UNIVERSITY OF TORONTO
FACULTY OF APPLIED SCIENCE & ENGINEERING

Report No. 3781 Revised

MEMORANDUM

To: Executive Committee of Faculty Council (February 3, 2025)
Faculty Council (February 24, 2025)

From: Professor Julie Audet
Vice-Dean, Graduate

Professor Lisa Romkey
Chair, Engineering Graduate Education Committee

Date: January 29, 2025 (Revised February 12, 2025)

Re: Creation of MEng Extended Full-time Plus Co-op Option

REPORT CLASSIFICATION

This is a major policy matter that will be considered by the Executive Committee for endorsing and forwarding to Faculty Council for vote as a regular motion (requiring a simple majority of members present and voting to carry).

BACKGROUND

Although the Faculty has launched several initiatives that aim at addressing the needs and interests of MEng students in developing workplace skills and career management strategies, there continues to be need and interest in career management training from graduate students.

Students are seeking broader experiential education opportunities including work terms, and multiple opportunities to develop and receive timely feedback on job search materials such as cover letters, resumes and interview skills along with enhanced industry networking opportunities.

Recent student surveys indicate that MEng students would like the preparation activities and work term to count for credit in their program. Also, international students have a strong interest in obtaining work experience in Canada during their graduate studies.

There are academic program specifications for obtaining a co-op permit which are not compatible with the current structure of most MEng programs, in which students are required to complete a four-month practicum. The proposed Extended Full-time Plus Co-op Option responds to student need and demand by establishing a work-term preparation course and the work-term as essential program requirements.

PROPOSED

It is proposed to create a new Extended Full-time Plus Co-op Option (EFT Co-op Option) within the Master of Engineering (MEng) programs in the following FASE units: University of Toronto Institute for Aerospace Studies (UTIAS), Department of Chemical Engineering & Applied Chemistry (ChemEng), Department of Civil & Mineral Engineering (CIVMIN), The Edward S. Rogers Sr. Department of Electrical & Computer Engineering (ECE), Department of Materials Science & Engineering (MSE), and Department of Mechanical & Industrial Engineering (MIE).

This option will offer a formal for-credit pathway for MEng students to develop a career strategy and workplace skills, make industry contacts, and obtain significant professional experience prior to graduation. It will utilize an Extended Full-Time (EFT) program length and registration pattern to allow sufficient time in program for a work term.

CONSULTATIONS

Consultations took place in 2024 and included graduate students; associate directors and associate chairs of FASE graduate units (plus ISTEP); FASE chairs and directors; Engineering Career Centre employers; and graduate administrative staff members. Feedback was considered carefully and addressed in the proposal where appropriate.

RECOMMENDATION FOR COUNCIL

> THAT the creation of an Extended Full-time Plus Co-op Option be approved as described in Report 3781 Revised, effective September 2025.

University of Toronto
Major Modification Proposal

New Field, Concentration or Option within an Existing Graduate Program

This template was developed by the Office of the Vice-Provost, Academic Programs and updated on March 7, 2017. It should be used to bring forward all proposals for new fields, concentrations or options in existing graduate programs for governance approval under the University of Toronto's Quality Assurance Process (UTQAP).

Program:	Master of Engineering (MEng)
Existing fields or concentrations:	(see Academic Rationale)
Proposed new field/concentration or option:	Extended Full-time Plus Co-op Option (EFT Co-op Option)
Unit (if applicable):	• Institute for Aerospace Studies • Department of Chemical Engineering & Applied Chemistry • Department of Civil & Mineral Engineering • Department of Electrical & Computer Engineering • Department of Materials Science & Engineering • Department of Mechanical & Industrial Engineering
Faculty/academic division:	Faculty of Applied Science and Engineering (FASE)
Dean's office contact:	Julie Audet, Vice Dean Graduate
Graduate unit contact:	n/a
Version date:	February 11, 2025

CONTENTS

1. Summary

- Provide a brief summary or overview of how the proposed field, concentration or option relates to existing fields or concentrations in the program summarizing many of the key points found in more detail elsewhere in the proposal. Please include:
    - A clear statement of purpose
    - Identification of existing fields or concentrations
    - A description of the proposed field or concentration
    - Rationale for its inclusion in the program
    - The impetus for its development (including student demand) and how it fits with existing fields or concentrations
    - Faculty and programmatic strength in the proposed area

This is a proposal is to create a new co-op option within six of the Master of Engineering (MEng) programs in the Faculty of Applied Science and Engineering (FASE) at the University of Toronto. The affected institutes and departments are:

- The University of Toronto Institute for Aerospace Studies (AER)
- The Department of Chemical Engineering & Applied Chemistry (CHE)
- The Department of Civil & Mineral Engineering (CIVMIN)
- The Edward S. Rogers Sr. Department of Electrical & Computer Engineering (ECE)
- The Department of Materials Science & Engineering (MSE)
- The Department of Mechanical & Industrial Engineering (MIE)

The new option, which will be called **Extended Full-Time Plus Co-op Option (EFT Co-op Option)**, will offer a formal pathway for MEng students to develop a career strategy, workplace skills, make industry contacts, and obtain significant professional experience prior to graduation. The EFT Co-op Option will utilize an Extended Full-Time (EFT) program length and registration pattern to allow sufficient time in program for a work term.

MEng students in all graduate units also have the option of completing one emphasis as part of their degree program. Some examples are Advanced Manufacturing; Biomanufacturing; Data Analytics and Machine Learning; Engineering and Globalization; Entrepreneurship, Leadership, Innovation and Technology in Engineering (ELITE); Forensic Engineering; Robotics; or Sustainable Energy. The ELITE emphasis is the second most popular emphasis Faculty-wide, after the emphasis in Data Analytics and Machine Learning.

There have been significant changes in the pool of applicants to the MEng program over the last decades. Initially, MEng students were mostly domestic working professionals wanting to upskill by taking courses with research-stream students in an accelerated full-time (1 year) or part-time (3 year) program format. Now, applicants to the MEng program are a more balanced mix of domestic and international students with varying levels of working experience, including many individuals with no prior work experience who have a keen interest in entering the job market for the first time. The Extended Full-time (EFT) Option of the MEng program, which was created more recently, has become a popular option among international students as it gives them more time during their program to transition to a new country, university and employment system. It also makes them eligible for up to a 3-year postgraduation work permit (although this extended time in program is no longer necessary for the postgraduation work permit).

Since 2019, FASE has been offering a co-curricular career exploration program called Opportunities for Professional Careers: Transitions, Industry Options, Networking, and Skills (OPTIONS), specifically designed for an MEng cohort. Many sessions have been added to address topics relevant to international students such as visa and work permit. Surveys from these multiple cohorts indicate that OPTIONS improves student confidence in their career skills but the improvement is modest which is expected as it is based on simulations. However, currently, except for the MEng programs in Biomedical Engineering (BME) and Cities Engineering & Management (CIV CEM) that were launched more recently and include a required four-month practicum, the structure of the MEng programs in the Faculty is such that is challenging for international students to obtain the necessary co-op permit needed to complete an industrial work term during their

studies (i.e. work terms are not formally defined as a requirement in any MEng program other than BME and CIV CEM). Surveys from two work term pilots in FASE have also suggested that it was challenging for MEng students to focus on developing their career management skills in addition to completing their regular coursework. The most recent (2022) Canadian Graduate and Professional Student Survey (CGPSSs) survey also suggested that the level of satisfaction of MEng students was lower than the overall level of satisfaction of professional programs offered to graduate students at U of T that include a required work term.

FASE has considerable experience and resources for supporting students in experiential learning and in developing career management skills. Undergraduate engineering students have had the option to take work terms as a part of their discipline program for more than forty years. The Engineering Career Center (ECC) supports undergraduate students in a Professional Experience Year Co-op Program, and the Institute for Studies in Transdisciplinary Engineering Education & Practice (ISTEP) with the Troost Institute for Leadership Education in Engineering (Troost ILead) has been instrumental in the development and delivery of Opportunities for Professional Careers: Transitions, Industry Options, Networking, and Skills (OPTIONS), a co-curricular initiative to support graduate students and postdoctoral fellows to explore diverse career options and apply their expertise in industry.

In the first five years following the launch of the EFT Co-op Option, FASE will evaluate its effectiveness via a well-defined framework that includes learning and industry access outcomes.

2. Effective Date

Effective date: September 1 2025.

3. Academic Rationale

- Identification of existing fields or concentrations.
- Description of the field, concentration or option(its intellectual focus, etc.) and its relationship to existing fields or concentrations.
- How the proposed field, concentration or option relates to the current state of the discipline or area of study. Identify pedagogical and other issues giving rise to the creation of this program. Where appropriate, speak to changes in the area of study or student needs that may have given rise to this development.
    - Appropriateness and consistency of the field, concentration or option name.
    - Distinctiveness.

- Identify any distinctive or innovative aspects of the proposed field or concentration.
- To what extent is what is being proposed "the norm"? As appropriate, speak to similar offerings elsewhere at the University of Toronto or at other universities.

The six participating MEng programs have the following approved fields; these fields are not impacted by the proposed new Extended Full-Time Plus Co-op Option:

- Aerospace Science & Engineering
    - Engineering Physics
    - Flight Dynamics
    - Fluid Dynamics
    - Materials and Structures
    - Space Systems Engineering
- Chemical Engineering & Applied Chemistry
    - Biomolecular and Biomedical Engineering
    - Bioprocess Engineering
    - Chemical and Materials Process Engineering
    - Engineering Informatics
    - Environmental Science and Engineering
    - Pulp and Paper
    - Surface and Interface Engineering
    - Sustainable Energy
- Civil & Mineral Engineering
    - Building Engineering
    - Environmental Engineering
    - Geomechanics
    - Structural Engineering
    - Transportation Engineering
- Electrical & Computer Engineering
    - Biomedical Engineering
    - Communications
    - Computer Engineering
    - Electromagnetics
    - Electronics
    - Energy Systems
    - Photonics
    - Systems Control
- Materials Science & Engineering
    - Advanced Materials
    - Extractive and Process Metallurgy
    - Physical Metallurgy

- Mechanical & Industrial Engineering
    - None (all fields were closed effective September 2022)

The FASE Dean's Office is currently working with each of the departments to close fields, as appropriate, as they are no longer being used. These changes will be addressed in future major modification proposals.

