world leaders in research and clinical work in each of the major topic nodes. MMG 3001Y will include assessment of both individual and group work. This fundamental course provides a knowledge framework for the entire program and introduces key concepts that will be examined in detail in subsequent courses.

Lab Component: No

MMG3002Y: Biological Statistics, 1 FCE

The ability to effectively analyze genomic data requires a strong foundation in both bioinformatics and statistics. This course begins with an introduction to major computer

programing concepts using the R coding language and the UNIX shell. Students are taught statistical theory and perform statistical tests using R to analyze biological datasets. This course focuses on practical knowledge, with interspersed discussions of how genomics integrates into the larger fields of statistics, computer science and applied math.

Students are required to bring a computer to class Wi-Fi internet connection to be able to participate in the labs for tutorials and labs.

Lab Component: Yes, Computational

MMG3003Y: Genomic Methodologies, 2 FCE

This course teaches the theory and practice of molecular biology relevant to genetic and genomic testing. This two-session course will cover classic, modern and emerging genetic methods. The course focuses on computational techniques to analyse genomic data. Students who complete this course will gain an understanding the scientific principles underlying genomic tests, will be able to examine the limitations and applications of current tests, and have the necessary background to understand new assays.
Students are required to bring a computer to class with Wi-Fi internet connection to be able to participate in tutorials and computational labs. The course does not include a wet-lab component.

Lab Component: Yes, Computational

MMG3004Y: Communication of Genetic Information, 1 FCE

This course teaches students the terminology and jargon relevant to genomic research to enable access to medical and scientific literature, and how to translate it for specific contexts and audiences. In addition, students are trained to effectively and bi-directionally translate clinical information into accessible language.
Concepts include but not limited to:

- Effective science communication
- Visual communication
- Writing of genetic test reports
- Direct-to-consumer genetic testing and communication
- Communication in a professional environment
- Journalism and entrepreneurship

Students will work on different individual and group assignments, creating pieces of writing tailored to a specific target audience, generating clinical test reports, and planning and recording a webinar.

Lab Component: No

MMG3005Y: Ethical and Legal Implications of Genomics, 1 FCE

This course explores the current ethical, legal and social landscape of human genetic analysis, with a focus on the application of genome-science on patient care. Students

explore the manifold legal and ethical implications of genomic science, including but not limited to:

- The ethics of care
- Disclosure and privacy, obtaining patient consent, ethical implications and protocols for use of patients in research studies, and emerging issues reporting of incidental findings
- Data protection
- Ethical and legal tensions in healthcare, with a focus on communication of genetic findings in the paediatric setting, and for patients with religious beliefs or value systems that affect clinical care
- Health policy and legislature, and public health ethics

MMG 3005Y is comprised of a combination of lecture, student-directed seminar, and project-based learning, and will include assessment of both individual and group work.

Lab Component: No

MMG3007Y: Clinical Practicum in Medical Genomics, 1 FCE

The clinical practicum in medical genomics will require clinical-stream students to integrate and apply the theoretical concepts and practical skills they learned via coursework in a clinical and/or research setting. The clinical practicum is a self-directed placement in which clinical-stream students will seek out a placement in an area related to their specific clinical interests, and generally work full time (~35 hr/week) with a host organization / supervisor for a 12 to 18 week period.

MMG3008Y: Practicum in Modern Genomics, 1 FCE

The practicum in Modern Genomics will require laboratory-stream students to integrate and apply the theoretical concepts and practical skills they learned via coursework in a professional setting. During the laboratory-stream practicum students will work full-time (~35 hr per week) with a host organization/supervisor for a 12 to 18 week period, focusing on a project of significance to the practicum partner in the field of Medical Genomics.

Short courses in Medical Genomics

You will be taking four short courses that run at different times throughout the program. Each course will involve 12-18 hours of contact time, and each is worth 0.25 FCE. Short courses include:

- MMG3201H - Graduate Professional Development
- MMG3202H - Next Generation Sequencing: Data generation
- MMG3203H - Next Generation Sequencing: Data analysis
- MMG3204H - Practical Applications of Genome Interpretation
- MMG3205H - Research Topics in Medical Genomics

Professional Development and the two Next-Generation Sequencing courses are required (unless you demonstrate excellence in one of the topics), and you can choose between MMG3204H: Practical Applications of Genome Interpretation and MMG3205H: Research Topics in Medical Genomics as your fourth course.

