UNIVERSITY OF WATERLOO | Senate

Senate Graduate Council

Open Session

November 2, 2026

10:00 a.m. - 11:30 a.m.

Needles Hall

NH 3318

Waterloo Campus

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UNIVERSITY OF WATERLOO | Senate

2026 11 02 Senate Graduate Council Meeting Book

AGENDA

	1. Governance Resources		
	1.1. Link to Governance Resources		
10:00 a.m.	2. Approval of the Agenda		
	2.1. Conflict of Interest		
	2.2. Approval of the Agenda and Consent Items	Decision	3
	2.3. Business Arising from the Minutes	Information	
	3. Consent Agenda		
	3.1. Minutes of September 15, 2026 Meeting	Decision	4
	3.2. Curricular Submissions		
	3.2.1. Faculty of Engineering	Decision	7
	3.2.2. Faculty of Environment	Decision	248
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	3.3. Graduate Awards and Scholarships	Information	335
	4. Regular Agenda		
10:05 a.m.	5. Chair's Remarks [Wan]		
	5.1. Opening Remarks from the Chair	Information	337
10:15 a.m.	6. Curricular Submissions	Decision	
	6.1. Faculty of Engineering	Decision	338
	6.2. Faculty of Environment	Decision	369
10:30 a.m.	7. Foreign Influence Transparency and Accountability Act and Research Security [Dean]		
	7.1. FITAA and Research Security	Discussion	376
10:55 a.m.	8. Teaching Support and Innovation Unit [Ellis and Taraban-Gordon]		
	8.1. TSI Support for Graduate Studies	Information	394
11:20 a.m.	9. Items Removed from the Consent Agenda		
11:25 a.m.	10. Other Business		
11:30 a.m.	11. Adjournment		

The next SGC meeting will be held on December 15, 2026.

UNIVERSITY OF WATERLOO | Senate

For Approval **Open Session**

To:	Senate Graduate Council
From:	Tony Kongly Governance Officer
Date of Meeting:	November 2, 2026
Agenda Item:	**2. Approval of the Agenda**

2.1. Conflict of Interest

Members are invited to declare any conflicts related to the open session agenda at this time. Should a conflict of interest arise during discussion, members are asked to declare a conflict of interest as it arises. Information and guidance on conflicts of interest is provided on the Secretariat website.

The Secretariat can provide guidance regarding potential conflicts of interest in advance of or during the meeting.

2.2. Approval of the Agenda and Approval of the Consent Agenda

Motion: To approve the agenda as presented/amended, and to approve or receive for information the items on the consent agenda, listed as items 3.1 – 3.3.

Members wishing to have an item removed from consent to the regular agenda are asked to contact the Secretariat in advance of the meeting. Members may also request to have items moved to the regular agenda immediately prior to the approval of the agenda.

2.3. Business Arising from the Minutes

None.

University of Waterloo
SENATE GRADUATE COUNCIL
Minutes of the September 15, 2026 Meeting

Present: Mike Beazley, Steven Bednarski, Adna Bliek, Helen Chen, Barbara Csima, Stephanie Denison, Sanniv Ganguly, Martin Karsten, Tony Kongly [Secretary], Brian Laird, Heather Mair, Beth Namachchivaya, Christopher Nielsen, Marcel O'Gorman, Brad Pomeroy, Ian Rowlands, Michelle Rutty, Geetam Saha, Meray Sadek, Justin Wan [Chair], Clarence Woudsma, Chris Yakymchuk

Resources/Guests: Tawnessa Carter, Trevor Clews, Jennifer Coghlin, Diana Goncalves, Urs Hengartner, Brian Ingalls, Deborah Kraft, Carrie MacKinnon Molson, Marianne Simm, Richard Wikkerink

Regrets: Charmaine Dean, Rob de Loë, Thomas Duever, Tizazu Mekonnen, Bill Rosehart, En-Hui Yang

Organization of Meeting: Justin Wan took the chair and Tony Kongly acted as secretary. The secretary advised that a quorum was present.

1. Governance Resources
This item was provided for information only.

2. Approval of Agenda
Council heard a motion to approve or receive for information the items of the consent agenda. Sadek and Woudsma. Carried.

2.1. Conflict of Interest
Chen declared a conflict of interest with approval of the consent agenda for item 3.2.2. and was advised not to enter into debate nor vote upon the specified item.

2.2. Approval of the Agenda and Consent Items
The Chair advised that the order of the agenda will be amended. Council approved the agenda as amended.

2.3. Business Arising from the Minutes
There was no business arising from the minutes.

3. Consent Agenda

3.1. Minutes of the September 15, 2026 Meeting
Council approved the minutes of the meeting as distributed.

3.2. Curricular Submissions
Council approved all curricular submissions items 3.2.1. – 3.2.3. on behalf of Senate.

3.3. Graduate Awards and Scholarships
Council received for information and approved all new awards and scholarships.

4. Regular Agenda

5. Chair's Remarks
The Chair offered opening remarks including a welcome to new and returning members of the Senate Graduate Council. The Chair congratulated faculty members and graduate students on their recent achievements and awards.

6. Introduction and Orientation
Roundtable introductions were made. The Chair provided an overview of the scope and mandate of the Senate Graduate Council, as well as the role of each member. The Terms of Reference for the Senate Graduate Council was reviewed.

7. AQuE Membership
The Chair provided an overview of the Academic Quality Enhancement Committee and asked three members of the Senate Graduate Council to participate on this committee.

A motion was heard to recommend that Senate approves Bradley Pomeroy, Christopher Nielsen, and Mike Beazley to serve on the Academic Quality Enhancement Committee for a term of two years. O'Gorman and Csima. Carried.

8. Waterloo Business
Weber provided a presentation about Waterloo Business, which is intended to strengthen University of Waterloo's overall business identity, improve coordination among existing business activities, and explore opportunities for new business programs. The initiative will not create a new faculty or change existing organizational reporting structures. Key discussion from council members focused on the potential development of new programs, employment opportunities for business graduates, and enhanced promotion and marketing of existing business programs.

9. Curricular Submissions

9.1. Faculty of Arts (Graduate Diploma in Accounting)
Pomeroy spoke to the new Graduate Diploma in Accounting program in the School of Accounting and Finance, which is intended to provide a shorter and lower-cost pathway alongside the existing Master of Accounting (MAcc) program and aligns with new requirements for the Chartered Professional Accountant (CPA) designation. The proposed program consists of five graduate-level courses, and it was designed as a professional program. Discussions from members included clarification on course requirements and differences between the Graduate Diploma in Accounting and Master of Accounting programs.

A motion was heard to recommend that Senate approves the creation of a Graduate Diploma in Accounting within the Faculty of Arts, effective May 1, 2027, as presented. Pomeroy and Nielsen. Carried.

9.2. Faculty of Health
Laird presented the major modifications from the Faculty of Health. A new graduate research field in Health and Behaviour for the Kinesiology and Health Sciences programs was proposed following consultation with graduate students. Discussions focused on the courses required for the proposed graduate research field.

A motion was heard to recommend that Senate approves the major modifications to the Doctor of Philosophy (PhD) in Kinesiology and Health Sciences and the Master of Science (MSc) in Kinesiology and Health Sciences programs for the Faculty of Health, effective January 1, 2027, as presented. Laird and Beazley. Carried.

9.3. Faculty of Mathematics (Master of Cybersecurity and Privacy)
Csima provided an overview of the new Master of Cybersecurity and Privacy program in the Faculty of Mathematics, which includes a co-op option. The degree requirements include nine graduate courses relevant to cybersecurity and privacy and an ethics workshop. The proposed program aims to provide students with the theoretical and practical knowledge required for obtaining a cybersecurity position in industry or the public sector. Discussions from council members focused on the co-op requirements for the proposed program.

A motion was heard to recommend that Senate approves the creation of a Master of Cybersecurity

and Privacy (MCP) program within the Faculty of Mathematics, effective September 1, 2027, as presented. Csima and Karsten. Carried.

10. New Program Approval Process
Cooke spoke to the new program approval process aimed at strengthening strategic oversight and ensuring that institutional considerations are assessed earlier in the process. The updated process introduces a new advisory committee, earlier Provost involvement, two annual intake periods, and opportunities for proposers to present their proposals. Potential changes to the Institutional Quality Assurance Process (IQAP) would also streamline governance approval by reducing the number of faculty- and unit-level approval stages before proposals reach Senate Undergraduate Council, Senate Graduate Council, and Senate. Key discussion points included the membership composition of the new Academic Programs Advisory Committee and the role of Strategic Enrollment Management in the new program approval process.

11. Academic Calendar Dates for 2027-2028
Coghlin provided a presentation about the Academic Calendar updates for 2027-2028. There were three editorial changes, including an updated co-op work-term end date, clarification about the Easter holiday, and a spelling correction.

A motion was heard to recommend that Senate approves the 2027-2028 academic calendar dates and guidelines for determining academic dates, as amended. Yakymchuk and Beazley. Carried

12. Items Removed from the Consent Agenda
No item was removed from the consent agenda.

13. Other Business
No other items of business were identified.

14. Adjournment
The next meeting of the Senate Graduate Council will be held November 2, 2026.

UNIVERSITY OF WATERLOO | Senate

For Approval **Open Session - Consent**

To:	Senate Graduate Council
From:	Christopher Nielsen Associate Dean, Graduate Studies
Date of Meeting:	November 2, 2026
Agenda Item:	**3.2.1. Faculty of Engineering**

Recommendation/Motion

To recommend that Senate Graduate Council approve, through its consent agenda, the submitted new graduate courses, the deletion of graduate courses, and proposed minor modifications to existing graduate courses and programs for the Faculty of Engineering, effective January 1, 2027, as presented.

Jurisdictional Information

As outlined in the council's Terms and Reference, Senate Graduate Council is empowered to make recommendation and approvals on behalf of Senate for a variety of matters:

- On behalf of Senate, consider and approve all new graduate courses, the deletion of graduate courses, and proposed minor modifications to existing graduate courses and programs, and provide Senate with a brief summary of Council's deliberations in this regard.