Over the last fifteen years, the MEng program has experienced a significant increase in enrolment levels across the different MEng programs offered in the Faculty. For instance, in 2006-2007, the total headcount was 243 domestic students and 22 international students, while in 2024-2025, it is 594 domestic students and 783 international students.

Enrolments in MEng Program (total headcounts including all options)

	2020-21	2021-22	2022-23	2023-24	2024-25
Domestic	573	532	493	509	594
International	451	648	705	697	783
Total	1024	1180	1198	1206	1377

The initial audience for the MEng program was mostly composed of domestic, working professionals interested in elevating their technical and industry leadership competencies. Currently, the MEng programs in the Faculty mostly attract students interested in obtaining, for the first time, industry experience in Canada. Therefore, in the last decade, efforts have been made to better support MEng students in developing their workplace skills in parallel with their technical skills. These include the development of a variety of professional development opportunities, and the creation of an emphasis in the MEng in Entrepreneurship, Leadership, Innovation & Technology in Engineering (ELITE).

ELITE courses that are highly focused on developing workplace skills, such as APS1001: Project Management and APS1049: Management Consulting, are particularly popular among MEng students. The high enrolment numbers in these courses and the sustained popularity of the ELITE emphasis across the Faculty (with ~340 MEng students completing the emphasis between June 2020 and November 2023) strongly indicates that students value the competencies and knowledge taught in these offerings.

In addition to the ELITE emphasis, there have been three other initiatives in FASE that aimed at addressing the needs and interests of MEng students in developing workplace skills and career management strategies.

Since 2017, the Vice Dean, Graduate Studies and Troost ILead have offered *Opportunities for Professional Careers: Transitions, Industry Options, Networking, and Skills* (OPTIONS), a co-curricular initiative to support graduate students and postdoctoral fellows to explore diverse career options and apply their expertise in industry. OPTIONS consists of an eight-week, not-for-credit, cohort program for approximately 70 participants. In the program, participants create a career exploration plan, develop job application materials, and apply networking tools to advance their career exploration. Participants also gain access to career management tools, participate in an informational interview with an alumni, participate in a mock interview, and have three one-on-one meetings with a career coach, an engineering professor, and an industry professional to review their resume and cover letter. OPTIONS was initially launched for PhD students and postdoctoral fellows. Since September 2019, OPTIONS has been offered once a year to MEng students.

From 2018-2022, the Faculty offered the Graduate Peer and Career Support (GradPACS) initiative which trained a group of graduate students in career coaching and hired them to assist students in need and to organize various community-building events. GradPACS aimed at lowering barriers for graduate students to seek and obtain career, wellness and mental health counselling when needed.

From 2019-2021, there were two work-term pilot projects in collaboration with the Engineering Career Center (ECC) to provide four-month work term placements to small groups of mostly domestic MEng students in the summer. A dedicated graduate work term coordinator was hired and their role was to prepare students to apply for work term positions and expand ECC's network of suitable industrial partners.

Past experience and surveys conducted for these three initiatives (GradPACS, summer work term pilots and OPTIONS) provided additional evidence of student demand for career management, but they also indicated that it was challenging for MEng students to dedicate sufficient time for career management activities in addition to their regular program requirements. A second key finding, which was obtained mostly from the Faculty's summer work term pilots, was that students who are able to accept placements that are longer in duration are more competitive on the job market and are more likely to be offered work term opportunities than those who can only accept shorter four-month placements (this was also suggested in the most recent employer surveys covered in Section 9: Consultation). These two aspects have been addressed in the design of the EFT Co-op Option which will only be available with the same program length and registration pattern as the existing Extended Full-time Option of the MEng program. The design of the EFT Co-op Option also takes into account the specific requirements and long period of time for international students to apply and obtain a co-op work permit for their placement. The (0.0 FCE CR/NCR) work-term placement

APS2000 will be a requirement in the option, along with the 0.5 FCE TEP1701 Navigating Engineering Workplaces course which will count towards the total 5.0 FCEs course requirement for the MEng in AER, CHE, CIV, MIE and MSE (and towards the total 4.5 FCEs in ECE).

The proposal to create an MEng EFT Co-op Option is also well-aligned with the University of Toronto's first Report of the Provost's Advisory Group on Lifelong Learning Opportunities (June 2021). The proposal addresses the following recommendation articulated in that report:

Recommendation 7: That divisions deepen and expand connections with industry and employers, with the assistance of the OVPRI, to identify areas in which existing research and teaching areas align with talent needs and collaborate to develop potential offerings to meet reskilling and upskilling demands.

4. Need and Demand

- Provide a brief description of the need and demand for the proposed field, concentration or option focusing, as appropriate, on student interest, societal need, employment opportunities for prospective graduates, accreditation requirements, etc.

Students today are seeking broader experiential education opportunities including work terms. Student demand has highlighted the need for multiple opportunities to develop and receive timely feedback on job search materials such as cover letters, resumes and interview skills along with enhanced industry networking opportunities.

Surveys of participants in our two summer work term pilots indicated that MEng students felt that the preparation activities and work terms should count for credit in the program. Also, international students have indicated a strong interest in obtaining work experience in Canada during their graduate studies but there are academic program specifications for obtaining a co-op permit which are not compatible with the current structure of most MEng programs; the exceptions are the MEng in Biomedical Engineering (BME) and the MEng in Cities & Engineering Management (CIV CEM), in which students are required to complete a four-month practicum. The proposed EFT Co-op Option responds to student need and demand by establishing a work-term preparation course and the work-term as essential program requirements.

There is evidence of need and interest in career management training from graduate students in Engineering as more than 400 graduate students and postdoctoral fellows have participated in an OPTIONS (eight-week) cohort program. In addition,

complementary events are offered which consist of two-hour to full-day workshops that provide an introduction to the school-to-work transition, tools to develop skills critical to the success of a professional, and a venue to network with engineering alumni. Over seven years, OPTIONS organizers have hosted over 100 events for over 4000 participants.

Table 1: Graduate Enrolment Projections*

		Academic Year 2025-26	Academic Year 2026-27	Academic Year 2027-28	Academic Year 2028-29	Academic Year 2029-30
EFT Co-op Option Domestic	Year 1	20	40	75	75	90
	Year 2	0	20	40	75	75
EFT Co-op Option International	Year 1	20	40	75	75	90
	Year 2	0	20	40	75	75
EFT Co-op Option Total	Year 1	40	80	150	150	180
	Year 2	0	40	80	150	150

*Steady state in 2030

- Adjust the table as necessary. Show registration in the program and indicate whether the addition of the new field, concentration or option will result in an overall increase in the total number of students or will be accommodated within the existing number of spaces. In either instance, please show the relative proportion of spaces in the proposed field or concentration.
- Below please provide any relevant information or comments on the enrolment projections above (e.g., relationship of field, concentration or option to existing field or concentration, etc.)

Enrolment projection fits within current plans for the MEng (modest but sustained growth of enrolment in next five years).

5. Admission Requirements

- Comment on the relationship of the admission requirements for the field, concentration or option to those of the parent program.
- If the same, describe the program admission requirements.
- If different, describe the field, concentration or option admission requirements; indicate how they are different from those of the parent program, and provide a rationale for the difference in relation to the focus and learning outcomes of the

field or concentration; i.e., how are these admissions requirements suitable to help support the success of students.

- How will these be administered?

Each year, participating graduate units will be offered, by FASE and in consultation with ECC, specific allocations which will define the maximum number of MEng students they can admit into the EFT Co-op Option. These allocations will be proportional to the three-year rolling average of the graduate unit Extended Full-time Option MEng enrolment as it is expected that the demand from applicants will be in proportion to enrolment numbers within a given unit (as opposed to some units facing a disproportionally high number of applicants to the EFT Co-op Option) . It is expected that the size of the allocations will gradually increase over the next five years after the EFT Co-op Option is launched.

As the Co-op option will not be effective before Sept 1, 2025, admissions in the EFT Co-op Option will proceed differently for applicants aiming to start their MEng program in the 2025-2026 academic year compared with the application cycles in the following years. This section first describes the steady-state admission process for applicants planning to start their MEng in the 2026-2027 academic year. The process planned for the first year the EFT Co-op Option will be offered is described at the end of this section.

Prospective students will apply directly to the EFT Co-op Option at the same time they apply to their MEng program. The EFT Co-op Option will have a distinct admissions POSt that applicants can select. The title of the admissions POSt will note that the option includes a co-op requirement, and this title will appear on letters of offer sent to students. The EFT Co-op Option will have the same program length and registration pattern as the existing Extended Full-Time (EFT) Option of the MEng program.

Applicants will start the program in the fall term. Applicants to the EFT Co-op Option who are unsuccessful will be informed that this option will not be available to them before they accept an admission offer to the MEng. The eligibility requirements for prospective students to apply to the EFT Co-op Option will be the same as the parent MEng program of the graduate unit. When the number of eligible applicants exceeds the capacity of the EFT Co-op Option, selection will be based on the same criteria in place in a given unit for the admission process in the parent MEng program.

Applicants selected for the EFT Co-op Option will be issued a letter of offer for the MEng program which will state their admission to the EFT Co-op Option and will cover the details of the requirements that must be met to remain in the EFT Co-op Option (see below). International applicants that are admitted to the EFT Co-op Option will be issued a co-op eligibility letter by the graduate unit (indicating that the work-term is a

program requirement for their degree). The co-op letter will make it possible for them to start an application for a work term permit as soon as possible (a 4-5 month wait time is expected).

MEng students that are admitted in the EFT Co-op Option will have to complete the following requirements in Year 1 of their program, by the beginning of the Winter session, to be allowed to remain in the option:

- Must have completed TEP1701 Navigating Engineering Workplaces (0.5 FCE) and have obtained a passing grade, in the first term (Fall) of their program;
- Must be in good standing in their MEng program.

Students accepted to the EFT Co-op Option must complete a core course TEP1701 Navigating Engineering Workplaces during the first term of their program to be allowed to remain in the EFT Co-op Option (otherwise they will be transferred to the regular Extended Full-Time Option (EFT Option) of the parent MEng program).