Course Waivers

Since the courses are cumulative, large, and the content is very specific, it is highly unlikely that a course waiver will be issued. In the rare instance that a student can document having taken a graduate level course in another department or university with highly overlapping content and equivalent weight, and can prove mastery of the subject (as decided by the M.H.Sc. course coordinator), the course coordinator in collaboration with the program director may decide to waive participation in the Medical Genomics program's course. A waiver is obtained by submitting a Course Waiver Request, along with a description of the course content (a half page description or a print-out of information from a course website) and a description of how the course mark was determined. The student must also attach a printout of their transcript showing the mark for the relevant course(s). Furthermore, the student must suggest a suitable substitute graduate-level course of equal credit, and organize access independently. The waiver must be presented and discussed as soon as possible after an offer of admission is made. The course waiver must be by signed by the Program Director and submitted to the Graduate Program Administrator for subsequent review and approval by the Graduate Coordinator. If approved, the student must submit a "Transfer Credit and/or Course Exemption" form available here:
http://www.sgs.utoronto.ca/currentstudents/Pages/Student-Forms-and-Letters.aspx

Failing a Course

The School of Graduate Studies requires students to complete all of the program's courses with at least a B- or 70% grade. Failure to achieve a mark of 70% or greater in any required course may result in the termination of the student's enrolment in the program. If a student fails a course, the Program Director, in collaboration with the course coordinator of the failed course, will determine whether the student is allowed to continue in the program. The course coordinator of the failed course and/or of the subsequent courses may request additional assignments in order to allow the student into the subsequent course. If the student is allowed to remain in the program, the failed course must be repeated or an adequate substitutive course or assignment may be allocated. The School of Graduate Studies requires that both the grade in the failed course and the grade in the repeated course be recorded on the student's transcript.

INTERRUPTION TO REGISTRATION STATUS

Personal Time Off, Leaves of Absence and Withdrawal

Sick leaves or absences for personal and health reasons must be documented and submitted to the course coordinator. If the absence affects the assignments in the course, or in the case of undocumented absences, the course coordinator may inform the Program Director. Absence from a substantial part of a course without adequate university documentation and program approval may result in failing the course.

For policy in case of short-term absence from a class, refer to the course syllabus. In case an assignment or exam is affected, complete the verification of student illness form available on the SGS website. http://www.illnessverification.utoronto.ca/index.php

Leave of Absence

Graduate students may experience a temporary or permanent interruption during the course of their studies. In a situation where it may be necessary to take time out from the graduate program the students should make an appointment to see the Program Director as soon as possible. While on leave, students are temporarily withdrawn from the graduate program and do not pay fees for the leave period. Please consult the Fees section of the SGS website for more information on fees for students on a Leave of Absence.

A student may apply to the Program Director for a three-term (1 year) leave during the program of study for the following reasons:

- Serious health or personal problems which temporarily make it impossible to continue in the program, or
- Parental leave by either parent at the time of pregnancy, birth or adoption, and/or to provide full-time care during the child's first year.

Leaves should coincide with the start and end of a session. A leave must therefore begin on the first day of term. The degree time limit will be extended by the number of sessions that the student is on leave. If it is necessary for a leave to begin in mid-session, it is necessary to contact the Director of Student Services at the School of Graduate Studies to make special arrangements.

During a leave, a student may not make demands on the resources of the University, such as using library facilities, or attending courses. Research Reader privileges are available at the library for a fee. Students have the option of opting into receiving access to Student Life (http://www.studentlife.utoronto.ca/), Hart House (http://harthouse.ca/) and Faculty of Kinesiology & Physical Education services (http://www.physical.utoronto.ca/) for a fee (see: http://www.sgs.utoronto.ca/Documents/Leave+of+Absence.pdf).

If a student requires a leave, it is necessary to complete the Request for Leave of Absence form available on the SGS website and to submit it to the Graduate Coordinator for consideration.