Governance Path

Senate Graduate Council: November 2, 2026

Date 2026/10/22

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Meeting Information

Agenda Page Title
SGC - Faculty of Engineering - Consent Agenda - November 2, 2026

Career Level
Graduate,

Faculty/Unit
Engineering

Date
2026-11-02

Summary

Course Proposals:

1) Architecture:

a. *4 course revisions*

2) Chemical Engineering:

a. *1 course being inactivated*
b. *3 course revisions*
c. *1 new course*

3) Electrical and Computer Engineering:

a. *11 course revisions*

4) Management Science and Engineering:

a. *1 new course*

5) Mechanical and Mechatronics Engineering:

a. 12 *courses being inactivated*

6) Systems Design Engineering:

a. *2 new courses*

Program Proposals:

1) Architecture:
1.1) Master of Architecture (MArch)
1.2) Master of Architecture (MArch) - Water

a. *Updating the admission requirements and degree requirements to reflect current practice.*

1.3) Master of Architecture (MArch) - Co-operative Program

a. *Updating the admission requirements and degree requirements to reflect current practice.*
b. *Replacing the Department supported "Graduate Studies Work Report" milestone with the CEE supported "Graduate WIL Reflective Report" milestone.*

1.4) Master of Architecture (MArch) - Water - Co-operative Program (attached)

a. *Adding a direct entry Co-operative program/option to the MArch - Water program.*

2) Chemical Engineering:

2.1) PhD in Chemical Engineering

2.2) PhD in Chemical Engineering - Nanotechnology
2.3) PhD in Chemical Engineering - Water
2.4) MASc in Chemical Engineering
2.5) MASc in Chemical Engineering - Nanotechnology
2.6) MASc in Chemical Engineering - Water
2.7) MEng in Chemical Engineering - Health Technologies - Co-operative Program

a. *Updating the admission and degree requirements to align with current practice and to articulate the requirements of the program more clearly. The intention is to provide greater clarity for students and to remove wording that already appears in the Faculty and University regulations.*

2.8) MEng in Chemical Engineering
2.9) MEng in Chemical Engineering - Co-operative Program

a. *Updating the admission and degree requirements to align with current practice and to articulate the requirements of the program more clearly. The intention is to provide greater clarity for students and to remove wording that already appears in the Faculty and University regulations.*
b. *Adding an elective course to the list of courses associated with the Graduate Specialization in Polymer Science and Engineering and the Graduate Specialization in Process Systems Engineering.*

3) Electrical and Computer Engineering:

3.1) MEng in Electrical and Computer Engineering
3.2) MEng in Electrical and Computer Engineering - Co-operative Program

a. *Updating the list of courses associated with the Graduate Specialization in Sustainable Energy.*

4) Systems Design Engineering:

4.1) MASc in Systems Design Engineering
4.2) MASc in Systems Design Engineering - Aeronautics
4.3) MASc in Systems Design Engineering - Nanotechnology

a. *Adding a Master's Thesis Proposal milestone to the degree requirements.*

4.4) MEng in Systems Design Engineering

a. *Replacing SYDE 544 Biomed Measure & SIP with BME 544 Biomedical Measurement and Signal Processing in the list of courses associated with the Graduate Specializations in "Biomedical Systems" and "Vision, Image and Signal Processing". Removing courses from the Graduate Specialization course lists that are no longer offered.*

Attachment(s)

- MArch - Water - Co-op - graduate_studies_program_revision_template - Reviewed by GSPA-ADG.pdf
- CEE Review - Master of Architecture_Water_AB_MP.pdf

Course Proposals

Courses: Retire

Code	Title	Type	Workflow Step
CHE 650	Engineering Work-term Experience Report	Courses	SGC, Senate Graduate Council (SGC)
ME 645	Metallurgy and Plasticity in Metalworking	Courses	SGC, Senate Graduate Council (SGC)
ME 648	Surface Modelling in Machining	Courses	SGC, Senate Graduate Council (SGC)
ME 709	Control Engineering and Mechanical Systems	Courses	SGC, Senate Graduate Council (SGC)
ME 711	Non-Linear Vibrations	Courses	SGC, Senate Graduate Council (SGC)
ME 722	Topics in Pressure Vessel Design	Courses	SGC, Senate Graduate Council (SGC)
ME 737	Microstructural Engineering Topics	Courses	SGC, Senate Graduate Council (SGC)
ME 741	Design of Intelligent Systems: Mechatronics	Courses	SGC, Senate Graduate Council (SGC)
ME 742	Modelling and Control of Dynamic Systems	Courses	SGC, Senate Graduate Council (SGC)
ME 743	Modal Analysis and Modelling	Courses	SGC, Senate Graduate Council (SGC)
ME 745	Quality Assurance and Reliability in Manufacturing	Courses	SGC, Senate Graduate Council (SGC)
ME 747	Topics in Manufacturing	Courses	SGC, Senate Graduate Council (SGC)

ME 762	Turbulent Diffusion in the Natural Environment	Courses	SGC, Senate Graduate Council (SGC)

Courses: New

Code	Title	Type	Workflow Step
CHE 643	Nanocomposites	Courses	SGC, Senate Graduate Council (SGC)
MSE 699	Master of Management Science Design Project	Courses	SGC, Senate Graduate Council (SGC)
SYDE 639	Energy Sustainability	Courses	SGC, Senate Graduate Council (SGC)
SYDE 685	Biomedical and Environmental Sensors	Courses	SGC, Senate Graduate Council (SGC)

Courses: Changes

Code	Title	Type	Workflow Step
ARCH 690	Design Studio	Courses	SGC, Senate Graduate Council (SGC)
ARCH 691	Design Studio - Comprehensive Building Design	Courses	SGC, Senate Graduate Council (SGC)
ARCH 692	Thesis Research and Design Studio I	Courses	SGC, Senate Graduate Council (SGC)
ARCH 693	Thesis Research & Design Studio II	Courses	SGC, Senate Graduate Council (SGC)
CHE 612	Interfacial Phenomena	Courses	SGC, Senate Graduate Council (SGC)
CHE 620	Applied Engineering Mathematics	Courses	SGC, Senate Graduate Council (SGC)
CHE 661	Advances in Biochemical Engineering	Courses	SGC, Senate Graduate Council (SGC)
ECE 663	Power Electronics	Courses	SGC, Senate Graduate Council (SGC)
ECE 668	Active Distribution Systems & DER Integration	Courses	SGC, Senate Graduate Council (SGC)
ECE 669	Dielectric Materials in Power and Transportation Systems	Courses	SGC, Senate Graduate Council (SGC)
ECE 6601PD	Power System Components and Modeling	Courses	SGC, Senate Graduate Council (SGC)
ECE 6602PD	Power System Planning: Generation, Transmission and Integrated Resource	Courses	SGC, Senate Graduate Council (SGC)
ECE 6605PD	Power System Protection	Courses	SGC, Senate Graduate Council (SGC)
ECE 6607PD	Power System Operation and Electricity Markets	Courses	SGC, Senate Graduate Council (SGC)
ECE 6608PD	Electrical Insulation in Power System Components	Courses	SGC, Senate Graduate Council (SGC)
ECE 6609PD	High Voltage Engineering Applications	Courses	SGC, Senate Graduate Council (SGC)
ECE 6610PD	Power Electronics Converters: Design and Applications	Courses	SGC, Senate Graduate Council (SGC)
ECE 6613PD	Power System Analysis	Courses	SGC, Senate Graduate Council (SGC)

Programs & Plans Proposals

Programs & Plans: Retire
No proposals have been added.

Programs & Plans: Major Modifications
No proposals have been added.

Programs & Plans: Minor Modifications

Code	Title	Type	Workflow Step
Master of Architecture (MArch)	Master of Architecture (MArch)	Programs	SGC, Senate Graduate Council (SGC)
Master of Architecture (MArch)-Water	Master of Architecture (MArch) - Water	Programs	SGC, Senate Graduate Council (SGC)
Master of Architecture (MArch)-Co-op	Master of Architecture (MArch) - Co-operative Program	Programs	SGC, Senate Graduate Council (SGC)
PhD in Chemical Engineering	Doctor of Philosophy (PhD) in Chemical Engineering	Programs	SGC, Senate Graduate Council (SGC)
PhD in Chemical Engineering-Nanotechnology	Doctor of Philosophy (PhD) in Chemical Engineering - Nanotechnology	Programs	SGC, Senate Graduate Council (SGC)
PhD in Chemical Engineering-Water	Doctor of Philosophy (PhD) in Chemical Engineering - Water	Programs	SGC, Senate Graduate Council (SGC)
MASc in Chemical Engineering	Master of Applied Science (MASc) in Chemical Engineering	Programs	SGC, Senate Graduate Council (SGC)
MASc in Chemical Engineering-Nanotechnology	Master of Applied Science (MASc) in Chemical Engineering - Nanotechnology	Programs	SGC, Senate Graduate Council (SGC)
MASc in Chemical Engineering-Water	Master of Applied Science (MASc) in Chemical Engineering - Water	Programs	SGC, Senate Graduate Council (SGC)
MEng in Chemical Engineering-Health Technologies-Co-op	Master of Engineering (MEng) in Chemical Engineering - Health Technologies - Co-operative Program	Programs	SGC, Senate Graduate Council (SGC)
MEng in Chemical Engineering	Master of Engineering (MEng) in Chemical Engineering	Programs	SGC, Senate Graduate Council (SGC)
MEng in Chemical Engineering-Co-op	Master of Engineering (MEng) in Chemical Engineering - Co-operative Program	Programs	SGC, Senate Graduate Council (SGC)
MEng in Electrical & Computer Engineering	Master of Engineering (MEng) in Electrical and Computer Engineering	Programs	SGC, Senate Graduate Council (SGC)
MEng in Electrical & Computer Engineering-Co-op	Master of Engineering (MEng) in Electrical and Computer Engineering - Co-operative Program	Programs	SGC, Senate Graduate Council (SGC)
MASc in Systems Design Engineering	Master of Applied Science (MASc) in Systems Design Engineering	Programs	SGC, Senate Graduate Council (SGC)
MASc in Systems Design Engineering-Aeronautics	Master of Applied Science (MASc) in Systems Design Engineering - Aeronautics	Programs	SGC, Senate Graduate Council (SGC)

MASc in Systems Design Engineering-Nanotechnology	Master of Applied Science (MASc) in Systems Design Engineering - Nanotechnology	Programs	SGC, Senate Graduate Council (SGC)
MEng in Systems Design Engineering	Master of Engineering (MEng) in Systems Design Engineering	Programs	SGC, Senate Graduate Council (SGC)

Regulations Proposals

Regulations: Retire
No proposals have been added.