MEng students admitted to the EFT Co-op Option may opt out at any point during their MEng program, and transfer to the EFT Option. They will not be able to transfer to either the Full-time or Part-time options of their MEng program. MEng students who are registered in the FT, PT (Part-time), or EFT options of their MEng may not transfer to the EFT Co-op Option during their MEng program.

Students are not guaranteed a work term placement and will automatically be considered to have opted out the EFT Co-op Option if they are not successful in obtaining an eight-month work term. They will then continue in the Extended Full-Time Option of their parent MEng program in their home graduate unit.

Students admitted in the EFT Co-op Option may take graduate courses for credit during their work term only with the knowledge and written approval of their employer.

Exceptionally, students who will be in the EFT Co-op Option during the first year it is offered (2025/26 academic year) will be invited and selected internally from the pool of MEng applicants that have received MEng offers, in each participating unit based on their allocations. The selection will be based on the normal criteria in place in each academic unit when making offers to MEng applicants.

The Engineering Career Centre's (ECC) role in the EFT Co-Op Option will be to provide support for the development of job postings and to run the recruitment cycle including applications and interviews. During the winter terms, ECC will hold events with

employers to provide information about placements to students. During placements, ECC will be responsible for mid-term check-ins, interactions with employers and receiving student assessments from employers. Estimates for students in the option who will not find a placement can be inferred from the PEY Co-op program; it has had a 95% success rate for undergraduate students on work term in 2023/24 and 92% for 2024/25. There might be differences for the graduate student programming given the shorter length of the placements compared with PEY; however ECC will be leveraging current employer relationships to source roles for students in the EFT Co-op Option.

There may be unique implications for international students if they are unable to secure a placement such as making sure they register in at least one course.

6. Program Requirements

- Describe the requirements of the field or concentration. Please comment on the relationship of the requirements of the field, concentration or option to those for the program in general and any other fields or concentrations.
    - Provide, as an appendix, proposed calendar copy (with all changes tracked) including the specific program requirements, required courses, electives and prerequisites.
- Provide as an appendix, where appropriate:
    - A full list of the course numbers and titles, indicating clearly whether they are new or existing. Please note that new courses need to be proposed and approved separately following established Faculty/divisional procedures.

TEP1701 Navigating Engineering Workplaces (0.5 FCE)

TEP1701 is a core course for the EFT Co-op Option and successful completion is a requirement to remain in the option. The course must be taken during the first (i.e. Fall) session of the MEng program for all students in the EFT Co-op Option. Through a combination of lectures, self-paced assignments, and collaborative group discussion, students will engage with their peers to understand course materials (including published literature), explore Canadian workplace contexts, and develop the skillset to conceptually design a narrative of experiential learning. Modules will include topics such as working as a licensed engineer in Canada, project management principles, problem-solving in the workplace, effective engineering communication in the context of the job search process, teamwork and leadership, professional and ethical challenges and strategies, and an introduction to productivity tools and software used in engineering careers. An interwoven component of this course includes both group discussions and reflective writing.

Students who successfully complete TEP1701 will be assigned a dedicated EFT Co-op Option advisor at ECC. This will ensure that students have an enhanced experiential learning experience by building self-awareness, acquiring job search techniques and developing knowledge of the job market. TEP1701 will introduce students to ECC and provide information about the support that students in the EFT Co-op Option will receive for their job search and during their work term.

The core course is aligned with the degree learning expectations (DLEs) of the MEng, with higher expectation in particular for 4. Professional Capacity/Autonomy and 5. Communications Skills (as described in Section 7).

Students admitted in the EFT Co-op Option must successfully complete TEP1701 in order to stay in the program. If they do not successfully complete TEP1701 they will be transferred to the regular EFT Option.

TEP1701 will count for credit (0.5 FCE) and will count as part of the 5.0 FCE (4.5 FCE in ECE). required for the MEng; students can take three to four courses outside of their home unit.

APS 2000 MEng Practicum (0.0 FCE CR/NCR)

The mandatory pre-requisite for this course will be TEP1701 (a proposal to modify APS 2000 is in progress and will come forward in parallel with this major modification). Students will be registered in this course during their mandatory eight-month work term in year 1/year 2 (usually the first summer and second fall session, S1-F2). During their work term, students will remain in contact with their ECC advisor through direct outreach by a staff member to the student (a site visit when possible; otherwise a personal call), and on-line assessments and reflections. At the conclusion of the work experience, students will submit a report describing their experience and reflections of the impact of that experience on their career plans.

The work term (practicum) helps to support students' achievement of the degree learning expectations (DLEs) of the MEng, with particular emphasis on DLEs 4. Professional Capacity/Autonomy and 5. Communications Skills (as described in Section 7).

Research-oriented work terms in academic laboratories will also be eligible activities for the EFT Co-op Option.

See Appendix [A] for the proposed calendar copy.

See Appendix [B] for a full list of the course numbers and titles, indicating whether they are new or existing.

7. Degree-Level Expectations (DLEs), Program Learning Outcomes and Program Structure

- Clearly outline the learning outcomes as they relate to the proposed field or concentration, underlining where these are similar to or different from those for existing fields or concentrations. Indicate the means by which students will satisfy the relevant DLEs.
- Demonstrate the clarity and appropriateness of the program's requirements and associated learning outcomes in addressing the institution's DLEs.

Table 2: Master's DLEs

The proposed EFT Co-op Option is a program design component that provides additional opportunities for students to achieve the FASE MEng degree level expectations (DLEs) and learning objectives. The DLEs are common across all MEng degrees offered at the University of Toronto, although they may be defined differently and/or be satisfied in different activities depending on the discipline. The EFT Co-op Option DLEs are the same as the general MEng DLEs but a subset of DLEs are more strongly represented in the EFT Co-op Option and the higher expectations are satisfied via a combination of a core course (TEP1701) and a work term (APS2000).

Table 2: Master of Engineering DLEs

FASE MASTER OF ENGINEERING (M.Eng.) DEGREE LEVEL EXPECTATIONS (Based on the DLEs approved by the Faculty of Applied Science & Engineering in 2011)	**FASE MASTER OF ENGINEERING (M.Eng.) PROGRAM LEARNING OBJECTIVES AND OUTCOMES**	**HOW THE PROGRAM DESIGN AND REQUIRED ELEMENTS SUPPORT THE ATTAINMENT OF STUDENT LEARNING OUTCOMES** **Specific to the proposed EFT Co-op Option**
EXPECTATIONS: *This Master of Engineering is awarded to Master of Engineering students who have demonstrated:*		
1. Depth and Breadth of Knowledge A systematic understanding of engineering and applied science knowledge including, where appropriate, relevant knowledge outside the field and engineering discipline, and a critical awareness of current problems and/or new insights, much of which is at, or informed by, the forefront of their engineering or applied science discipline.	Depth and breadth of knowledge are defined in the MEng as expertise in at least one field of engineering and an understanding of the challenges of moving engineering projects forward in a working environment. This is reflected in students who are able to: • Apply mathematics, life sciences, physical sciences, and engineering to relevant problems in a specific organization. • Appreciate potentially conflicting interests or	The program design and requirement elements specific to the EFT Co-op Option that ensure these student outcomes for depth and breadth of knowledge are: • Captured in the work term (APS2000) where students will apply their academic knowledge to relevant problems in a specific organization. This will vary substantially from one placement to the other.

FASE MASTER OF ENGINEERING (M.Eng.) DEGREE LEVEL EXPECTATIONS (Based on the DLEs approved by the Faculty of Applied Science & Engineering in 2011)	**FASE MASTER OF ENGINEERING (M.Eng.) PROGRAM LEARNING OBJECTIVES AND OUTCOMES**	**HOW THE PROGRAM DESIGN AND REQUIRED ELEMENTS SUPPORT THE ATTAINMENT OF STUDENT LEARNING OUTCOMES** **Specific to the proposed EFT Co-op Option**
	points of view (clients, technical experts and business persons).	
2. Knowledge of Methodologies A conceptual understanding and methodological competence that: (a) Enables a working comprehension of how established techniques of inquiry are used to interpret knowledge in the discipline. (b) Enables a critical evaluation of current developments in the discipline. (c) Enables a treatment of technical issues and judgments based on established principles and techniques.	Knowledge of Methodologies is defined in the MEng as a conceptual understanding and methodological competence that: • Enables a working comprehension of how experimental methods and data analysis methods can be used for relevant problems in a specific organization. • Enables a critical evaluation of current developments in at least one field of study, and familiarity with viewpoints of experts in other	The program design and requirements specific to the EFT Co-op Option that ensure these student outcomes for knowledge of methodologies are: • Captured in the work term APS2000 where students will apply their academic knowledge of methodologies to solve problems in a specific organization. This will vary substantially from one placement to the other.

FASE MASTER OF ENGINEERING (M.Eng.) DEGREE LEVEL EXPECTATIONS (Based on the DLEs approved by the Faculty of Applied Science & Engineering in 2011)	**FASE MASTER OF ENGINEERING (M.Eng.) PROGRAM LEARNING OBJECTIVES AND OUTCOMES**	**HOW THE PROGRAM DESIGN AND REQUIRED ELEMENTS SUPPORT THE ATTAINMENT OF STUDENT LEARNING OUTCOMES** **Specific to the proposed EFT Co-op Option**
	disciplines. • Enables a treatment of technical issues and judgments based on principles of engineering designs and method of data analysis. This is reflected in students who are able to: • Critically and comprehensively assess a complex problem from the viewpoints of stakeholders. • Distinguish between what is known and what is unknown and subsequently elaborate a plan that will shed light on the unknown.	

