Mechanical Engineering

The Graduate Program in Mechanical Engineering provides course- and research-based training to graduate students leading to acquisition of the degrees of Master of Applied Science and Doctor of Philosophy in Mechanical Engineering. The program is focused on nurturing excellence in learning and professional development for graduate students. It aims not only to advance students' knowledge and expertise beyond Bachelor's level in the field of Mechanical Engineering, but also to enable and foster their independent research skills, creative activities and entrepreneurship skills. In addition to the focus placed on original research, students are provided with opportunities for professional development through engagement in complementary education and training in areas such as law, business, ethics, technical writing and communication.

Graduate students play a central role in the success of research projects and programs led by faculty members at the Department of Mechanical Engineering. They are responsible for conducting cutting edge research in core (thermo-fluids, mechanics, design and control/measurement, and manufacturing) and interdisciplinary (sustainable energy systems, dynamics and control of electromechanical systems, advanced manufacturing and materials, and micro-systems and bio-systems) areas of mechanical engineering. The research outcomes and findings achieved through the graduate program are of utmost significance for various key industrial sectors such as medical devices, automotive, aerospace, electronics packaging, manufacturing, shipping, transportation, energy production and usage, mechanics of human body and living organisms, mechatronics, nanotechnology, robotics, microsystems, sustainable building systems, control and industrial simulators, and rehabilitation technology. Graduates from the Graduate Program in Mechanical Engineering can expect to pursue careers in any of the above areas as well as related research and development, certification, inspection, maintenance, implementation and life-cycle management functions. Moreover, they may be excellent champions in creating new ventures by translating their own research into commercialized products and services.

Master of Applied Science Program

Students enrolled at this level pursue a Master of Applied Science degree in the Graduate Program in Mechanical Engineering at York University.

ADMISSION REQUIREMENTS

Applicants must have an undergraduate degree from a relevant engineering (*e.g.*, mechanical engineering, material engineering, or electrical engineering) or sciences (*e.g.*, physics, chemistry, or biology) program. The minimum admission requirement for the MASc program is listed in the table below:

Applicant's Past Degree	MASc
Past Degree in Engineering:	B in each of the past two years of undergraduate studies
Past Degree in Non-Engineering:	B+ in each of the past two years of undergraduate studies

Applicants must provide in their application package all of their undergraduate degree transcripts, a *curriculum vitae*, a cover letter elaborating their professional goals and motivations for pursuing graduate studies, and two confidential letters of recommendation.

Applicants who have not completed four full years of studies at the secondary-school level or university level in a country where English is a primary language or where English is the primary language of instruction must demonstrate their language proficiency in English. Accepted tests include Test of English as a Foreign Language, International English Language Testing System, and York English Language Test. A minimum of 6.5 International English Language Testing System score or 79-80 Test of English as a Foreign Language Internet-based (550 paper-based) English Test score is considered satisfactory. More detailed scores can be found at http://futurestudents.yorku.ca/requirements/language_tests#exemptions

DEGREE REQUIREMENTS

MASc Degree by Thesis

Students must identify academic supervisors (faculty members from the Graduate Program in Mechanical Engineering) when they enrol in the program. All students are required to plan and conduct their course- and research-related activities under the direct guidance of their supervisors. Candidates for the MASc degree must fulfill the following requirements:

1. Courses

Students are required to complete their coursework requirements according to the table below and in consultation with their supervisor(s) and the graduate program director.

Required Course Type	Number of half-credit (3.0) courses
Core	**3** (with at least **1** from Mechanical Engineering fundamental **courses**)
Complementary* or Reading or Outside Mechanical Engineering	Only **1** out of **3 core courses** may be from this group
Other mandatory	**Engineering 6000 0.0: Engineering Ethics** in term 1. **Mechanical Engineering 6000 0.0: Graduate Seminar**** every year. **Mechanical Engineering 9001 0.0: MSc Thesis** every year.

* See the Complementary Education and Training section below.
** Applies to full-time students only.