Termination of Enrolment

A student's enrolment in the program may be terminated without obtaining a degree under the following circumstances:

1. Failing any course in the program
2. Arrears in paying tuition fees
3. Extenuating circumstances including, but not limited to, academic misconduct

More information on general policies at the University of Toronto and the School of Graduate studies that apply to students of the program can be found here:
https://sgs.calendar.utoronto.ca/important-notices

Confidentiality

As per University of Toronto guidelines, the Department of Molecular Genetics administration requires the expressed written permission of the student in question before we are able to communicate with people outside of the University of Toronto (parents, other family members etc.) regarding the status of said graduate students in our program.

INSTITUTIONAL POLICIES AND SUPPORT

Student code of Conduct

All students at the University of Toronto are expected to abide by our governing Student Code of Conduct, which can be found **here**. It is important that you take the time to read through this document, to ensure that your behaviour during your tenure as a student here is in alignment with these principles. Students who are found to be acting in offence of this code will be subject to disciplinary procedures and / or sanctions from the MHSc program in Medical Genomics, the Department of Molecular Genetics, the Temerty Faculty of Medicine, and / or the University of Toronto's Code of Conduct Hearing Officer(s), depending on the scope and severity of the incident.

Policy on Distribution of the Materials outside of the Program:

At the University of Toronto and the Department of Molecular Genetics we take pride in the fact that we have unique, high-level and up-to-date expertise in the course topics. All course materials are the Intellectual Property of the lecturers. Further distribution of the lecture materials without permission constitutes an academic offence, and the instructors have the right to pursue disciplinary action.

Academic Integrity

Academic integrity is essential to the pursuit of learning and scholarship in a university, and to ensuring that a degree from the University of Toronto is a strong signal of each student's individual academic achievement. As a result, the University treats cases of cheating and plagiarism very seriously. The University of Toronto's Code of Behaviour on Academic Matters (www.governingcouncil.utoronto.ca/policies/behaveac.htm) outlines the behaviours that constitute academic dishonesty and the processes for addressing academic offences. Potential offences include, but are not limited to:

In papers and assignments:

1. Using someone else's ideas or words without appropriate acknowledgement.
2. Submitting your own work in more than one course without the permission of the instructor.
3. Making up sources or facts.
4. Obtaining or providing unauthorized assistance on any assignment.

On tests and exams:

1. Using or possessing unauthorized aids.
2. Looking at someone else's answers during an exam or test.
3. Misrepresenting your identity.

In academic work:

1. Falsifying institutional documents or grades.
2. Falsifying or altering any documentation required by the University.

All suspected cases of academic dishonesty will be investigated following procedures outlined in the Code of Behaviour on Academic Matters. If you have questions or concerns about what constitutes appropriate academic behaviour or appropriate research and citation methods, you are expected to seek out additional information on academic integrity from your instructor or from other institutional resources.

Accessibility Needs

The University of Toronto is committed to accessibility. If you require accommodations for a disability, or have any accessibility concerns about a course, classroom or course materials, please contact Accessibility Services as soon as possible:
http://accessibility.utoronto.ca/

STUDENT SERVICES

The University of Toronto provides a multitude of services, a selection is listed below.

Accessibility Services: http://accessibility.utoronto.ca/
ACORN: www.acorn.utoronto.ca
Career Resources: http://www.careers.utoronto.ca/ and https://moleculargenetics.utoronto.ca/career-development-resources
Centre for International Experience: http://www.cie.utoronto.ca/
General student services and resources at Student Life: www.studentlife.utoronto.ca
Graduate Conflict Resolution Centre: https://www.sgs.utoronto.ca/resources-supports/supervision/guide/
Graduate Wellness Portal: https://www.sgs.utoronto.ca/gradhub/resources-supports/#health-wellness
Health Services: http://healthandwellness.utoronto.ca/
Housing Services: http://www.housing.utoronto.ca/
Molecular Genetics Graduate Students Association (MGGSA): http://mogen.sa.utoronto.ca/
Quercus: https://q.utoronto.ca/
Safety: http://safety.utoronto.ca/ and https://www.studentlife.utoronto.ca/feeling-distressed
School of Graduate Studies: https://www.sgs.utoronto.ca/
Student Life: www.studentlife.utoronto.ca
University of Toronto libraries: https://onesearch.library.utoronto.ca/