FASE MASTER OF ENGINEERING (M.Eng.) DEGREE LEVEL EXPECTATIONS (Based on the DLEs approved by the Faculty of Applied Science & Engineering in 2011)	**FASE MASTER OF ENGINEERING (M.Eng.) PROGRAM LEARNING OBJECTIVES AND OUTCOMES**	**HOW THE PROGRAM DESIGN AND REQUIRED ELEMENTS SUPPORT THE ATTAINMENT OF STUDENT LEARNING OUTCOMES** **Specific to the proposed EFT Co-op Option**
3. Level of Application of Knowledge Competence in the application of an existing body of data in the critical analysis of advanced problems or issues. Here, advanced indicates a difficulty level beyond that encountered at the undergraduate level.	Application of Knowledge is defined in the MEng as ability to identify areas where engineering can be used to innovate and solve problems and develop a plan to achieve this goal. This is reflected in students who are able to: • Proficiently identify, formulate, and solve advanced engineering problems. • Use advanced techniques, skills, and modern engineering tools necessary to develop solutions to relevant problems in a specific organization. • Distinguish between	The program design and requirements specific to the EFT Co-op Option that ensure these student outcomes for level and application of knowledge are: N/A

FASE MASTER OF ENGINEERING (M.Eng.) DEGREE LEVEL EXPECTATIONS (Based on the DLEs approved by the Faculty of Applied Science & Engineering in 2011)	**FASE MASTER OF ENGINEERING (M.Eng.) PROGRAM LEARNING OBJECTIVES AND OUTCOMES**	**HOW THE PROGRAM DESIGN AND REQUIRED ELEMENTS SUPPORT THE ATTAINMENT OF STUDENT LEARNING OUTCOMES** **Specific to the proposed EFT Co-op Option**
	what is known and what is unknown and elaborate a research plan that will shed light on the unknown. • Proficiently design and validate experiments, systems, components or processes to meet desired needs. • Develop a concept based on literature and patent searches, input from experts. • Critically assess a complex problem with opposite and conflicting perspectives.	
4. Professional Capacity/Autonomy (a) The qualities and transferable skills necessary for	Professional Capacity/Autonomy is defined in the MEng as the ability to translate ideas into organizational	The program design and requirements specific to the EFT Co-op Option that ensure these student outcomes for professional capacity/autonomy are: • Complete a core course TEP1701: Navigating Engineering Workplaces

FASE MASTER OF ENGINEERING (M.Eng.) DEGREE LEVEL EXPECTATIONS (Based on the DLEs approved by the Faculty of Applied Science & Engineering in 2011)	**FASE MASTER OF ENGINEERING (M.Eng.) PROGRAM LEARNING OBJECTIVES AND OUTCOMES**	**HOW THE PROGRAM DESIGN AND REQUIRED ELEMENTS SUPPORT THE ATTAINMENT OF STUDENT LEARNING OUTCOMES** **Specific to the proposed EFT Co-op Option**
employment requiring: i. The exercise of initiative and of personal responsibility and accountability. ii. Decision-making in complex situations. (b) The intellectual independence required for continuing professional development. (c) The ethical behaviour consistent with academic integrity and the use of appropriate guidelines and procedures for responsible conduct in a professional context. (d) The ability to participate meaningfully as leaders in society.	realities. This is reflected in students who are able to: • Prepare research papers and practicum reports. • Integrate professional, social, ethical and environmental considerations into their decision analysis. • Display proficient contemporary technical and scientific comprehension and lifelong learning. • Complete the degree requirements in a timely manner. • Demonstrate project	which require students to examine their existing skills, competencies, values and interests and identify the challenges and opportunities best-suited to meet their needs • Engage in practical skills development to support job finding and workplace success based on topics covered in TEP1701 • Independent work outside of the classroom during the work term APS2000. • Evaluation of reflections and work term report in APS2000

FASE MASTER OF ENGINEERING (M.Eng.) DEGREE LEVEL EXPECTATIONS (Based on the DLEs approved by the Faculty of Applied Science & Engineering in 2011)	**FASE MASTER OF ENGINEERING (M.Eng.) PROGRAM LEARNING OBJECTIVES AND OUTCOMES**	**HOW THE PROGRAM DESIGN AND REQUIRED ELEMENTS SUPPORT THE ATTAINMENT OF STUDENT LEARNING OUTCOMES** **Specific to the proposed EFT Co-op Option**
	management skills. • Revise plans and adapt to the unexpected.	
5. Level of Communications Skills The ability to communicate ideas, issues, and conclusions clearly in oral and written form. This includes being capable of constructing a credible argument and presenting it in appropriate formats.	Communications Skills are defined in the MEng as an ability for proficient technical and scientific communication. This is reflected in students who are able to: • Construct a credible argument and present it in appropriate formats. • Generate research and position papers. • Make professional presentations. • Condense complex topics and analyses into simple and easily communicated messages for a	The program design and requirements specific to the EFT Co-op Option that ensure these student outcomes for level of communication skills are: • Complete a core course TEP1701 Navigating Engineering Workplaces which will require students to deliver presentations and participate in group discussions in class using professional communication • Successfully apply and obtain a work term placement • Work term APS2000 report and reflections

FASE MASTER OF ENGINEERING (M.Eng.) DEGREE LEVEL EXPECTATIONS (Based on the DLEs approved by the Faculty of Applied Science & Engineering in 2011)	**FASE MASTER OF ENGINEERING (M.Eng.) PROGRAM LEARNING OBJECTIVES AND OUTCOMES**	**HOW THE PROGRAM DESIGN AND REQUIRED ELEMENTS SUPPORT THE ATTAINMENT OF STUDENT LEARNING OUTCOMES** **Specific to the proposed EFT Co-op Option**
	diverse set of stakeholders.	
6. Awareness of the Limits of Knowledge Cognizance of the complexity of knowledge, its underlying assumptions, and the potential contributions of other interpretations, methods, and disciplines	Limits of Knowledge is defined in the MEng program as cognizance of the complexity of knowledge, its underlying assumptions, and the potential contributions of other interpretations, methods, and disciplines. This is reflected in students who are able to: • Critically assess a complex problem with opposite and conflicting perspectives (engineers, scientists and business persons). • Judge when it is necessary to consult	The program design and requirements specific to the EFT Co-op option that ensure these student outcomes for level of awareness of limits of knowledge are: Mostly N/A, however in the internship report, one of the performance indicators used will be that the student has the ability to reflect on their experience and has identified areas where alternative or better approaches could have been used.

FASE MASTER OF ENGINEERING (M.Eng.) DEGREE LEVEL EXPECTATIONS (Based on the DLEs approved by the Faculty of Applied Science & Engineering in 2011)	**FASE MASTER OF ENGINEERING (M.Eng.) PROGRAM LEARNING OBJECTIVES AND OUTCOMES**	**HOW THE PROGRAM DESIGN AND REQUIRED ELEMENTS SUPPORT THE ATTAINMENT OF STUDENT LEARNING OUTCOMES** **Specific to the proposed EFT Co-op Option**
	experts in specific areas. • Recognize limitations of methods used (in engineering and business, economics). • Envision areas for future work/research, or next steps.	

8. Assessment of Teaching and Learning

- Describe the methods of evaluation for the various program requirements as they relate to the proposed field or concentration.
- Describe how the methods for assessing student achievement are appropriate and effective relative to established program learning outcomes and DLEs (in other words, how will faculty be able to determine whether students have learned and can do what we expect them to by the end of the program).
- Describe how the program document and demonstrate the level of performance of students consistent with the University's DLEs?

For the course TEP1701H Navigating Engineering Workplaces, evaluations will be based on participation (20%), assignments (reflections) and group projects. Best practices in FASE encourage graduate course instructors to provide feedback such as marked assignments or tests before the middle (fifth week) of the term to allow for adjustments or remediation on the part of the students or instructors. All graduate courses are subject to student evaluation at the end of the session. The director of ISTEP, the course instructor, and the Vice Dean Graduate will monitor the evaluations of the TEP1701 course evaluations so that necessary adjustments in course contents and delivery can be made.

The eight-month work term (APS2000) is a critical part of the EFT Co-op Option, intended to provide an opportunity for students to apply the concepts learned and practiced in simulations created in the TEP1701 course, as well as their technical courses taken as MEng requirements to a complex problem related to their field.

For the work term, assessment of students will be in agreement with the University policy on *Assessment of Student Performance in Placements* (Section 7.0). Students will receive a formal statement describing the evaluation process, the field assessors will be informed of the University course policies. Students will prepare an interim and final report that will be evaluated by their practicum supervisor and ECC's advisor. After the interim report, a written assessment of the student's progress along with recommended considerations or changes (as appropriate), will be provided by the supervisor.

The final work term report will be submitted to the work term supervisor and program director within two weeks of completing the work term. Work term supervisors will be asked to complete an evaluation of the student's work at the completion of the work term. The assessment of the student will be based on a rubric that considers how

successfully their work was completed, or whether the student had made significant advances as well as the following performance indicators.

1. The student has displayed expertise in at least one area of engineering
2. Professional Capacity/Autonomy
3. Communication Skills

During the first five years of the EFT Co-op Option, FASE will assess its success by following students closely after graduation and recording employment data. After working a year in industry, graduates will be invited to provide feedback about the option. In addition, employers will be invited to provide feedback about the graduates. If necessary, feedback will be used to adjust the option curriculum to better address the needs of the students and industry.

9. Consultation

- Describe the expected impact of what is being proposed on the nature and quality of the unit's/division's program of study and any impact on other units/divisions.
- Describe any consultation with the Deans of Faculties/divisions that will be implicated or affected by the creation of the proposed field or concentration.

Consultations with faculty in the participating Departments and programs:

From February 2024 to July 2024, there were consultations within a MEng working group composed of the director of ECC, Associate Directors and Associate Chairs graduate studies from all units, including ISTEP, as well as some graduate administrative staff members and an invited guest from the University's Master of Information program. In addition, the proposal was discussed at meetings of Chairs & Directors (C&D) in April and December 2024. During these consultations, participants expressed their support for providing students with a formal pathway to obtain a co-op placement during their MEng program but raised significant concerns related to possible increase in administrative load, the availability of a sufficient number of placements. There was uncertainty around the necessity for a mandatory career management course.

Consultations with Students:

Surveys of students who had participated in the 2019-2020 and 2020-2021 MEng Co-op pilots indicated that most were in favor of a formal, for-credit, co-op pathway in the MEng.