Regulations: New
No proposals have been added.

Regulations: Changes
No proposals have been added.

CHE 650 - Engineering Work-term Experience Report

Top

Effective Date & Career

Career
Graduate

Effective Term and Year

Proposed

Effective Term and Year
Winter 2027

Existing

Effective Term and Year
Fall 2023

Quest Course ID
16626

Offering Number
1

Proposal Details

Proposal Type
Retire

Academic Unit Approval
2026-06-08

Last Offering of Course
-

Retired Impact
No

Rationale and Background for Change

CHE 650 was removed from the MEng in Chemical Engineering Co-op and MEng in Chemical Engineering - Health Technologies Co-op program's degree requirements effective Winter 2026. The course is being inactivated because it has been replaced by the Graduate WIL Reflective Report milestone.

Course Information

Faculty
Faculty of Engineering

Academic Unit
Department of Chemical Engineering

Subject Code
CHE

Number
650

Is this course cross-listed?
No

Title
Engineering Work-term Experience Report

Abbreviated Title
Eng Workterm Experience Report

Description
A structured report articulating the student's co-operative work-term experience in the context of the professional practice requirements for engineering licensure.

Units
0.25

Exceptions to Fees or Academic Progress Units
No

Components
Project

Primary Component
Project

Grading Information

Grading Basis
Credit/No Credit

Repeatable Courses

Can this course be repeated for credit?
No

Enrolment Rules

Consent to Add

Consent to Drop

No consent required

No consent required

Prerequisites

- **Enrolled in:**
- **MEng in Chemical Engineering-Co-op - Master of Engineering (MEng) in Chemical Engineering - Co-operative Program**

Corequisites

Antirequisites

Course Notes

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Engineering

Dependencies

There are no dependencies

ME 645 - Metallurgy and Plasticity in Metalworking

Top

Effective Date & Career

Career
Graduate

Effective Term and Year

Proposed

Effective Term and Year
Winter 2027

Existing

Effective Term and Year
Fall 2023

Quest Course ID
1861

Offering Number
1

Proposal Details

Proposal Type

Academic Unit Approval

Retire

2026-05-27

Last Offering of Course
2005

Retired Impact
No

Rationale and Background for Change

The course has not been offered in over a decade nor is there any plan to offer the course in the foreseeable future. As a result, we request the removal of the course from our course Calendar list to better reflect our current course offerings and the “truth in advertising” principle written in the requirements of the Ontario Universities Council on Quality Assurance.

Course Information

Faculty

Faculty of Engineering

Academic Unit

Department of Mechanical and Mechatronics Engineering

Subject Code
ME

Number
645

Is this course cross-listed?
No

Title
Metallurgy and Plasticity in Metalworking

Abbreviated Title
Fundamentals of Metalworking

Description
The interaction of material properties and process variables in plastic deformation processes. Phenomena of hot, warm and cold working. Thermo-mechanical processing. Flow stress and workability. Effects of hydrostatic pressure. Analysis of stress and strain state in forging, rolling, extrusion, drawing and sheet metalworking.

Units
0.50

Exceptions to Fees or Academic Progress Units
No

Components

Lecture

Primary Component
Lecture

Grading Information

Grading Basis
Numerical Grading Basis

Repeatable Courses

Can this course be repeated for credit?
No

Enrolment Rules

Consent to Add
No consent required

Consent to Drop
No consent required

Prerequisites

Corequisites

Antirequisites

Course Notes

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Engineering

Dependencies

There are no dependencies

ME 648 - Surface Modelling in Machining

Top

Effective Date & Career

Career	Effective Term and Year	Quest Course ID	Offering Number
Graduate	Proposed	1862	1

Effective Term and Year
Winter 2027

Existing

Effective Term and Year
Fall 2023

Proposal Details

Proposal Type
Retire

Academic Unit Approval
2026-05-27

Last Offering of Course
1990

Retired Impact
No

Rationale and Background for Change

The course has not been offered in over a decade nor is there any plan to offer the course in the foreseeable future. As a result, we request the removal of the course from our course Calendar list to better reflect our current course offerings and the “truth in advertising” principle written in the requirements of the Ontario Universities Council on Quality Assurance.

Course Information

Faculty
Faculty of Engineering

Academic Unit
Department of Mechanical and Mechatronics Engineering

Subject Code
ME

Number
648

Is this course cross-listed?
No

Title
Surface Modelling in Machining

Abbreviated Title
Surface Modelling in Machining

Description
This course presents the principles behind the mathematical representation of surfaces in ways that are suitable for computers, together with the application of such representations to computer-controlled machining processes. The Bezier, B-spline and NURBS representations are all covered, as are important surface properties, like curvature, shortest-distance algorithms, ray-intersection, surface sub-division, knot insertion, and degree elevation. Machining aspects covered are three-,

four- and five-axis methods, anti-gouging methods and anti-interference checking.

Units
0.50

Exceptions to Fees or Academic Progress Units
No

Components
Lecture

Primary Component
Lecture

Grading Information

Grading Basis
Numerical Grading Basis

Repeatable Courses

Can this course be repeated for credit?
No

Enrolment Rules

Consent to Add
No consent required

Consent to Drop
No consent required

Prerequisites

Corequisites

Antirequisites

Course Notes

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Engineering

Dependencies

There are no dependencies

ME 709 - Control Engineering and Mechanical Systems

Top

Effective Date & Career

Career
Graduate

Effective Term and Year

Proposed

Effective Term and Year
Winter 2027

Existing

Effective Term and Year
Fall 2023

Quest Course ID
1875

Offering Number
1

Proposal Details

Proposal Type
Retire

Academic Unit Approval
2026-05-27

Last Offering of Course
2000

Retired Impact
No

Rationale and Background for Change

The course has not been offered in over a decade nor is there any plan to offer the course in the foreseeable future. As a result, we request the removal of the course from our course Calendar list to better reflect our current course offerings and the “truth in advertising” principle written in the requirements of the Ontario Universities Council on Quality Assurance.

Course Information

Faculty
Faculty of Engineering

Academic Unit
Department of Mechanical and Mechatronics Engineering

Subject Code
ME

Number
709

Is this course cross-listed?

No

Title
Control Engineering and Mechanical Systems

Abbreviated Title
Vibration Control

Description
This course is aimed at applications of control to Mechanical Systems. Course contents: Review of Control; Poles and zeros, Transfer functions, Time Reponse, Actuators, Electrical Systems, PID Control, designing controllers with root locus, state space representations, phase planes, stability concepts, frequency Response. Applications to Mechanical systems: Robots, Hydraulic systems, Active Vibration Control.

Units
0.50

Exceptions to Fees or Academic Progress Units
No

Components
Lecture

Primary Component
Lecture

Grading Information

Grading Basis
Numerical Grading Basis

Repeatable Courses

Can this course be repeated for credit?
No

Enrolment Rules

Consent to Add
No consent required

Consent to Drop
No consent required

Prerequisites

Corequisites

Antirequisites

Course Notes

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Engineering

Dependencies

There are no dependencies

ME 711 - Non-Linear Vibrations

Top

Effective Date & Career

Career
Graduate

Effective Term and Year

Proposed

Effective Term and Year
Winter 2027

Existing

Effective Term and Year
Fall 2023

Quest Course ID
1877

Offering Number
1

Proposal Details

Proposal Type
Retire

Academic Unit Approval
2026-05-27

Last Offering of Course
2004

Retired Impact
No

Rationale and Background for Change

The course has not been offered in over a decade nor is there any plan to offer the course in the foreseeable future. As a result, we request the removal of the course from our course Calendar list to better reflect our current course offerings and the “truth in advertising” principle written in the requirements of the Ontario Universities Council on Quality Assurance.

Course Information

Faculty

Faculty of Engineering

Academic Unit

Department of Mechanical and Mechatronics Engineering

Subject Code

ME

Number

711

Is this course cross-listed?

No

Title

Non-Linear Vibrations

Abbreviated Title

Non-Linear Vibrations

Description

Review of linear systems; free and forced vibrations; conservation systems; general autonomous systems; equilibrium and periodic solutions, linearization and Lyapunov stability criteria; Poincare-Bendixon theorem; quantitative analysis of weakly nonlinear systems in free and forced vibrations using perturbation methods; bifurcations and chaos in dynamical systems. This course will use computer programs (such as MAPLE and MATLAB) for simulation and analysis.

Units

0.50

Exceptions to Fees or Academic Progress Units

No

Components

Lecture

Primary Component

Lecture

Grading Information

Grading Basis

Numerical Grading Basis

Repeatable Courses

Can this course be repeated for credit?

No

Enrolment Rules

Consent to Add

Consent to Drop

No consent required

No consent required

Prerequisites

Corequisites

Antirequisites

Course Notes

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Engineering

Dependencies

There are no dependencies

ME 722 - Topics in Pressure Vessel Design

Top

Effective Date & Career

Career
Graduate

Effective Term and Year

Proposed

Effective Term and Year
Winter 2027

Existing

Effective Term and Year
Fall 2023

Quest Course ID
1879

Offering Number
1

Proposal Details

Proposal Type
Retire

Academic Unit Approval
2026-05-27

Last Offering of Course
1988

Retired Impact
No

Rationale and Background for Change

The course has not been offered in over a decade nor is there any plan to offer the course in the foreseeable future. As a result, we request the removal of the course from our course Calendar list to better reflect our current course offerings and the “truth in advertising” principle written in the requirements of the Ontario Universities Council on Quality Assurance.

Course Information

Faculty
Faculty of Engineering

Academic Unit
Department of Mechanical and Mechatronics Engineering

Subject Code
ME

Number
722

Is this course cross-listed?
No

Title
Topics in Pressure Vessel Design

Abbreviated Title
Pressure Vessel Design Topics

Description
Design and analysis of pressure vessels, safety considerations and interpretation of pressure vessel codes. Fatigue and fracture modes of failure. Intersecting vessels and connections. Computer techniques of analysis.