2. Thesis

MASc students are required to become involved in research activities immediately upon registration in the Mechanical Engineering program and under the general direction of their supervisors. They must be registered for non-credit **Mechanical Engineering 9001 0.0: MASc Thesis** course. Students are required to submit a progress report to their supervisory committee in compliance with the requirements of the Faculty of Graduate Studies. The progress report documents courses taken, teaching assistant duties, knowledge

dissemination through publications and presentations and supervisory committee's direct feedback on the overall performance of the graduate student. If the performance of the student in research is deemed unsatisfactory by the supervisory committee, they may be asked to withdraw from the program immediately. If recommended to continue, students are obliged to conduct and conclude their research and to submit a written thesis to their supervisory committee at the end of their degree period. The thesis should clearly demonstrate the candidate's ability to conduct independent research and creative activities with guidance, resulting in contributions to the body of knowledge in the area of investigation. The research undertaken and the thesis should be defended by the student in an oral examination session, according to the Faculty of Graduate Studies regulations. The examination committee members are selected and the defence is conducted based on regulations set by the Faculty of Graduate Studies.

COMPLEMENTARY EDUCATION AND TRAINING

The Graduate Program in Mechanical Engineering uniquely engages graduate students in important complementary education and training in areas such as teaching/mentoring, engineering pedagogy, technology transfer, entrepreneurship and commercialization, legal aspects and governance, communications, as well as ethical, societal and safety obligations. This engagement is enabled by a complementary studies coursework requirement as well as an atmosphere that encourages students' outreach and extracurricular activities. Complementary education and training results in the diversification of knowledge and experience beyond the immediate research field as well as the acquisition of qualities and transferable skills required for employment and professional development.

PROGRAM LENGTH

For MASc students, the expected degree completion time is 6 terms (two years) on a full-time enrolment basis. For those MASc students who complete degree requirements earlier than 6 terms, they must register and pay fees for a minimum of the equivalent of four (4) terms of full-time study. All requirements for a MASc degree must be fulfilled within 12 terms (4 years) of registration as a full time or part-time MASc student, in accordance with Faculty of Graduate Studies registration policies, including the requirement of continuous registration.

Doctor of Philosophy Program

Students enrolled at this level pursue a Doctor of Philosophy degree in the Graduate Program in Mechanical Engineering.

ADMISSION REQUIREMENTS

Applicants must hold a master's degree equivalent to the Mechanical Engineering MASc degree at York University, conferred by a relevant engineering (*e.g.*, mechanical engineering, material engineering, or electrical engineering) or sciences (*e.g.*, physics, chemistry, or biology) program. The minimum admission requirement for the PhD program in the Graduate Program in Mechanical Engineering is listed in the table below:

Applicant's Past Degree	PhD	Direct PhD
Past Degree in Engineering:	B+ in each of the past two years of graduate studies	A- in each of the past two years of undergraduate studies
Past Degree in Non-Engineering:	A- in each of the past two years of graduate studies	A in each of the past two years of undergraduate studies

Applicants must provide in their application package all of their undergraduate and master's degree transcripts, a *curriculum vitae*, a cover letter elaborating their research interests and motivations for pursuing PhD studies, and two confidential letters of recommendation.

For applicants who have not completed four full years of studies at the secondary-school level or university level in a country where English is a primary language or where English is the primary language of instruction, they must demonstrate their language proficiency in English. Accepted tests include Test of English as a Foreign Language, International English Language Testing System, and York English Language Test. A minimum of 6.5 International English Language Testing System score or 79-80 Test of English as a Foreign Language Internet-based (550 paper-based) English Test score is considered satisfactory.

DEGREE REQUIREMENTS

Students must identify academic supervisors (faculty members from the Graduate Program in Mechanical Engineering) when they enrol in the program. All students are required to plan and conduct their course- and research-related activities under the direct guidance of their supervisors. Candidates for the PhD degree must fulfill the following requirements:

1. Courses

Students are required to complete their coursework requirements according to the table below and in consultation with their supervisor(s) and the graduate program director.

Required Course Type	Number of half-credit (3.0) courses	
	PhD	**Direct PhD**
Core	**3** (with at least **1** from Mechanical Engineering fundamental **courses**)	**5** (with at least from **2** Mechanical Engineering fundamental **courses**)
Complementary* or Reading or Outside ME	Only **1** out of **3 core courses** may be from this group	Only **1** out of **5 core courses** may be from this group
Other mandatory	**Engineering 6000 0.0: Engineering Ethics** in term 1. **Mechanical Engineering 6000 0.0: Graduate Seminar**** every year. **Mechanical Engineering 9002 0.0: PhD dissertation** every year.	

* See the Complementary Education and Training section below.
** Applies to full-time students only

2. Dissertation Course and Supervisory Committee

PhD students commence their research activities upon registration in the program and plan them in consultation with their supervisor at the start of their studies. They must register for the non-credit **Mechanical Engineering 9002 0.0: PhD Dissertation** course. A supervisory committee, recommended by the Graduate Program Director and approved by the Dean, Faculty of Graduate Studies, must be formed no later than the end of the fourth term of study. This committee consists of the student's supervisor and at least two other faculty members from the Faculty of Graduate Studies at York University, one of whom must be from the Graduate Program in Mechanical Engineering.