Two focus group sessions with MEng students were organized in December 2024. The feedback from the MEng students was overwhelmingly positive. Students found value in the Fall term mandatory co-op course TEP1701 Navigating Engineering Workplaces and the grading scale (CR/NCR), as the incoming students would need time to acclimate to graduate school and, for some, take time to learn about being in a new country. Feedback included that a course where everyone could meet early would support establishing a community throughout their program, and a CR/NCR would enable them to focus on their other graded courses. Students voiced positive feedback on the following features of the course content: involvement of guest speakers, group-based activities with the opportunity to share back and engage in peer-based learning, and learning how to obtain a PEng. Participants shared that they felt the course allowed learning for students with little industry experience, some industry experience, and those looking to make a career change. Topic areas that the group suggested were important to the co-op preparation included how to prepare application documents, interviews, strategies to understand organizational culture, learning sectorial/industry trends, and ways to identify career aspirations.

Consultations broadly in FASE:

The proposal was discussed in annual meeting of the OPTIONS working group in August 20, 2024 and the feedback was positive; the working group felt that the creation of the Co-op Option was timely.

Consultations and review of calendar entries with individual graduate administrative staff in each participating unit took place in December 2024. The main concerns raised was the structure and requirements of the Co-op option were not entirely flexible; it was also suggested that the selection criteria for admitting students in the Co-op option should be decided at the unit level. This last point was subsequently addressed in the proposal.

Consultations with Employers:

ECC distributed a survey among their employers that included specific questions related to the MEng Co-op structure (December 2024-January 2025, 300 recipients and 31 responses). The results indicated that 59% of employers had plans to hire a UofT MEng Co-op student in the next three years; that most employers prefer longer-term placements (e.g. 12-month placement ranked first while four-month placements ranked last); and that most employers prefer placements that start in May. Moreover, the

survey indicated that it was important for most employers to have a mandatory preparation course such as TEP1701 before the work term, and that it was important or somewhat important to require students to submit a final work term report.

10. Resources

- Describe any resource implications of the change(s) including, but not limited to, faculty complement, space, libraries and enrolment/admissions.
- Specify where this may impact significant enrolment agreements with the Faculty/Provost's office.
- Indicate if the major modification will affect any existing agreements with other institutions or will require the creation of a new agreement to facilitate the major modification (e.g., Memorandum of Understanding, Memorandum of Agreement, etc.). Consult with the Provost's office (vp.academicprograms@utoronto.ca) regarding any implications to existing or new agreements.

An existing data analyst at the Engineering Career Center (ECC) will provide a dashboard to provide real-time information on the number of interviews and placements per areas.

Existing business development staff at ECC can help support the earlier phases of the Co-op Option.

ECC will create one to three positions and hire new staff as the EFT Co-op Options grows over five years.

The Institute for Studies in Transdisciplinary Engineering Education and Practice (ISTEP) will provide administration, delivery (instructor), course development and course evaluation for TEP1701 and APS2000.

No ancillary fees will be charged to students participating in the first year of the EFT Co-op Option; however, subsequently, a new ancillary fees proposal will be submitted based on the cost information collected in the first year. As a reference, the comparable Co-op Option in the Master of Information program charged ancillary fees of $612 for 2023/24.

10.1 Faculty Complement

- Brief statement to provide evidence of the participation of a sufficient number and quality of faculty who will actively participate in the delivery of the program.

- Comment on the expertise of the faculty who will actively support or participate in the field, concentration or option and discuss the role of any adjunct or contractual faculty.
- Comment on the impact of the field, concentration or option on the parent program, focusing on the extent of the diversion of faculty from existing graduate courses and/or supervision.
- Comment on the provision of supervision of experiential learning opportunities, as appropriate.
- If relevant, describe the plan to provide additional faculty resources to support the program.

The proposed Co-op Option addresses the demand of students to complement their technical skills as it is highly valued by potential employers. Therefore, the students who have completed this option will be competitive on the job market in diverse engineering sectors and will have a keen interest in lifelong career development.

The Institute for Studies in Transdisciplinary Engineering Education and Practice (ISTEP) faculty and staff, through existing programming, have significant experience in professional development in curricular and co-curricular activities that will be put to effective use through the delivery of the core course, TEP1701 Navigating Engineering Workplaces. Therefore, ISTEP is uniquely positioned to offer an engineering-focused Career Development course at the graduate level that will be based on the research and teaching expertise of its faculty.

ECC and FASE have considerable experience and resources for supporting students in experiential learning. For forty years, FASE has been offering a 12-16 month Professional Experience Year (PEY) Co-op program which undergraduate students can take as an optional part of their discipline program.

Table 4: Detailed Listing of Committed Faculty

Faculty Name and Rank	Home Unit	Area(s) of Specialization
Chirag Variawa, Associate Professor	Institute for Studies in Transdisciplinary Engineering Education and Practice (ISTEP)	Engineering Education [CI] TEP1701H

10.2 Space/Infrastructure

- Address any unique space/infrastructure requirements including information technology, laboratory space and equipment, etc.

ECC will use its existing job posting platform and space to hold events with employers to support the EFT MEng Co-Op Option.

11. UTQAP and Approvals Process

The UTQAP approvals pathway is summarized in the table below.

Steps	**Approval**
Development/consultation within unit	
Consultation with Dean's office	
Graduate unit approval as appropriate	n/a
VPAP Sign-off	February 11, 2025
Engineering Graduate Education Committee approval	January 29, 2025
Faculty/divisional council	February 24, 2025
Submission to Provost's office	February 2025
Report to AP&P	
Report to Ontario Quality Council	

Appendix A: Calendar Copy

MEng
Emphases:

- Advanced Manufacturing;
- Aerial Robotics;
- Engineering and Globalization;
- Entrepreneurship, Leadership, Innovation and Technology in Engineering (ELITE);
- Robotics;
- Sustainable Aviation (closure pending final approval);
- Sustainable Energy

AEROSPACE SCIENCE AND ENGINEERING MENG

The **Master of Engineering (MEng)** is a course-based program designed to lead to employment in the aerospace industry. Students select from the wide range of UTIAS courses, as well as courses offered by other University of Toronto departments, to create a personalized curriculum. Students can also opt to follow one of several emphases, which provide more concentrated teaching in a specific area, and which are recorded on the student's transcript.

The MEng program can be taken on a full-time, extended full-time, or part-time basis. Transfer between the full-time, extended full-time, and part-time options is not permitted after registration. The default registration is the extended full-time option.

MEng Program (Full-Time and Part-Time Options)

Minimum Admission Requirements

- Applicants are admitted under the General Regulations of the School of Graduate Studies. Applicants must also satisfy UTIAS's additional admission requirements stated below.
- An appropriate bachelor of applied science degree in engineering, or an equivalent four-year degree from a recognized undergraduate engineering program.

Completion Requirements

- **Coursework.** Completion of **5.0 full-course equivalents (FCEs)** (10 half courses) as follows:
    - A minimum of seven half courses (3.5 FCEs) must be technical.
    - A minimum of half the courses must be offered at UTIAS.
    - A maximum of three 500-level courses (1.5 FCEs) is permitted.
    - For part-time students, a maximum of two half courses (1.0 FCE) may be taken in any session and a maximum of four half courses (2.0 FCEs) may be taken in any academic year.
    - Students must achieve at least a B– average to be in good academic standing. Failure in any course taken for credit may result in termination of the student's registration.
    - Students deemed to have insufficient background may be required to complete supplementary coursework in addition to the required 5.0 FCEs. A maximum of 5.5 FCEs may be taken; permission must be granted by the graduate office to exceed 5.0 FCEs.
    - Full-time students must complete all the required courses within three sessions (one year). Part-time students must complete all the required courses within nine sessions (three years).
- Once students are registered, transfer between the full-time, extended full-time, or part-time option is not permitted.
- Students have the option of completing an emphasis in Advanced Manufacturing; Aerial Robotics; Engineering and Globalization; Entrepreneurship, Leadership, Innovation and Technology in Engineering (ELITE); Robotics; Sustainable Aviation; or Sustainable Energy as part of their degree program. Please see details in the Aerospace Science and Engineering Emphases section.

Mode of Delivery: In person
Program Length: 3 sessions full-time (typical registration sequence: FWS); 9 sessions part-time
Time Limit: 3 years full-time; 6 years part-time

MEng Program (Extended Full-Time Option)

Minimum Admission Requirements

- Applicants holding an appropriate bachelor of applied science degree in engineering are considered for admission under the General Regulations of the School of Graduate Studies.
- An appropriate bachelor of applied science degree in engineering, or an equivalent four-year degree from a recognized undergraduate engineering program.

Completion Requirements

- **Coursework.** Students must complete **5.0 full-course equivalents (FCEs)** (10 half courses).
    - A minimum of seven half courses (3.5 FCEs) must be technical.
    - A minimum of half the courses must be offered at UTIAS.
    - A maximum of three 500-level courses (1.5 FCEs) is permitted.
    - A maximum of three half courses (1.5 FCEs) may be taken in any session.
    - A maximum of six half courses (3.0 FCEs) may be taken in any academic year.
    - Students must achieve at least a B– average to be in good academic standing. Failure in any course taken for credit may result in termination of the student's registration.
    - Students deemed to have insufficient background may be required to complete supplementary coursework in addition to the required 5.0 FCEs. A maximum of 5.5 FCEs may be taken; permission must be granted by the graduate office to exceed 5.0 FCEs.
    - Students must complete all the required courses within six sessions (two years).
- Once students are registered, transfer between the full-time, extended full-time, or part-time option is not permitted.
- Students have the option of completing an emphasis in Advanced Manufacturing; Aerial Robotics; Engineering and Globalization; Entrepreneurship, Leadership, Innovation and Technology in Engineering (ELITE); Robotics; Sustainable Aviation; or Sustainable Energy as part of their degree program. Please see details in the Aerospace Science and Engineering Emphases section.

Mode of Delivery: In person
Program Length: 6 sessions full-time (typical registration sequence: FWS-FWS)
Time Limit: 3 years full-time

MEng Program (Extended Full-time Plus Co-op Option)

Minimum Admission Requirements

- Applicants holding an appropriate bachelor of applied science degree in engineering are considered for admission under the General Regulations of the School of Graduate Studies.

An appropriate bachelor of applied science degree in engineering, or an equivalent four-year degree from a recognized undergraduate engineering program.