Units
0.50

Exceptions to Fees or Academic Progress Units
No

Components
Lecture

Primary Component
Lecture

Grading Information

Grading Basis

Numerical Grading Basis

Repeatable Courses

Can this course be repeated for credit?
Yes

Total Completions Allowed
03

Allow Multiple Enrol in a Term
Yes

Enrolment Rules

Consent to Add
No consent required

Consent to Drop
No consent required

Prerequisites

Corequisites

Antirequisites

Course Notes

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Engineering

Dependencies

There are no dependencies

ME 737 - Microstructural Engineering Topics

Top

Effective Date & Career

Career
Graduate

Effective Term and Year
Proposed
Effective Term and

Quest Course ID
1892

Offering Number
1

Year
Winter 2027

Existing

Effective Term and Year
Fall 2023

Proposal Details

Proposal Type
Retire

Academic Unit Approval
2026-05-27

Last Offering of Course
1999

Retired Impact
No

Rationale and Background for Change

The course has not been offered in over a decade nor is there any plan to offer the course in the foreseeable future. As a result, we request the removal of the course from our course Calendar list to better reflect our current course offerings and the “truth in advertising” principle written in the requirements of the Ontario Universities Council on Quality Assurance.

Course Information

Faculty
Faculty of Engineering

Academic Unit
Department of Mechanical and Mechatronics Engineering

Subject Code
ME

Number
737

Is this course cross-listed?
No

Title
Microstructural Engineering Topics

Abbreviated Title
Microstructural Eng Topics

Description
Consult the schedule of classes for specific topics being offered.

Units

Exceptions to Fees or Academic Progress Units

0.50

No

Components

Lecture

Primary Component

Lecture

Grading Information

Grading Basis

Numerical Grading Basis

Repeatable Courses

Can this course be repeated for credit?

Yes

Total Completions Allowed

03

Allow Multiple Enrol in a Term

Yes

Enrolment Rules

Consent to Add

No consent required

Consent to Drop

No consent required

Prerequisites

Corequisites

Antirequisites

Course Notes

Workflow Information

Workflow Path

Committee approvals

Faculty/AFIW Path(s) for Workflow

Faculty of Engineering

Dependencies

There are no dependencies

ME 741 - Design of Intelligent Systems: Mechatronics

Top

Effective Date & Career

Career
Graduate

Effective Term and Year

Proposed

Effective Term and Year
Winter 2027

Existing

Effective Term and Year
Fall 2023

Quest Course ID
10458

Offering Number
1

Proposal Details

Proposal Type
Retire

Academic Unit Approval
2026-05-27

Last Offering of Course
2005

Retired Impact
No

Rationale and Background for Change

The course has not been offered in over a decade nor is there any plan to offer the course in the foreseeable future. As a result, we request the removal of the course from our course Calendar list to better reflect our current course offerings and the “truth in advertising” principle written in the requirements of the Ontario Universities Council on Quality Assurance.

Course Information

Faculty
Faculty of Engineering

Academic Unit
Department of Mechanical and Mechatronics Engineering

Subject Code
ME

Number
741

Is this course cross-listed?
No

Title
Design of Intelligent Systems: Mechatronics

Abbreviated Title
Design of Mechatronics Systems

Description
Review of modelling and approximation of dynamic systems. Review of classical control theory. Electronic realisation of control elements and compensations: ideal and real PID. Elements of digital control theory: sampling theorem, z-transform and digital filters. Review of computer interfacing, power amplifiers, sequential logic, encoders, and motor control. The course involves practical projects and significant laboratory usage.

Units
0.50

Exceptions to Fees or Academic Progress Units
No

Components
Lecture

Primary Component
Lecture

Grading Information

Grading Basis
Numerical Grading Basis

Repeatable Courses

Can this course be repeated for credit?
No

Enrolment Rules

Consent to Add
No consent required

Consent to Drop
No consent required

Prerequisites

Corequisites

Antirequisites

Course Notes

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Engineering

Dependencies

There are no dependencies

ME 742 - Modelling and Control of Dynamic Systems

Top

Effective Date & Career

Career
Graduate

Effective Term and Year

Proposed

Effective Term and Year
Winter 2027

Existing

Effective Term and Year
Fall 2023

Quest Course ID
1895

Offering Number
1

Proposal Details

Proposal Type
Retire

Academic Unit Approval
2026-05-27

Last Offering of Course
2011

Retired Impact
No

Rationale and Background for Change

The course has not been offered in over a decade nor is there any plan to offer the course in the foreseeable future. As a result, we request the removal of the course from our course Calendar list to better reflect our current course offerings and the “truth in advertising” principle written in the requirements of the Ontario Universities Council on Quality Assurance.

Course Information

Faculty

Faculty of Engineering

Academic Unit

Department of Mechanical and Mechatronics Engineering

Subject Code

ME

Number

742

Is this course cross-listed?

No

Title

Modelling and Control of Dynamic Systems

Abbreviated Title

Systems Modelling and Control

Description

Review of classical system modelling. Introducing bondgraphs as a unified approach in modelling of mechanical, electrical, thermal, and fluid dynamic systems. Application of bondgraphs to multibody dynamics. State space representation and response of linear systems. Review of classical linear control theory. Introduction to modern control theory and study system characteristics: controllability, observability and stability.

Units

0.50

Exceptions to Fees or Academic Progress Units

No

Components

Lecture

Primary Component

Lecture

Grading Information

Grading Basis

Numerical Grading Basis

Repeatable Courses

Can this course be repeated for credit?

No

Enrolment Rules

Consent to Add
No consent required

Consent to Drop
No consent required

Prerequisites

Corequisites

Antirequisites

Course Notes

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Engineering

Dependencies

There are no dependencies

ME 743 - Modal Analysis and Modelling

Top

Effective Date & Career

Career
Graduate

Effective Term and Year

Proposed

Effective Term and Year
Winter 2027

Existing

Effective Term and Year
Fall 2023

Quest Course ID
1896

Offering Number
1

Proposal Details

Proposal Type
Retire

Academic Unit Approval
2026-05-27

Last Offering of Course
2011

Retired Impact
No

Rationale and Background for Change

The course has not been offered in over a decade nor is there any plan to offer the course in the foreseeable future. As a result, we request the removal of the course from our course Calendar list to better reflect our current course offerings and the “truth in advertising” principle written in the requirements of the Ontario Universities Council on Quality Assurance.

Course Information

Faculty
Faculty of Engineering

Academic Unit
Department of Mechanical and Mechatronics Engineering

Subject Code
ME

Number
743

Is this course cross-listed?
No

Title
Modal Analysis and Modelling

Abbreviated Title
Modal Analysis & Modelling

Description
Computer-aided engineering complements CAD/CAM by helping the engineer design not only individual components, but also design and analyse total systems. This course deals with the area of advanced vibration analysis and modelling using a combination of data acquisition and software analysis methods. This modal analysis approach to design uses several software packages. Topics discussed are the theory of modal analysis, parameter estimation and error assessment, computer modelling of structures, practical aspects of good data collection and manipulation. The course involves significant laboratory usage.

Units
0.50

Exceptions to Fees or Academic Progress Units
No

Components

Primary Component
Lecture

Lecture

Grading Information

Grading Basis
Numerical Grading Basis

Repeatable Courses

Can this course be repeated for credit?
No

Enrolment Rules

Consent to Add
No consent required

Consent to Drop
No consent required

Prerequisites

Corequisites

Antirequisites

Course Notes

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Engineering

Dependencies

There are no dependencies

Top

ME 745 - Quality Assurance and Reliability in

Manufacturing

Effective Date & Career

Career
Graduate

Effective Term and Year

Proposed

Effective Term and Year
Winter 2027

Existing

Effective Term and Year
Fall 2023

Quest Course ID
1898

Offering Number
1

Proposal Details

Proposal Type
Retire

Academic Unit Approval
2026-05-27

Last Offering of Course
2000

Retired Impact
No

Rationale and Background for Change

The course has not been offered in over a decade nor is there any plan to offer the course in the foreseeable future. As a result, we request the removal of the course from our course Calendar list to better reflect our current course offerings and the “truth in advertising” principle written in the requirements of the Ontario Universities Council on Quality Assurance.

Course Information

Faculty
Faculty of Engineering

Academic Unit
Department of Mechanical and Mechatronics Engineering

Subject Code
ME

Number
745

Is this course cross-listed?
No

Title

Quality Assurance and Reliability in Manufacturing

Abbreviated Title
Quality Control & Reliability

Description
Building quality in manufacturing processes and products through statistical design of experiments. Reliability engineering and the association with quality. Reliability models of systems. Maintainability, and fault free analysis.

Units
0.50

Exceptions to Fees or Academic Progress Units
No

Components
Lecture

Primary Component
Lecture

Grading Information

Grading Basis
Numerical Grading Basis

Repeatable Courses

Can this course be repeated for credit?
No

Enrolment Rules

Consent to Add
No consent required

Consent to Drop
No consent required

Prerequisites

Corequisites

Antirequisites

Course Notes

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Engineering

Dependencies

There are no dependencies

ME 747 - Topics in Manufacturing

Top

Effective Date & Career

Career
Graduate

Effective Term and Year

Proposed

Effective Term and Year
Winter 2027

Existing

Effective Term and Year
Fall 2023

Quest Course ID
1901

Offering Number
1

Proposal Details

Proposal Type
Retire

Academic Unit Approval
2026-05-27

Last Offering of Course
2011

Retired Impact
No

Rationale and Background for Change

The course has not been offered in over a decade nor is there any plan to offer the course in the foreseeable future. As a result, we request the removal of the course from our course Calendar list to better reflect our current course offerings and the “truth in advertising” principle written in the requirements of the Ontario Universities Council on Quality Assurance.

Course Information

Faculty
Faculty of Engineering

Academic Unit
Department of Mechanical and Mechatronics Engineering

Subject Code
ME

Number
747

Is this course cross-listed?
No

Title
Topics in Manufacturing

Abbreviated Title
Topics in Manufacturing

Description
Various courses dealing with recent advances in manufacturing systems.