3. Comprehensive Examination and Research Proposal

Within the first 12 to 18 months of starting the graduate program, each PhD student must pass the PhD comprehensive examination. Direct entry PhD students must complete their comprehensive examination within 24 to 30 months of beginning the program. Students who are unable to meet the academic and research requirements for the PhD degree may have the option to be transferred to the MASc degree with appropriate course credits, as recommended by a committee comprised of the chair of the Department of Mechanical Engineering, the Graduate Program Director, and the Associate Dean Research & Graduate Studies, Lassonde School of Engineering or their representative.

The purpose of this comprehensive examination is two-fold: to assess the student's fundamental knowledge in mechanical engineering and of the subject matter relevant to the dissertation; and to assess the student's ability to conduct independent research of highest quality. The student must prepare a short report outlining their research work conducted, proposed research plan and timeline for completion of their degree requirements. The student must present this report in front of the doctoral comprehensive examination committee. This is an open presentation, typically 15-20 minutes, followed by a question and answer period from the audience attending the presentation part of the examination. The presentation is followed by a closed-door oral examination by the examination committee members. Typically, the first round of questions assesses the student's fundamental knowledge in the discipline. The second and subsequent round of questions assesses the student's understanding of the research topic.

4. Dissertation and Defence

PhD students are required to conduct research independently through defining, planning and solving of scientific problems to lead and advance knowledge in their field of specialization. Research outcomes should lead to creativity and competence at an international level and have the significance and standard level that can be disseminated in the form of scientific publications. The PhD student's research progress is examined annually by meeting with their supervisory committee. Students are required to submit a progress report which documents courses taken, teaching assistant duties, knowledge dissemination through publications and presentations, and supervisor's direct feedback on the student's overall performance. If the annual performance of the student in research is deemed unsatisfactory by the supervisory committee, they may be asked to withdraw from the program immediately, even after successful completion of the PhD comprehensive examination. If recommended to continue, students are obliged to conduct and conclude their research and to submit a written dissertation to their supervisory committee at the end of their degree period. The dissertation must clearly demonstrate the candidate's ability to conduct independent research and creative activities, resulting in contributions to the body of knowledge in the area of investigation. The research undertaken and the dissertation must be defended by the student in an oral examination session. The examination committee members are selected and the defence session is conducted based on regulations set by the Faculty of Graduate Studies.

DIRECT ENTRY OPTION

Students who are admitted directly into the Ph.D. program in Mechanical Engineering after completion of their undergraduate degree must successfully complete a minimum of 6 courses. Four (4) of those courses must be from the core Mechanical Engineering graduate program course offerings, one can be a directed study course or a course from outside the Graduate Program in Mechanical Engineering (from other graduate programs in Lassonde School of Engineering, outside the Lassonde School of Engineering at York University). One course must be one of the compulsory complementary education and training courses, typically to be taken after completion of the first year of the program. In addition to the six credited courses, each registered graduate student must complete two non-credit courses, **Engineering 6000 0.0: Engineering Ethics** and **Mechanical Engineering 6000 0.0: Graduate Seminar Series**. All students are required to register annually in the Graduate Seminar Series course throughout their full-time registration in the program.

COMPLEMENTARY EDUCATION AND TRAINING

The Graduate Program in Mechanical Engineering uniquely engages graduate students in important complementary education and training in areas such as teaching/mentoring, engineering pedagogy, technology transfer, entrepreneurship and commercialization, legal aspects and governance, communications, as well as ethical, societal and safety obligations. This engagement is enabled by a complementary studies coursework requirement, as well as an atmosphere that encourages students' outreach and extracurricular activities. Complementary education and training results in the diversification of knowledge and experience beyond the immediate research field as well as the acquisition of qualities and transferable skills required for employment and professional development.

PROGRAM LENGTH

For PhD students, the expected degree completion time is 12 terms (four years) on a full-time enrolment basis. For those PhD students who complete degree requirements earlier than 12 terms, they must register and pay fees for a minimum of the equivalent of nine (9) terms of full-time study. All requirements for a PhD degree must be fulfilled within 18 terms (6 years) of registration as a full time or part-time PhD student, in accordance with Faculty of Graduate Studies' registration policies, including the requirement of continuous registration.