Completion Requirements

- **Coursework.** Students must complete **5.0 full-course equivalents (FCEs)** (10 half courses)
- Students must complete TEP1701H *Navigating Engineering Workplaces*. The course must be taken in Fall of Year 1.
- Students must also complete APS2000Y MEng Practicum, a mandatory 8-month work term to be taken in the Summer of Year 1 and Fall of Year 2.
- A minimum of seven half courses (3.5 FCEs) must be technical.
- A minimum of half the courses must be offered at UTIAS.
- A maximum of three 500-level courses (1.5 FCEs) is permitted.
- A maximum of three half courses (1.5 FCEs) may be taken in any session.
- A maximum of six half courses (3.0 FCEs) may be taken in any academic year.
- Students must achieve at least a B– average to be in good academic standing. Failure in any course taken for credit may result in termination of the student's registration.
- Students deemed to have insufficient background may be required to complete supplementary coursework in addition to the required 5.0 FCEs. A maximum of 5.5 FCEs may be taken; permission must be granted by the graduate office to exceed 5.0 FCEs.
- Students must complete all the required courses within six sessions (two years).
- After registration, students may not transfer between program options — full-time, extended full-time, extended full-time plus co-op, or part-time — except from extended full-time plus co-op to extended full-time.

- Students have the option of completing an emphasis in Advanced Manufacturing; Aerial Robotics; Engineering and Globalization; Entrepreneurship, Leadership, Innovation and Technology in Engineering (ELITE); Robotics; Sustainable Aviation; or Sustainable Energy as part of their degree program. Please see details in the Aerospace Science and Engineering Emphases section.

Mode of Delivery: In person
Program Length: 6 sessions full-time (typical registration sequence: FWS-FWS)
Time Limit: 3 years full-time

CHEMICAL ENGINEERING AND APPLIED CHEMISTRY MENG

The MEng program is designed for engineers who wish to enhance their career opportunities in as little as one year of full-time study. Students undergo advanced professional training that is respected by employers and differentiates them in a crowded marketplace. The MEng program differs from the MASc and PhD programs in that it is oriented to learning through prescribed courses rather than through research.

The MEng program can be taken on a full-time, extended full-time (EFT), or part-time basis. The part-time option is intended primarily for engineers in full-time professional practice. Students may begin the EFT program at different times.

Full-Time and Part-Time Options

Minimum Admission Requirements

- Applicants are admitted under the General Regulations of the School of Graduate Studies. Applicants must also satisfy the Department of Chemical Engineering and Applied Chemistry's additional admission requirements stated below.
- A Bachelor of Engineering (BEng) or Bachelor of Applied Science (BASc) degree in engineering or physical/chemical/biological sciences with at least a mid-B (or equivalent) in each of the last two years of full-time study.

Completion Requirements

- The MEng program normally requires completion of:
    - a total of 5.0 full-course equivalents (FCEs) **or**
    - 3.5 FCEs plus a 1.5-FCE project supervised by a faculty member. At the discretion of the supervisor, a second reviewer and/or oral defence may be requested for students who plan to enter the doctoral program.
- Full-time students normally complete the requirements in three sessions (one year).
- Part-time students normally complete the requirements in nine sessions (three years). The limit is four half courses per year and two half courses per session.
- Students have the option of completing an emphasis in Advanced Manufacturing; Advanced Soft Materials; Advanced Water Technologies; Biomanufacturing; Data Analytics and Machine Learning; Engineering and Globalization; Entrepreneurship, Leadership, Innovation and Technology in Engineering (ELITE); Environmental Engineering Consulting; Forensic Engineering; or Sustainable Energy as part of their degree program. Please see details in the Chemical Engineering and Applied Chemistry Emphases section.

Mode of Delivery: In person
Program Length: 3 sessions full-time (typical registration sequence: FWS); 9 sessions part-time
Time Limit: 3 years full-time; 6 years part-time

Extended Full-Time Option

Minimum Admission Requirements

- Applicants are admitted under the General Regulations of the School of Graduate Studies. Applicants must also satisfy the Department of Chemical Engineering and Applied Chemistry's additional admission requirements stated below.
- A Bachelor of Engineering (BEng) or Bachelor of Applied Science (BASc) degree in engineering or physical/chemical/biological sciences with at least a mid-B (or equivalent) in each of the last two years of full-time study.

Completion Requirements

- The MEng program normally requires completion of:
    - a total of 5.0 full-course equivalents (FCEs) **or**

    - 3.5 FCEs plus a 1.5-FCE project supervised by a faculty member. At the discretion of the supervisor, a second reviewer and/or oral defence may be requested for students who plan to enter the doctoral program.
- Students are expected to complete the requirements in six sessions (two years). The limit is six half courses per year and three half courses per session.
- Students have the option of completing an emphasis in Advanced Manufacturing; Advanced Soft Materials; Advanced Water Technologies; Biomanufacturing; Data Analytics and Machine Learning; Engineering and Globalization; Entrepreneurship, Leadership, Innovation and Technology in Engineering (ELITE); Environmental Engineering Consulting; Forensic Engineering; or Sustainable Energy as part of their degree program. Please see details in the Chemical Engineering and Applied Chemistry Emphases section.

Mode of Delivery: In person
Program Length: 6 sessions full-time (typical registration sequence: FWS-FWS)
Time Limit: 3 years full-time

MEng Program (Extended Full-time Plus Co-op Option)

Minimum Admission Requirements

- Applicants are admitted under the General Regulations of the School of Graduate Studies. Applicants must also satisfy the Department of Chemical Engineering and Applied Chemistry's additional admission requirements stated below.
- A Bachelor of Engineering (BEng) or Bachelor of Applied Science (BASc) degree in engineering or physical/chemical/biological sciences with at least a mid-B (or equivalent) in each of the last two years of full-time study.

Completion Requirements

- The MEng program normally requires completion of:
    - a total of 5.0 full-course equivalents (FCEs) **or**
    - 3.5 FCEs plus a 1.5-FCE project supervised by a faculty member. At the discretion of the supervisor, a second reviewer and/or oral defence may be requested for students who plan to enter the doctoral program.
- Students must complete TEP1701H *Navigating Engineering Workplaces* as part of the 5.0 FCEs or part of the 3.5 FCEs if a supervised project is completed. The course must be taken in Fall of Year 1.

- Students must also complete APS2000Y *MEng Practicum*, a mandatory 8-month work term to be taken in the Summer of Year 1 and Fall of Year 2.
- Students are expected to complete the requirements in six sessions (two years). The limit is six half courses per year and three half courses per session.
- After registration, students may not transfer between program options — full-time, extended full-time, extended full-time plus co-op, or part-time — except from extended full-time plus co-op to extended full-time.
- Students have the option of completing an emphasis in Advanced Manufacturing; Advanced Soft Materials; Advanced Water Technologies; Biomanufacturing; Data Analytics and Machine Learning; Engineering and Globalization; Entrepreneurship, Leadership, Innovation and Technology in Engineering (ELITE); Environmental Engineering Consulting; Forensic Engineering; or Sustainable Energy as part of their degree program. Please see details in the Chemical Engineering and Applied Chemistry Emphases section.

Mode of Delivery: In person
Program Length: 6 sessions full-time (typical registration sequence: FWS-FWS)
Time Limit: 3 years full-time

CIVIL ENGINEERING MENG

The **Master of Engineering (MEng) program** is course based and intended to provide continuing and advanced education for recent graduates and civil engineers in professional practice. The program can be taken on a full-time, extended full-time, or part-time basis.

MEng Program (Full-Time and Part-Time Options)

Minimum Admission Requirements

- Applicants are admitted under the General Regulations of the School of Graduate Studies. Applicants must also satisfy the Department of Civil and Mineral Engineering's additional admission requirements stated below.
- A completed undergraduate degree equivalent to a four-year University of Toronto program with a minimum final-year grade point average (GPA) of a mid-B (3.0 out of 4.0 or 75%).

- Applicants whose primary language is not English and who graduated from a university where the language of instruction and examination was not English must demonstrate proficiency in English. See General Regulations section 4.3 for requirements.

Completion Requirements

- **Coursework.** Students must complete **5.0 full-course equivalents (FCEs)** (10 half courses), of which up to two half courses (1.0 FCE) may be replaced by a research/design project: CIV1001H or CIV1002Y.
- Part-time students are limited to four half courses per year and two half courses per session. Students normally complete the requirements in nine sessions.
- Students have the option of completing an emphasis in Advanced Water Technologies; Building Science; Concrete; Construction Management; Data Analytics and Machine Learning; Engineering and Globalization; Entrepreneurship, Leadership, Innovation and Technology in Engineering (ELITE); Environmental Engineering; Forensic Engineering; Geomechanics; Structural Engineering; Sustainable Energy; Sustainable Urban Systems; or Transportation Engineering and Planning as part of their degree program. Please see details in the Civil Engineering Emphases section.

Mode of Delivery: In person
Program Length: 3 sessions full-time (typical registration sequence: FWS); 9 sessions part-time
Time Limit: 3 years full-time; 6 years part-time

MEng Program (Extended Full-Time Option)

Minimum Admission Requirements

- Applicants are admitted under the General Regulations of the School of Graduate Studies. Applicants must also satisfy the Department of Civil and Mineral Engineering's additional admission requirements stated below.
- A completed undergraduate degree equivalent to a four-year University of Toronto program with a minimum final-year grade point average (GPA) of a mid-B (3.0 out of 4.0 or 75%).
- Applicants whose primary language is not English and who graduated from a university where the language of instruction and examination was not English

must demonstrate proficiency in English. See General Regulations section 4.3 for requirements.

Completion Requirements

- **Coursework.** Students must complete **5.0 full-course equivalents (FCEs)** (10 half courses), of which up to two half courses (1.0 FCE) may be replaced by a research/design project: CIV1001H or CIV1002Y.
- Students typically complete the requirements in six sessions (two years) and take six half courses per year and three half courses per session.
- Students have the option of completing an emphasis in Advanced Water Technologies; Building Science; Concrete; Construction Management; Data Analytics and Machine Learning; Engineering and Globalization; Entrepreneurship, Leadership, Innovation and Technology in Engineering (ELITE); Environmental Engineering; Forensic Engineering; Geomechanics; Structural Engineering; Sustainable Energy; Sustainable Urban Systems; or Transportation Engineering and Planning as part of their degree program. Please see details in the Civil Engineering Emphases section.