Units
0.50

Exceptions to Fees or Academic Progress Units
No

Components
Reading

Primary Component
Reading

Grading Information

Grading Basis
Numerical Grading Basis

Repeatable Courses

Can this course be repeated for credit?
Yes

Total Completions Allowed
03

Allow Multiple Enrol in a Term
Yes

Enrolment Rules

Consent to Add
No consent required

Consent to Drop
No consent required

Prerequisites

Corequisites

Antirequisites

Course Notes

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Engineering

Dependencies

There are no dependencies

ME 762 - Turbulent Diffusion in the Natural Environment

Top

Effective Date & Career

Career
Graduate

Effective Term and Year

Proposed

Effective Term and Year
Winter 2027

Existing

Effective Term and Year
Fall 2023

Quest Course ID
1911

Offering Number
1

Proposal Details

Proposal Type
Retire

Academic Unit Approval
2026-05-27

Last Offering of Course
1996

Retired Impact
No

Rationale and Background for Change

The course has not been offered in over a decade nor is there any plan to offer the course in the foreseeable future. As a result, we request the removal of the course from our course Calendar list to better reflect our current course offerings and the “truth in advertising” principle written in the requirements of the Ontario Universities Council on Quality Assurance.

Course Information

Faculty

Faculty of Engineering

Academic Unit

Department of Mechanical and Mechatronics Engineering

Subject Code

ME

Number

762

Is this course cross-listed?

No

Title

Turbulent Diffusion in the Natural Environment

Abbreviated Title

Diffusion in the Environment

Description

Statistical quantities of interest in turbulent diffusion; Eulerian and Lagrangian probability distributions, averages, correlations, spectra. Specific prediction models for atmospheric and oceanic mixing processes, diffusion in a homogeneous field in a boundary layer. Effects of density stratification, buoyant movements.

Units

0.50

Exceptions to Fees or Academic Progress Units

No

Components

Lecture

Primary Component

Lecture

Grading Information

Grading Basis

Numerical Grading Basis

Repeatable Courses

Can this course be repeated for credit?
No

Enrolment Rules

Consent to Add
No consent required

Consent to Drop
No consent required

Prerequisites

Corequisites

Antirequisites

Course Notes

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Engineering

Dependencies

There are no dependencies

CHE 643 - Nanocomposites

Top

Effective Date & Career

Career
Graduate

Effective Term and Year
Winter 2027

Proposal Details

Proposal Type
New

Academic Unit Approval
2026-05-11

Rationale and Background for New Course

To enable CHE students to take a course equivalent to NANO 603 without reducing the number of electives they can take from outside the Department. Electives from outside the Department are limited to 1 for Ph D, 2 for MASc, and 3 for MEng.

Course Information

Faculty
Faculty of Engineering

Academic Unit
Department of Chemical Engineering

Subject Code
CHE

Number
643

Is this course cross-listed?
No

Title
Nanocomposites

Abbreviated Title
Nanocomposites

Description
Introduction to nanomaterials and nanocomposites relevant to advanced manufacturing, transportation, energy, environmental and packaging applications. Nanocomposites in nature. Dispersion, mixing of nanoparticles and liquids, percolation theory. Polymer nanocomposite manufacturing approaches and modification of nanoparticles for controlled functionality. Nanostructures and models for mechanical, electrical, thermal and gas diffusion properties in nanocomposites. Biobased nanoparticles and nanocomposite. Nanofibers. Health and safety of nanocomposites. Selected Research Topics and Patents Seminars and Assessments.

Units
0.50

Exceptions to Fees or Academic Progress Units
No

Components
Lecture

Primary Component
Lecture

Grading Information

Grading Basis
Numerical Grading Basis

Repeatable Courses

Can this course be repeated for credit?
No

Enrolment Rules

Consent to Add
No consent required

Consent to Drop
No consent required

Prerequisites

Corequisites

Antirequisites

- **Not completed nor concurrently enrolled in: NANO603, NANO701 (Topic 12: Nanocomposites), NANO702 (Topic 14: Nanocomposites)**

Course Notes

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Engineering

Dependencies

There are no dependencies

MSE 699 - Master of Management Science Design Project

Top

Effective Date & Career

Career
Graduate

Effective Term and Year
Winter 2027

Proposal Details

Proposal Type
New

Academic Unit Approval
2026-05-04

Rationale and Background for New Course

To provide a design project experience, particularly for our course-based Master's students. This would allow them to gain valuable and practical implementation experience from their program. Other Engineering departments (e.g., ECE, MSE) offer similar courses, and there is strong demand for them.

Course Information

Faculty
Faculty of Engineering

Academic Unit
Department of Management Science and Engineering

Subject Code
MSE

Number
699

Is this course cross-listed?
No

Title
Master of Management Science Design Project

Abbreviated Title
Masters Design Project

Description
This project course is open to master's students who have completed at least three courses and have a cumulative average of at least 80%. The student, individually or as part of a team, will carry out a term-long applied project under the direct supervision of a Management Science and Engineering faculty member. Deliverables may include intermediate check-ins, written reports, oral presentations, or other artifacts as determined by the supervising faculty member. At the end of the term, a final project deliverable will be submitted, evaluated, and graded. Students must obtain a permission number to register for this course.

Units
0.50

Exceptions to Fees or Academic Progress Units
No

Components

Project

Primary Component
Project

Grading Information

Grading Basis
Numerical Grading Basis

Repeatable Courses

Can this course be repeated for credit?
No

Enrolment Rules

Consent to Add
Department consent required

Consent to Drop
No consent required

Prerequisites

Corequisites

Antirequisites

Course Notes

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow

Faculty of Engineering

Dependencies

There are no dependencies

SYDE 639 - Energy Sustainability

Top

Effective Date & Career

Career
Graduate

Effective Term and Year
Winter 2027

Proposal Details

Proposal Type
New

Rationale and Background for New Course

The course will be particularly valuable for SYDE graduate students conducting research in energy systems. The material directly supports their degree requirements by providing foundational and applied knowledge relevant to contemporary energy research, systems modeling, and engineering decision-making. All units involved in the cross-listing have been consulted and are supportive of the proposed change.

Course Information

Faculty
Faculty of Engineering

Academic Unit
Department of Systems Design Engineering

Subject Code
SYDE

Number
639

Is this course cross-listed?
Yes

Cross-Listed Courses
GEOG 669 - Energy Sustainability
ERS 619 - Energy Sustainability
DEVP 606 - Energy Sustainability

Title
Energy Sustainability

Abbreviated Title
Energy Sustainability

Description
Renewable and non-renewable energy supply systems are compared using economic and environmental measures. Consumption trends, conservation options and choices are considered at the household, community and global scales. Projects are used to demonstrate the economic and environmental challenges in the design of sustainable energy systems. *eligible for MES.

Units
0.50

Exceptions to Fees or Academic Progress Units
No

Components
Lecture Reading Seminar

Primary Component
Lecture

Grading Information

Grading Basis
Numerical Grading Basis

Repeatable Courses

Can this course be repeated for credit?
No

Enrolment Rules

Consent to Add
No consent required

Consent to Drop
No consent required

Prerequisites

Corequisites

Antirequisites

- **Not completed nor concurrently enrolled in any of the following:**
  - DEVP606 - Energy Sustainability (0.50)
  - ERS619 - Energy Sustainability (0.50)
  - GEOG669 - Energy Sustainability (0.50)

Course Notes

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Engineering

Dependencies

There are no dependencies

SYDE 685 - Biomedical and Environmental Sensors

Top

Effective Date & Career

Career
Graduate

Effective Term and Year
Winter 2027

Proposal Details

Proposal Type
New

Rationale and Background for New Course

Our information driven science, economy, and society has an insatiable need for measurement, data and the sensors needed to acquire it. Graduate students interested in Biomedical and Environmental sensors need to access and eventually master a broad set of concepts from various disciplines related to the properties and synthesis of the sensitive materials, the fabrication of sensor platforms, and signal processing as well as concepts specific to sensor design, characterization, and operation. This course is a starting point to allow students interested in this area to acquire a breadth of knowledge over those disciplines and concepts before proceeding to gain in-depth knowledge in one or a few of them. The course is co-taught to University of Waterloo students by an instructor from the University of Waterloo (in person) and an instructor from Simon Fraser University (live streamed).

Course Information

Faculty
Faculty of Engineering

Academic Unit
Department of Systems Design Engineering

Subject Code
SYDE

Number
685

Is this course cross-listed?
No

Title
Biomedical and Environmental Sensors

Abbreviated Title
Biomed & Environmental Sensors

Description
This course provides students interested in the sensors research area with a foundational level of knowledge and understanding of cross-disciplinary science and engineering concepts necessary for this field. It also enables access to more advanced courses on sensor science and engineering. Specifically, it provides foundational training in the theory and practice of biomedical and environmental sensors systems, including design of the sense platform and the sensitive material, fabrication and synthesis of the platform and sensitive material, sensor integration and signal processing, and experimental techniques relevant to biomedical and environmental sensor testing and characterization.

Units
0.50

Exceptions to Fees or Academic Progress Units
No

Components
Lecture

Primary Component
Lecture

Grading Information

Grading Basis
Numerical Grading Basis

Repeatable Courses

Can this course be repeated for credit?
No

Enrolment Rules

Consent to Add
No consent required

Consent to Drop
No consent required

Prerequisites

Corequisites

Antirequisites

Course Notes

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Engineering

Dependencies

There are no dependencies

ARCH 690 - Design Studio

Top

Effective Date & Career

Career
Graduate

Effective Term and Year

Proposed

Effective Term and Year
Fall 2027

Existing

Effective Term and Year
Fall 2023

Quest Course ID
15048

Offering Number
1

Proposal Details

Proposal Type
Change

Academic Unit Approval
2026-07-22

Unit Weight/Number Changes
Yes

Rationale and Background for Change

As part of a curriculum review throughout the School of Architecture in both Undergraduate and Graduate programs we have decided to shift the weighting of the graduate design studio courses ARCH 690, 691, 692 and 693 from 1.5 to 1.0 credits and (for all but 693*) to hold them on 1.5 days a week (one full day and one half day), instead of two days a week as they are

currently scheduled. *ARCH 693 involves more independent student work and is therefore currently only scheduled for one day a week.

These reduced hours and credit weighting are being introduced to bring our program into line with other schools of architecture in Canada and to other programs at the University of Waterloo. At 14 hours per week, Waterloo has had the second longest studio hours of 12 schools of architecture in Canada. This change will bring it in line with other schools such as Laurentian, Carleton, UBC and TMU, whose studio hours range from 10.5-9 hours per week. Waterloo's graduate program routinely requires exceptions to the recommended credit limit for graduate students in the early terms of the degree and this will reduce student credit load by 0.5 credits, bringing it closer to other Waterloo graduate programs.

These changes will allow students more time and flexibility to make progress on their thesis work outside of programmed class time. This should lighten student stress and increase student wellness.