Mode of Delivery: In person
Program Length: 6 sessions full-time (typical registration sequence: FWS-FWS)
Time Limit: 3 years full-time

MEng Program (Extended Full-time Plus Co-op Option)

Minimum Admission Requirements

- Applicants are admitted under the General Regulations of the School of Graduate Studies. Applicants must also satisfy the Department of Civil and Mineral Engineering's additional admission requirements stated below.
- A completed undergraduate degree equivalent to a four-year University of Toronto program with a minimum final-year grade point average (GPA) of a mid-B (3.0 out of 4.0 or 75%).
- Applicants whose primary language is not English and who graduated from a university where the language of instruction and examination was not English must demonstrate proficiency in English. See General Regulations section 4.3 for requirements.

Completion Requirements

- **Coursework.** Students must complete **5.0 full-course equivalents (FCEs)** (10 half courses), of which up to two half courses (1.0 FCE) may be replaced by a research/design project: CIV1001H or CIV1002Y.
- Students must complete TEP1701H *Navigating Engineering Workplaces* as part of the 5.0 FCEs. The course must be taken in the Fall of Year 1.
- Students must also complete APS2000Y *MEng Practicum*, a mandatory 8-month work term to be taken in the Summer of Year 1 and Fall of Year 2.
- Students typically complete the requirements in six sessions (two years) and take six half courses per year and three half courses per session.
- After registration, students may not transfer between program options — full-time, extended full-time, extended full-time plus co-op, or part-time — except from extended full-time plus co-op to extended full-time.
- Students have the option of completing an emphasis in Advanced Water Technologies; Building Science; Concrete; Construction Management; Data Analytics and Machine Learning; Engineering and Globalization; Entrepreneurship, Leadership, Innovation and Technology in Engineering (ELITE); Environmental Engineering; Forensic Engineering; Geomechanics; Structural Engineering; Sustainable Energy; Sustainable Urban Systems; or Transportation Engineering and Planning as part of their degree program. Please see details in the Civil Engineering Emphases section.

Mode of Delivery: In person
Program Length: 6 sessions full-time (typical registration sequence: FWS-FWS)
Time Limit: 3 years full-time

ELECTRICAL AND COMPUTER ENGINEERING MENG

The **Master of Engineering (MEng) program** is designed to provide professional training beyond the undergraduate level and to accelerate careers with specialized engineering expertise needed in business, government, and industry.

The MEng program can be taken on a full-time, extended full-time, or part-time basis.
MEng Program (Full-Time and Part-Time Options)

Minimum Admission Requirements

- Applicants are admitted under the General Regulations of the School of Graduate Studies. Applicants must also satisfy the Department of Electrical and Computer Engineering's additional admission requirements stated below.
- An appropriate bachelor's degree in electrical and computer engineering or its equivalent from a recognized university.
- High academic standing equivalent to a mid-B or better, normally demonstrated by an average grade in the final year or over senior-level courses.

Completion Requirements

- **Coursework.** Normally, completion of **4.5 graduate full-course equivalents (FCEs)** or nine half courses for applicants with adequate undergraduate preparation. At least 2.5 graduate FCEs or five half courses must be drawn from graduate courses offered by the Department of Electrical and Computer Engineering.
- Students may choose to complete an **engineering project** with an equivalent value of 1.5 FCEs. Students choosing the project option will be required to complete a total of 3.0 FCEs in addition to the project. In order to pursue the project option, the student must secure a professor who will act as the supervisor throughout the project.
- Part-time students normally complete the requirements in nine sessions (three years). The limit is four half courses per year and two half courses per session.
- Students have the option of completing an emphasis in Biomedical Engineering; Communications; Computer Engineering; Data Analytics and Machine Learning; Electromagnetics; Electronics; Energy Systems; Engineering and Globalization; Entrepreneurship, Leadership, Innovation and Technology in Engineering (ELITE); Identity, Privacy and Security (IPS); Photonics; Robotics; Sustainable Energy; or Systems Control as part of their degree program. Please see details in the Electrical and Computer Engineering Emphases section.

Mode of Delivery: In person
Program Length: 3 sessions full-time (typical registration sequence: FWS); 9 sessions part-time
Time Limit: 3 years full-time; 6 years part-time

MEng Program (Extended Full-Time Option)

Minimum Admission Requirements

- Applicants are admitted under the General Regulations of the School of Graduate Studies. Applicants must also satisfy the Department of Electrical and Computer Engineering's additional admission requirements stated below.
- An appropriate bachelor's degree in electrical and computer engineering or its equivalent from a recognized university.
- High academic standing equivalent to a mid-B or better, normally demonstrated by an average grade in the final year or over senior-level courses.

Completion Requirements

- **Coursework.** Normally, completion of **4.5 graduate full-course equivalents (FCEs)** or nine half courses for applicants with adequate undergraduate preparation. At least 2.5 graduate FCEs or five half courses must be drawn from graduate courses offered by the Department of Electrical and Computer Engineering.
- Students may choose to complete an **engineering project** with an equivalent value of 1.5 FCEs. Students choosing the project option will be required to complete a total of 3.0 FCEs in addition to the project. In order to pursue the project option, the student must secure a professor who will act as the supervisor throughout the project.
- Students are expected to complete the requirements in six sessions (two years). The limit is six half courses per year and three half courses per session.
- Students have the option of completing an emphasis in Biomedical Engineering; Communications; Computer Engineering; Data Analytics and Machine Learning; Electromagnetics; Electronics; Energy Systems; Engineering and Globalization; Entrepreneurship, Leadership, Innovation and Technology in Engineering (ELITE); Identity, Privacy and Security (IPS); Photonics; Robotics; Sustainable Energy; or Systems Control as part of their degree program. Please see details in the Electrical and Computer Engineering Emphases section.

Mode of Delivery: In person
Program Length: 6 sessions full-time (typical registration sequence: FWS-FWS)
Time Limit: 3 years full-time

MEng Program (Extended Full-time Plus Co-op Option)

Minimum Admission Requirements

- Applicants are admitted under the General Regulations of the School of Graduate Studies. Applicants must also satisfy the Department of Electrical and Computer Engineering's additional admission requirements stated below.
- An appropriate bachelor's degree in electrical and computer engineering or its equivalent from a recognized university.
- High academic standing equivalent to a mid-B or better, normally demonstrated by an average grade in the final year or over senior-level courses.

Completion Requirements

- **Coursework.** Normally, completion of **4.5 graduate full-course equivalents (FCEs)** or nine half courses for applicants with adequate undergraduate preparation. At least 2.5 graduate FCEs or five half courses must be drawn from graduate courses offered by the Department of Electrical and Computer Engineering.
- Students must complete TEP1701H *Navigating Engineering Workplaces* as part of the 4.5 FCEs. The course must be taken in the Fall of Year 1.
- Students must also complete APS2000Y *MEng Practicum*, a mandatory 8-month work term to be taken in the Summer of Year 1 and Fall of Year 2.
- Students may choose to complete an **engineering project** with an equivalent value of 1.5 FCEs. Students choosing the project option will be required to complete a total of 3.0 FCEs in addition to the project. In order to pursue the project option, the student must secure a professor who will act as the supervisor throughout the project.
    - If choosing to complete an engineering project, students must complete TEP1701H *Navigating Engineering Workplaces* as part of the 3.0 FCEs. The course must be taken in the Fall of Year 1.
- Students must also complete APS2000Y *MEng Practicum*, a mandatory 8-month work term to be taken in the Summer of Year 1 and Fall of Year 2.
- Students are expected to complete the requirements in six sessions (two years). The limit is six half courses per year and three half courses per session.
- After registration, students may not transfer between program options — full-time, extended full-time, extended full-time plus co-op, or part-time — except from extended full-time plus co-op to extended full-time.
- Students have the option of completing an emphasis in Biomedical Engineering; Communications; Computer Engineering; Data Analytics and Machine Learning;

Electromagnetics; Electronics; Energy Systems; Engineering and Globalization; Entrepreneurship, Leadership, Innovation and Technology in Engineering (ELITE); Identity, Privacy and Security (IPS); Photonics; Robotics; Sustainable Energy; or Systems Control as part of their degree program. Please see details in the Electrical and Computer Engineering Emphases section.

Mode of Delivery: In person
Program Length: 6 sessions full-time (typical registration sequence: FWS-FWS)
Time Limit: 3 years full-time

MATERIALS SCIENCE AND ENGINEERING MENG

The **Master of Engineering (MEng)** program has been developed for recent graduates who wish to pursue graduate-level studies but may not be interested in continuing to the PhD program. This program is also intended for working engineers who wish to augment their current knowledge and add to their credentials. The multidisciplinary nature of materials engineering and the coursework-only and coursework-plus-project options enable students to build personalized programs which best suit their individual interests and needs. The MSE MEng is recognized and respected by employers globally and can enhance and enrich the career opportunities of graduates.

The MEng program can be taken on a full-time, extended full-time, or part-time basis.
MEng Program (Full-Time and Part-Time Options)

Minimum Admission Requirements

- Applicants are admitted under the General Regulations of the School of Graduate Studies. Applicants must also satisfy the Department of Materials Science and Engineering's additional admission requirements stated below.
- For students whose primary language is not English, the department requires a Test of English as a Foreign Language (TOEFL) with the following minimum scores:
    - Paper-based TOEFL: minimum score of 580 and 4 on the Test of Written English (TWE)
    - Internet-based TOEFL: minimum score of 93/120 and 22/30 on the writing and speaking sections.

Completion Requirements

- For students with adequate undergraduate preparation, the normal program will include **5.0 full-course equivalents (FCEs)** (10 half courses). A project may be substituted for 1.5 FCEs (3 half courses). Students enrolled in this option work in consultation with a professor who acts as advisor for the project undertaken. An oral presentation of the project may be required.
- Full-time students normally complete the requirements in three sessions (one year).
- Part-time students normally complete the requirements in nine sessions (three years). The limit is four half courses per year and two half courses per session.
- Full-time MEng students may transfer to the research-stream MASc program if they meet all of the following criteria:
    - The request to transfer must be submitted at the beginning of the second session of enrolment. For example, students enrolled in September must successfully complete 1.5 FCEs (three half courses), technical courses of which at least one must be from MSE, with a B+ or 78% average. The technical courses taken during the MEng program will be credited toward the MASc program.
    - Have a supervisor who is willing to provide funding for an MASc research project starting in the second session of enrolment.
- Students have the option of completing an emphasis in Advanced Manufacturing; Advanced Soft Materials; Advanced Water Technologies; Biomanufacturing; Data Analytics and Machine Learning; Engineering and Globalization; Entrepreneurship, Leadership, Innovation and Technology in Engineering (ELITE); Forensic Engineering; or Sustainable Energy as part of their degree program. Please see details in the Materials Science and Engineering Emphases section.