Students will also have more time during the week to use essential infrastructure within the School such as the library and workshop and to attend school lectures and events.

Finally, this will also lighten faculty in-class time. Currently architecture faculty teach more courses than other faculty in Engineering, but also among the highest contact hours amongst CACB-accredited architecture programs in Canada. This will free time to allow faculty to better balance their research and administrative loads with teaching.

Course Information

Faculty

Faculty of Engineering

Academic Unit

School of Architecture

Subject Code

ARCH

Number

690

Is this course cross-listed?

No

Title

Design Studio

Abbreviated Title

Design Studio

Description

The Design Studio is subdivided into various sections, providing students the opportunity to select an Architectural studio of their interest and undertake a detailed exploration of design project within this theme. Studio fee $25.00.

Units

Proposed
Units 1.00
Existing
Units 1.50

Exceptions to Fees or Academic Progress Units

No

Components

Studio

Primary Component

Studio

Grading Information

Grading Basis

Numerical Grading Basis

Repeatable Courses

Can this course be repeated for credit?

No

Enrolment Rules

Consent to Add

No consent required

Consent to Drop

No consent required

Prerequisites

- **Enrolled in:**
- **Master of Architecture (MArch) - Master of Architecture (MArch)**
- **Master of Architecture (MArch)-Co-op - Master of Architecture (MArch) - Co-operative Program**
- **Master of Architecture (MArch)-Water - Master of Architecture (MArch) - Water**

Corequisites

Antirequisites

Course Notes

Workflow Information

Workflow Path

Committee approvals

Faculty/AFIW Path(s) for Workflow

Faculty of Engineering

Dependencies

There are no dependencies

ARCH 691 - Design Studio - Comprehensive Building Design

Top

Effective Date & Career

Career
Graduate

Effective Term and Year

Proposed

Effective Term and Year
Fall 2027

Existing

Effective Term and Year
Fall 2023

Quest Course ID
15044

Offering Number
1

Proposal Details

Proposal Type
Change

Academic Unit Approval
2026-07-22

Unit Weight/Number Changes
Yes

Rationale and Background for Change

As part of a curriculum review throughout the School of Architecture in both Undergraduate and Graduate programs we have decided to shift the weighting of the graduate design studio courses ARCH 690, 691, 692 and 693 from 1.5 to 1.0 credits and (for all but 693*) to hold them on 1.5 days a week (one full day and one half day), instead of two days a week as they are currently scheduled. *ARCH 693 involves more independent student work and is therefore currently only scheduled for one day a week.

These reduced hours and credit weighting are being introduced to bring our program into line with other schools of architecture in Canada and to other programs at the University of Waterloo. At 14 hours per week, Waterloo has had the second longest studio hours of 12 schools of architecture in Canada. This change will bring it in line with other schools such as Laurentian, Carleton, UBC and TMU, whose studio hours range from 10.5-9 hours per week. Waterloo's graduate program routinely requires exceptions to the recommended credit limit for graduate students in the early terms of the degree and this will reduce student credit load by 0.5 credits, bringing it closer to other Waterloo graduate programs.

These changes will allow students more time and flexibility to make progress on their thesis work outside of programmed class time. This should lighten student stress and increase student wellness.

Students will also have more time during the week to use essential infrastructure within the School such as the library and workshop and to attend school lectures and events.

Finally, this will also lighten faculty in-class time. Currently architecture faculty teach more courses than other faculty in Engineering, but also among the highest contact hours amongst CACB-accredited architecture programs in Canada. This will free time to allow faculty to better balance their research and administrative loads with teaching.

Course Information

Faculty

Faculty of Engineering

Academic Unit

School of Architecture

Subject Code
ARCH

Number
691

Is this course cross-listed?
No

Title
Design Studio - Comprehensive Building Design

Abbreviated Title
Comprehensive Design Studio

Description
Through the integration and application of skills and knowledge to a complex building project, students will develop designs to a high level of detail. A concern for technical material, environmental and legal aspects of Architecture will support open speculation and innovative design. Studio fee $25.00.

Units

Proposed

Units
1.00

Existing

Units
1.50

Exceptions to Fees or Academic Progress Units
No

Components

Studio

Primary Component
Studio

Grading Information

Grading Basis
Numerical Grading Basis

Repeatable Courses

Can this course be repeated for credit?
No

Enrolment Rules

Consent to Add
No consent required

Consent to Drop
No consent required

Prerequisites

- **Enrolled in:**
- **Master of Architecture (MArch) - Master of Architecture (MArch)**
- **Master of Architecture (MArch)-Co-op - Master of Architecture (MArch) - Co-operative Program**
- **Master of Architecture (MArch)-Water - Master of Architecture (MArch) - Water**

Corequisites

Antirequisites

Course Notes

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Engineering

Dependencies

Corequisites

- ARCH 671 - Technical Report

View Program

ARCH 692 - Thesis Research and Design Studio I

Top

Effective Date & Career

Career
Graduate

Effective Term and Year
Proposed

Effective Term and Year

Quest Course ID
10634

Offering Number
1

Fall 2027

Existing

Effective Term and Year
Fall 2023

Proposal Details

Proposal Type
Change

Academic Unit Approval
2026-07-22

Unit Weight/Number Changes
Yes

Rationale and Background for Change

As part of a curriculum review throughout the School of Architecture in both Undergraduate and Graduate programs we have decided to shift the weighting of the graduate design studio courses ARCH 690, 691, 692 and 693 from 1.5 to 1.0 credits and (for all but 693*) to hold them on 1.5 days a week (one full day and one half day), instead of two days a week as they are currently scheduled. *ARCH 693 involves more independent student work and is therefore currently only scheduled for one day a week.

These reduced hours and credit weighting are being introduced to bring our program into line with other schools of architecture in Canada and to other programs at the University of Waterloo. At 14 hours per week, Waterloo has had the second longest studio hours of 12 schools of architecture in Canada. This change will bring it in line with other schools such as Laurentian, Carleton, UBC and TMU, whose studio hours range from 10.5-9 hours per week. Waterloo's graduate program routinely requires exceptions to the recommended credit limit for graduate students in the early terms of the degree and this will reduce student credit load by 0.5 credits, bringing it closer to other Waterloo graduate programs.

These changes will allow students more time and flexibility to make progress on their thesis work outside of programmed class time. This should lighten student stress and increase student wellness.

Students will also have more time during the week to use essential infrastructure within the School such as the library and workshop and to attend school lectures and events.

Finally, this will also lighten faculty in-class time. Currently architecture faculty teach more courses than other faculty in Engineering, but also among the highest contact hours amongst CACB-accredited architecture programs in Canada. This will free time to allow faculty to better balance their research and administrative loads with teaching.

Course Information

Faculty
Faculty of Engineering

Academic Unit
School of Architecture

Subject Code
ARCH

Number
692

Is this course cross-listed?
No

Title
Thesis Research and Design Studio I

Abbreviated Title
Research & Design Studio I

Description
The Graduate Thesis is designed to develop competence in design research and critical analysis while providing students with the opportunity to examine in depth current topics in architectural theory and practice, and to position these within a broader cultural context. Graduate Thesis Research and Design is a two-semester sequence of courses that guide students in the development of an individualized topic that is related to broader thematic areas within architecture, urbanism and landscape. ARCH 692 requires each student to formulate a focused research agenda, the premise of which will be developed throughout the preparation of a written research document and/or tested through a specific design proposal in ARCH 693. Studio fee $25.00.

Units

Proposed
Units 1.00
Existing
Units 1.50

Exceptions to Fees or Academic Progress Units
No

Components
Studio

Primary Component
Studio

Grading Information

Grading Basis
Numerical Grading Basis

Repeatable Courses

Can this course be repeated for credit?
No

Enrolment Rules

Consent to Add
Department consent required

Consent to Drop
No consent required

Prerequisites

- **Enrolled in:**
- **Master of Architecture (MArch) - Master of Architecture (MArch)**
- **Master of Architecture (MArch)-Co-op - Master of Architecture (MArch) - Co-operative Program**
- **Master of Architecture (MArch)-Water - Master of Architecture (MArch) - Water**

Corequisites

Antirequisites

Course Notes

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Engineering

Dependencies

There are no dependencies

ARCH 693 - Thesis Research & Design Studio II

Top

Effective Date & Career

Career
Graduate

Effective Term and Year

Proposed

Effective Term and Year
Fall 2027

Existing

Effective Term and Year
Fall 2023

Quest Course ID
15046

Offering Number
1

Proposal Details

Proposal Type
Change

Academic Unit Approval
2026-07-22

Unit Weight/Number Changes
Yes

Rationale and Background for Change

As part of a curriculum review throughout the School of Architecture in both Undergraduate and Graduate programs we have decided to shift the weighting of the graduate design studio courses ARCH 690, 691, 692 and 693 from 1.5 to 1.0 credits and (for all but 693*) to hold them on 1.5 days a week (one full day and one half day), instead of two days a week as they are currently scheduled. *ARCH 693 involves more independent student work and is therefore currently only scheduled for one day a week.

These reduced hours and credit weighting are being introduced to bring our program into line with other schools of architecture in Canada and to other programs at the University of Waterloo. At 14 hours per week, Waterloo has had the second longest studio hours of 12 schools of architecture in Canada. This change will bring it in line with other schools such as Laurentian, Carleton, UBC and TMU, whose studio hours range from 10.5-9 hours per week. Waterloo's graduate program routinely requires exceptions to the recommended credit limit for graduate students in the early terms of the degree and this will reduce student credit load by 0.5 credits, bringing it closer to other Waterloo graduate programs.

These changes will allow students more time and flexibility to make progress on their thesis work outside of programmed class time. This should lighten student stress and increase student wellness.

Students will also have more time during the week to use essential infrastructure within the School such as the library and workshop and to attend school lectures and events.

Finally, this will also lighten faculty in-class time. Currently architecture faculty teach more courses than other faculty in Engineering, but also among the highest contact hours amongst CACB-accredited architecture programs in Canada. This will free time to allow faculty to better balance their research and administrative loads with teaching.

Course Information

Faculty

Faculty of Engineering

Academic Unit

School of Architecture

Subject Code

ARCH

Number

693

Is this course cross-listed?

No

Title

Thesis Research & Design Studio II

Abbreviated Title

Research & Design Studio II

Description

Graduate Thesis Research & Design Studio II guides students through the development of their thesis projects. Students may draw from a wide range of sources both within and beyond the conventional boundaries of the architectural discipline, using methods of exploration that mat employ the tools of architectural production and critique, and that culminate in a written research document and/or design proposal. The goal of the Graduate Thesis is to make an active contribution to the field by opening up new ways of understanding an existing architectural topic. Studio fee $ 25.00.

Units

Proposed

Units
1.00

Exceptions to Fees or Academic Progress Units

No

Existing

Units
1.50

Components

Studio

Primary Component
Studio

Grading Information

Grading Basis
Numerical Grading Basis

Repeatable Courses

Can this course be repeated for credit?
No

Enrolment Rules

Consent to Add
Department consent required

Consent to Drop
No consent required

Prerequisites

- **Enrolled in:**
- **Master of Architecture (MArch) - Master of Architecture (MArch)**
- **Master of Architecture (MArch)-Co-op - Master of Architecture (MArch) - Co-operative Program**
- **Master of Architecture (MArch)-Water - Master of Architecture (MArch) - Water**

Corequisites

Antirequisites

Course Notes

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow

Faculty of Engineering

Dependencies

There are no dependencies

CHE 612 - Interfacial Phenomena

Top

Effective Date & Career

Career
Graduate

Effective Term and Year

Proposed

Effective Term and Year
Winter 2027

Existing

Effective Term and Year
Fall 2023

Quest Course ID
12789

Offering Number
1

Proposal Details

Proposal Type
Change

Academic Unit Approval
2026-06-08

Unit Weight/Number Changes
No

Rationale and Background for Change

The prerequisite is being removed to broaden access to students from other departments, schools, and Faculties. This revision aligns the prerequisite structure with that of other 600-level CHE courses.

Course Information

Faculty
Faculty of Engineering

Academic Unit
Department of Chemical Engineering

Subject Code

Number

CHE

612

Is this course cross-listed?
No

Title
Interfacial Phenomena

Abbreviated Title
Interfacial Phenomena

Description
An overview of interfacial phenomena, surface physical chemistry, importance of surfaces for small particles, and relevance to other subjects such as biology, nanotechnology and biomedicine. The fundamental concepts fo surface thermodynamics and intermolecular forces will be discussed.

Units
0.50

Exceptions to Fees or Academic Progress Units
No

Components
Lecture

Primary Component
Lecture

Grading Information

Grading Basis
Numerical Grading Basis

Repeatable Courses

Can this course be repeated for credit?
No

Enrolment Rules

Consent to Add
No consent required

Consent to Drop
No consent required

Prerequisites

Corequisites

Antirequisites

Course Notes

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Engineering

Dependencies

There are no dependencies

CHE 620 - Applied Engineering Mathematics

Top

Effective Date & Career

Career	Effective Term and Year	Quest Course ID	Offering Number
Graduate	Proposed **Effective Term and Year** Winter 2027 Existing **Effective Term and Year** Fall 2023	14409	1

Proposal Details

Proposal Type
Change

Academic Unit Approval
2026-06-08

Unit Weight/Number Changes
No

Rationale and Background for Change

The prerequisite is being removed to broaden access to students from other departments, schools, and Faculties. This revision aligns the prerequisite structure with that of other 600-level CHE courses.

Course Information

Faculty

Faculty of Engineering

Academic Unit

Department of Chemical Engineering

Subject Code

CHE

Number

620

Is this course cross-listed?

No

Title

Applied Engineering Mathematics

Abbreviated Title

Applied Eng. Mathematics

Description

Advanced engineering mathematics for the solution of linear differential equations arising from physiochemical models. Topics include scaling analysis of differential equations, series solutions for ordinary differential equations (ODEs), numerical solutions for initial/boundary value problems, Laplace transforms, characterization of partial differential equations (PDEs), and solution methods for PDEs (Sturm-Liouville transform, numerical methods).

Units

0.50

Exceptions to Fees or Academic Progress Units

No

Components

Lecture

Primary Component

Lecture

Grading Information

Grading Basis

Numerical Grading Basis

Repeatable Courses

Can this course be repeated for credit?

No

Enrolment Rules

Consent to Add
No consent required

Consent to Drop
No consent required

Prerequisites

Corequisites

Antirequisites

Course Notes

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Engineering

Dependencies

There are no dependencies

CHE 661 - Advances in Biochemical Engineering

Top

Effective Date & Career

Career
Graduate

Effective Term and Year

Proposed

Effective Term and Year
Winter 2027

Existing

Effective Term and Year
Fall 2023

Quest Course ID
346

Offering Number
1

Proposal Details

Proposal Type
Change

Academic Unit Approval
2026-06-08

Unit Weight/Number Changes
No

Rationale and Background for Change

The prerequisite is being removed to broaden access to students from other departments, schools, and Faculties. This revision aligns the prerequisite structure with that of other 600-level CHE courses.

Course Information

Faculty
Faculty of Engineering

Academic Unit
Department of Chemical Engineering

Subject Code
CHE

Number
661

Is this course cross-listed?
No

Title
Advances in Biochemical Engineering

Abbreviated Title
Adv.Biochemical Engineering

Description
Design and control of bioprocesses with application to advanced or novel systems including enzymes, mixed cultures, genetically engineered cells, plant cells and animal cells. Exploration of new methods of producing materials, food, pharmaceuticals and providing services such as biological waste treatment.

Units
0.50

Exceptions to Fees or Academic Progress Units
No

Components
Lecture

Primary Component
Lecture

Grading Information

Grading Basis
Numerical Grading Basis

Repeatable Courses

Can this course be repeated for credit?
No

Enrolment Rules

Consent to Add
No consent required

Consent to Drop
No consent required

Prerequisites

Corequisites

Antirequisites

Course Notes

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Engineering

Dependencies

There are no dependencies

ECE 663 - Power Electronics

Top

Effective Date & Career

Career
Graduate

Effective Term and Year

Proposed

Effective Term and Year
Winter 2027

Existing

Effective Term and Year
Spring 2026

Quest Course ID
799

Offering Number
1

Proposal Details

Proposal Type
Change

Academic Unit Approval
2026-04-23

Unit Weight/Number Changes
No

Rationale and Background for Change

Changing the name of ECE 663 Energy Processing to ECE 663 Power Electronics and updating the course description. Adding ECE 6610PD as an antirequisite to minimize content overlap.

The content of this course has evolved over the years, updates are being made to keep in line with the developments in the topics discussed in them.

These courses overlap. We need to make sure that students who may have previously taken one or more of these courses in one of our programs (BSc, MASc, Ph D, MENG, MENG PWR) do not retake equivalent courses to them if/when they enroll in another one of our programs.

Note: The ECE 663 course title will also be updated on the following program pages in the GSAC:
Doctor of Philosophy (Ph D) in Electrical and Computer Engineering
Master of Applied Science (MASc) in Electrical and Computer Engineering

Course Information

Faculty
Faculty of Engineering

Academic Unit
Department of Electrical and Computer Engineering

Subject Code

Number

ECE 663

Is this course cross-listed?
No

Title

Proposed
Title Power Electronics
Existing
Title Energy Processing

Abbreviated Title

Proposed
Abbreviated Title Power Electronics
Existing
Abbreviated Title Energy Processing

Description

Proposed
Description This course covers the following topics: The essential role of power electronic converters in application areas such as dc power supplies, motor drives, power quality control, renewable energy integration, energy storage, transportation electrification, and microgrids. Operational characteristics of power semiconductor devices. Converter topologies. Converter design, power circuits, and standards.
Existing
Description This course is intended to embrace power electronic aspects together with the broader issues of the systems of energy processing for emerging technologies. Within this framework, topics include performance, selection and optimization of power semiconductor devices including thyristors, GTOs, triacs, BJTs, MOSFETs, IGBTs and MCTs; classification, circuits and performance of converting circuits including rectifiers, inverters, choppers and cycloconverters; control and protection of conversion circuits; requirements and constraints of energy processing systems such as variable speed drives, high energy battery installations, transportation, solar and wind generators and industrial processes.

Units
0.50

Exceptions to Fees or Academic Progress Units
No

Components
Lecture

Primary Component
Lecture

Grading Information

Grading Basis

Numerical Grading Basis

Repeatable Courses

Can this course be repeated for credit?
No

Enrolment Rules

Consent to Add
No consent required

Consent to Drop
No consent required

Prerequisites

Corequisites

Antirequisites

- **Not completed nor concurrently enrolled in: ECE463, ECE6610PD**

Course Notes

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Engineering

Dependencies

There are no dependencies

ECE 668 - Active Distribution Systems & DER Integration

Top

Effective Date & Career

Career	Effective Term and Year	Quest Course ID	Offering Number
Graduate	Proposed	803	1

Effective Term and Year
Winter 2027

Existing

Effective Term and Year
Fall 2023

Proposal Details

Proposal Type
Change

Academic Unit Approval
2026-04-23

Unit Weight/Number Changes
No

Rationale and Background for Change

Changing the name of ECE 668 Distribution System Engineering to ECE 668 Active Distribution Systems & DER Integration and updating the course description.

The content of this course has evolved over the years, updates are being made to keep in line with the developments in the topics discussed in them.

Note: The ECE 668 course title will also be updated on the following program pages in the GSAC:
Doctor of Philosophy (Ph D) in Electrical and Computer Engineering
Master of Applied Science (MASc) in Electrical and Computer Engineering

Course Information

Faculty
Faculty of Engineering

Academic Unit
Department of Electrical and Computer Engineering

Subject Code
ECE

Number
668

Is this course cross-listed?
No

Title

Proposed

Title
Active Distribution Systems & DER Integration

Existing

Title
Distribution System Engineering

Abbreviated Title

Proposed

Abbreviated Title
Actv Dstrbtn Sstms and DER Int

Existing

Abbreviated Title
Distribution System Engineerin

Description

Proposed

Description
This course covers the following topics: Foundational principles of distribution system engineering. Technologies and operational strategies associated with distributed generation and DER integration. Distribution networks and systems. Load characteristics and forecasting. Power flow analysis, voltage regulation and capacitor placement. Distributed generation technologies, DER integration impacts, hosting capacity analysis, microgrids, electric vehicle charging infrastructure, and advanced control strategies. Volt/Var optimization and microgrids.