Mode of Delivery: In person
Program Length: 3 sessions full-time (typical registration sequence: FWS); 9 sessions part-time
Time Limit: 3 years full-time; 6 years part-time

MEng Program (Extended Full-Time Option)

Minimum Admission Requirements

- Applicants are admitted under the General Regulations of the School of Graduate Studies. Applicants must also satisfy the Department of Materials Science and Engineering's additional admission requirements stated below.
- For students whose primary language is not English, the department requires a Test of English as a Foreign Language (TOEFL) with the following minimum scores:
    - Paper-based TOEFL: minimum score of 580 and 4 on the Test of Written English (TWE)
    - Internet-based TOEFL: minimum score of 93/120 and 22/30 on the writing and speaking sections.

Completion Requirements

- For students with adequate undergraduate preparation, the normal program will include **5.0 full-course equivalents (FCEs) (10 half courses)**. A project may be substituted for 1.5 FCEs (3 half courses). Students enrolled in this option work in consultation with a professor who acts as advisor for the project undertaken. An oral presentation of the project may be required.
- Students are expected to complete the requirements in six sessions (two years). The limit is six half courses per year and three half courses per session.
- Full-time MEng students may transfer to the research-stream MASc program if they meet all of the following criteria:
    - The request to transfer must be submitted at the beginning of the second session of enrolment. For example, students enrolled in September must successfully complete 1.5 FCEs (three half courses), technical courses of which at least one must be from MSE, with a B+ or 78% average. The technical courses taken during the MEng program will be credited toward the MASc program.
    - Have a supervisor who is willing to provide funding for an MASc research project starting in the second session of enrolment.
- Students have the option of completing an emphasis in Advanced Manufacturing; Advanced Soft Materials; Advanced Water Technologies; Biomanufacturing; Data Analytics and Machine Learning; Engineering and Globalization; Entrepreneurship, Leadership, Innovation and Technology in Engineering (ELITE); Forensic Engineering; or Sustainable Energy as part of their degree program. Please see details in the Materials Science and Engineering Emphases section.

Mode of Delivery: In person
Program Length: 6 sessions full-time (typical registration sequence: FWS-FWS)
Time Limit: 3 years full-time

MEng Program (Extended Full-time Plus Co-op Option)

Minimum Admission Requirements

- Applicants are admitted under the General Regulations of the School of Graduate Studies. Applicants must also satisfy the Department of Materials Science and Engineering's additional admission requirements stated below.
- For students whose primary language is not English, the department requires a Test of English as a Foreign Language (TOEFL) with the following minimum scores:
    - Paper-based TOEFL: minimum score of 580 and 4 on the Test of Written English (TWE)
    - Internet-based TOEFL: minimum score of 93/120 and 22/30 on the writing and speaking sections.

Completion Requirements

- For students with adequate undergraduate preparation, the normal program will include **5.0 full-course equivalents (FCEs) (10 half courses)**. A project may be substituted for 1.5 FCEs (3 half courses). Students enrolled in this option work in consultation with a professor who acts as advisor for the project undertaken. An oral presentation of the project may be required.
- Students must complete TEP1701H *Navigating Engineering Workplaces* as part of the 5.0 FCEs or part of the 3.5 FCEs if completing a project. The course must be taken in the Fall of Year 1.
- Students must also complete APS2000Y *MEng Practicum*, a mandatory 8-month work term to be taken in the Summer of Year 1 and Fall of Year 2.
- Students are expected to complete the requirements in six sessions (two years). The limit is six half courses per year and three half courses per session.
- After registration, students may not transfer between program options — full-time, extended full-time, extended full-time plus co-op, or part-time — except from extended full-time plus co-op to extended full-time.
- Students have the option of completing an emphasis in Advanced Manufacturing; Advanced Soft Materials; Advanced Water Technologies;

Biomanufacturing; Data Analytics and Machine Learning; Engineering and Globalization; Entrepreneurship, Leadership, Innovation and Technology in Engineering (ELITE); Forensic Engineering; or Sustainable Energy as part of their degree program. Please see details in the Materials Science and Engineering Emphases section.

Mode of Delivery: In person
Program Length: 6 sessions full-time (typical registration sequence: FWS-FWS)
Time Limit: 3 years full-time

MECHANICAL AND INDUSTRIAL ENGINEERING MENG

The **Master of Engineering (MEng)** degree program is designed for students preparing for advanced professional activity; it is not a research-oriented degree. The program may be taken on a full-time, extended full-time, or part-time basis.

MEng Program (Full-Time and Part-Time Options)

Minimum Admission Requirements

- Applicants are admitted under the General Regulations of the School of Graduate Studies. Applicants must also satisfy the Department of Mechanical and Industrial Engineering's additional admission requirements stated below.
- A mid-B in the final two years of undergraduate study.

Completion Requirements

- Students must successfully complete a total of **5.0 full-course equivalents (FCEs) or 3.5 FCEs plus a supervised project**. A majority of the courses must be either offered by the Department of MIE or from a list (found on the department's website) of approved courses deemed equivalent to an MIE course.
- Program completion is possible in three sessions (one year).
- Part-time students are limited to four half courses per year and two half courses per session. Time to completion will be greater than two years.
- Students in the MEng program have the option of completing an emphasis in Advanced Manufacturing; Biomanufacturing; Data Analytics and Machine Learning; Engineering and Globalization; Entrepreneurship, Leadership, Innovation and Technology in Engineering (ELITE); Forensic Engineering;

Robotics; or Sustainable Energy as part of their degree program. Please see details in the Mechanical and Industrial Engineering Emphases section.

Mode of Delivery: In person
Program Length: 3 sessions full-time (typical registration sequence: FWS); 9 sessions part-time
Time Limit: 3 years full-time; 6 years part-time

MEng Program (Extended Full-Time Option)

Minimum Admission Requirements

- Applicants are admitted under the General Regulations of the School of Graduate Studies. Applicants must also satisfy the Department of Mechanical and Industrial Engineering's additional admission requirement stated below.
- A mid-B in the final two years of undergraduate study.

Completion Requirements

- Students must successfully complete a total of **5.0 full-course equivalents (FCEs) or 3.5 FCEs plus a supervised project.** A majority of the courses must be either offered by the Department of MIE or from a list (found on the department's website) of approved courses deemed equivalent to an MIE course.
- Students are expected to complete the requirements in six sessions (two years). They are limited to seven half courses per year and three half courses per session.
- Students in the MEng program have the option of completing an emphasis in Advanced Manufacturing; Biomanufacturing; Data Analytics and Machine Learning; Engineering and Globalization; Entrepreneurship, Leadership, Innovation and Technology in Engineering (ELITE); Forensic Engineering; Robotics; or Sustainable Energy as part of their degree program. Please see details in the Mechanical and Industrial Engineering Emphases section.

Mode of Delivery: In person
Program Length: 6 sessions full-time (typical registration sequence: FWS-FWS)
Time Limit: 3 years full-time

MEng Program (Extended Full-time Plus Co-op Option)

Minimum Admission Requirements

- Applicants are admitted under the General Regulations of the School of Graduate Studies. Applicants must also satisfy the Department of Mechanical and Industrial Engineering's additional admission requirement stated below.
- A mid-B in the final two years of undergraduate study.

Completion Requirements

- Students must successfully complete a total of **5.0 full-course equivalents (FCEs) or 3.5 FCEs plus a supervised project.** A majority of the courses must be either offered by the Department of MIE or from a list (found on the department's website) of approved courses deemed equivalent to an MIE course.
- Students must complete TEP1701H *Navigating Engineering Workplaces* as part of the 5.0 FCEs or part of the 3.5 FCEs if completing a supervised project. The course must be taken in the Fall of Year 1.
- Students must also complete APS2000Y *MEng Practicum*, a mandatory 8-month work term to be taken in the Summer of Year 1 and Fall of Year 2.
- Students are expected to complete the requirements in six sessions (two years). They are limited to seven half courses per year and three half courses per session.
- After registration, students may not transfer between program options — full-time, extended full-time, extended full-time plus co-op, or part-time — except from extended full-time plus co-op to extended full-time.
- Students in the MEng program have the option of completing an emphasis in Advanced Manufacturing; Biomanufacturing; Data Analytics and Machine Learning; Engineering and Globalization; Entrepreneurship, Leadership, Innovation and Technology in Engineering (ELITE); Forensic Engineering; Robotics; or Sustainable Energy as part of their degree program. Please see details in the Mechanical and Industrial Engineering Emphases section.

Mode of Delivery: In person
Program Length: 6 sessions full-time (typical registration sequence: FWS-FWS)
Time Limit: 3 years full-time

Appendix B: List of Courses

TEP1070H: Navigating Engineering Workplaces (approved February 2024)
The field of engineering is moving at a rapid pace, driven by advancements in technology, innovation, and global challenges. Coupling in-class learning with practical experience is demonstrated to be an invaluable tool in preparation for a professional career in engineering. In this graduate-level course, the emphasis is on students to gain a comprehensive understanding of engineering workplace strategies before diving into their co-op term and building a personal legacy on authentic engineering education experiences. Through a combination of lectures, self-paced assignments, and collaborative group discussion, students will engage with their peers to understand course materials (including published literature), explore Canadian workplace contexts, and develop the skillset to conceptually design a narrative of experiential learning.

APS2000Y: Engineering Practicum (existing course, modification pending approval)
Existing 0.0 FCE (CR/NCR) course which modification is pending approval. The modifications will include adding TEP1070 as a pre-requisite, a revised assessment plan, APS to TEP prefix substitution and a two-term duration. The assessment plan will include a mid-term assessment based on an interim report and the final assessment will be based on written self-reflection and employer evaluation.