Existing

Description
This course covers the following topics in distribution engineering: Load Characteristics and distribution system load forecasting; Distribution system planning; Distribution system automation; Design and application of distribution transformers; Design and optimal operation of sub-transmission lines and distribution systems; Distribution system voltage regulation; Reactive power control for distribution systems; Application of capacitors to distribution systems; Calculation of voltage drops in lateral distribution systems; Calculation of power losses in distribution systems; Introduction to distribution system protection. Background Required - basic knowledge of power system operation and analysis.

Units
0.50

Exceptions to Fees or Academic Progress Units
No

Components
Lecture

Primary Component
Lecture

Grading Information

Grading Basis
Numerical Grading Basis

Repeatable Courses

Can this course be repeated for credit?
No

Enrolment Rules

Consent to Add
No consent required

Consent to Drop
No consent required

Prerequisites

Corequisites

Antirequisites

Course Notes

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Engineering

Dependencies

There are no dependencies

ECE 669 - Dielectric Materials in Power and Transportation Systems

Top

Effective Date & Career

Career
Graduate

Effective Term and Year

Proposed

Effective Term and Year
Winter 2027

Existing

Effective Term and Year
Fall 2023

Quest Course ID
804

Offering Number
1

Proposal Details

Proposal Type
Change

Academic Unit Approval
2026-04-23

Unit Weight/Number Changes
No

Rationale and Background for Change

Changing the name of ECE 669 Dielectric Materials to ECE 669 Dielectric Materials in Power and Transportation Systems and updating the course description. Adding ECE 6608PD as an antirequisite to minimize content overlap.

The content of this course has evolved over the years, updates are being made to keep in line with the developments in the topics discussed in them.

These courses overlap. We need to make sure that students who may have previously taken one or more of these courses in one of our programs (BSc, MASc, Ph D, MENG, MENG PWR) do not retake equivalent courses to them if/when they enroll in another one of our programs.

Course Information

Faculty
Faculty of Engineering

Academic Unit
Department of Electrical and Computer Engineering

Subject Code
ECE

Number
669

Is this course cross-listed?
No

Title

Proposed

Title
Dielectric Materials in Power and Transportation Systems

Existing

Title
Dielectric Materials

Abbreviated Title

Proposed

Dltcs Mtls in Pwr & Transp Sys

Existing

Abbreviated Title
Dielectric Materials

Description

Proposed

Description
This course covers the following topics: The physics of dielectric materials and their application in power systems. Gaseous, liquid, and solid dielectrics. Conduction and breakdown mechanisms, dielectric ageing and failure processes. Diagnostic/testing techniques under high electric fields. Insulation systems in transformers, motors and cables. Outdoor insulators. Insulation performance in renewable energy and transport electrification systems.

Existing

Description
Selected topics from theory of solid insulation breakdown. Conduction process in insulating liquids. Hydro dynamic processes. Theories of breakdown due to gaseous inclusion, moisture inclusion and particle contamination. Kinetic theory of gases. Breakdown mechanism in uniform electric fields. Corona and breakdown in non-uniform electric fields. Compressed gas insulation.

Units
0.50

Exceptions to Fees or Academic Progress Units
No

Components
Lecture

Primary Component
Lecture

Grading Information

Grading Basis
Numerical Grading Basis

Repeatable Courses

Can this course be repeated for credit?
No

Enrolment Rules

Consent to Add
No consent required

Consent to Drop
No consent required

Prerequisites

Corequisites

Antirequisites

- **Not completed nor concurrently enrolled in: ECE6608PD**

Course Notes

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Engineering

Dependencies

There are no dependencies

ECE 6601PD - Power System Components and Modeling

Top

Effective Date & Career

Career
Graduate

Effective Term and Year

Proposed

Effective Term and Year
Winter 2027

Existing

Effective Term and Year
Fall 2023

Quest Course ID
12050

Offering Number
1

Proposal Details

Proposal Type
Change

Academic Unit Approval
2026-04-23

Unit Weight/Number Changes
No

Rationale and Background for Change

Adding ECE 762 as an antirequisite to minimize content overlap.

These courses overlap. We need to make sure that students who may have previously taken one or more of these courses in one of our programs (BSc, MASc, Ph D, MENG, MENG PWR) do not retake equivalent courses to them if/when they enroll in another one of our programs.

Course Information

Faculty

Faculty of Engineering

Academic Unit

Department of Electrical and Computer Engineering

Subject Code

ECE

Number

6601PD

Is this course cross-listed?

No

Title

Power System Components and Modeling

Abbreviated Title

Power Syst Comp & Modelling

Description

Discuss in detail the basic structure, functional characteristics and protection schemes of the main components that make up a powers system, in particular generators, transformers, transmission lines, cables, loads, HVDC and FACTS controllers. Understand the modelling and simulation of these components for detailed electromagnetic transients analyses, as well as phasor models for power flow and stability studies.

Units

0.50

Exceptions to Fees or Academic Progress Units

No

Components

Lecture

Primary Component

Lecture

Grading Information

Grading Basis

Numerical Grading Basis

Repeatable Courses

Can this course be repeated for credit?
No

Enrolment Rules

Consent to Add
No consent required

Consent to Drop
No consent required

Prerequisites

- **Enrolled in:**
- **MEng in Electrical & Computer Engineering-Electric Power Engineering - Master of Engineering (MEng) in Electrical and Computer Engineering - Electric Power Engineering**
- **GDip in Electric Power Engineering (Type 3/Direct-entry) - Graduate Diploma (GDip) in Electric Power Engineering (Type 3/Direct-entry)**

Corequisites

Antirequisites

- **Not completed nor concurrently enrolled in any of the following:**
  - ECE762 - Power System Components and Modeling (0.50)

Course Notes

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Engineering

Dependencies

Coursework Option: Course Requirements

- MEng in Electrical & Computer Engineering-Electric Power Engineering - Master of Engineering (MEng) in Electrical and Computer Engineering - Electric Power Engineering View Program

Graduate Diploma: Course Requirements

- GDip in Electric Power Engineering (Type 3/Direct-entry) - Graduate Diploma (GDip) in Electric Power Engineering (Type 3/Direct-entry) View Program

ECE 6602PD - Power System Planning: Generation, Transmission and Integrated Resource

Top

Effective Date & Career

Career
Graduate

Effective Term and Year

Proposed

Effective Term and Year
Winter 2027

Existing

Effective Term and Year
Fall 2023

Quest Course ID
12051

Offering Number
1

Proposal Details

Proposal Type
Change

Academic Unit Approval
2026-04-23

Unit Weight/Number Changes
No

Rationale and Background for Change

Changing the name of ECE 6602PD Power System Management & Electricity Markets to ECE 6602PD Power System Planning: Generation, Transmission and Integrated Resource and updating the course description.

The content of this course has evolved over the years, updates are being made to keep in line with the developments in the topics discussed in them.

Note: The ECE 6602PD course title will also be updated on the following program pages in the GSAC:
Graduate Diploma (GDip) in Electric Power Engineering (Type 3)
Master of Engineering (MEng) in Electrical and Computer Engineering - Electric Power Engineering

Course Information

Faculty
Faculty of Engineering

Academic Unit
Department of Electrical and Computer Engineering

Subject Code
ECE

Number
6602PD

Is this course cross-listed?
No

Title

Proposed

Title
Power System Planning: Generation, Transmission and Integrated Resource

Existing

Title
Power System Management & Electricity Markets

Abbreviated Title

Proposed

Abbreviated Title
Pwr Stm Pln Gen Trns & Int Res

Existing

Abbreviated Title
Pwr. Sys. Mgmt. & Elec. Mkts.

Description

Proposed

Description
This course covers the following topics: Power generation, transmission, and integrated resource planning. Planning in a deregulated power system. Engineering economics and fundamentals of utility cost analysis. Generation, transmission and distribution planning from the traditional perspective and model-based formulations, and applications in current practices. Power system adequacy, maintenance planning, reactive power planning, and capacity market design. Uncertainty considerations in system planning, and the inclusion of renewables.

Existing

Description
The course will provide a comprehensive overview of power system operations and management, starting with a general understanding of system economics. Many emerging issues in power sector deregulation- such as those in system reliability and system control- shall be discussed within the course. The course will provide a perspective on operations planning models and train the participant to look at technical issues of power system operation simultaneously with the economic aspects. Recommended Background: Basic understanding of power system operation is required. Knowledge of mathematical programming is desirable.

Units
0.50

Exceptions to Fees or Academic Progress Units
No

Components
Lecture

Primary Component
Lecture

Grading Information

Grading Basis
Numerical Grading Basis

Repeatable Courses

Can this course be repeated for credit?
No

Enrolment Rules

Consent to Add
No consent required

Consent to Drop
No consent required

Prerequisites

- **Enrolled in:**
- **MEng in Electrical & Computer Engineering-Electric Power Engineering - Master of Engineering (MEng) in Electrical and Computer Engineering - Electric Power Engineering**
- **GDip in Electric Power Engineering (Type 3/Direct-entry) - Graduate Diploma (GDip) in Electric Power Engineering (Type 3/Direct-entry)**

Corequisites

Antirequisites

Course Notes

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Engineering

Dependencies

Coursework Option: Course Requirements

- MEng in Electrical & Computer Engineering-Electric Power Engineering - Master of Engineering (MEng) in Electrical and Computer Engineering - Electric Power Engineering View Program

Graduate Diploma: Course Requirements

- GDip in Electric Power Engineering (Type 3/Direct-entry) - Graduate Diploma (GDip) in Electric Power Engineering (Type 3/Direct-entry) View Program

ECE 6605PD - Power System Protection

Top

Effective Date & Career

Career
Graduate

Effective Term and Year

Proposed

Effective Term and Year
Winter 2027

Existing

Effective Term and Year
Fall 2023

Quest Course ID
12054

Offering Number
1

Proposal Details

Proposal Type
Change

Academic Unit Approval
2026-04-23

Unit Weight/Number Changes
No

Rationale and Background for Change

Adding ECE 661 as an antirequisite to minimize content overlap.

These courses overlap. We need to make sure that students who may have previously taken one or more of these courses in one of our programs (BSc, MASc, Ph D, MENG, MENG PWR) do not retake equivalent courses to them if/when they enroll in another one of our programs.

Course Information

Faculty
Faculty of Engineering

Academic Unit
Department of Electrical and Computer Engineering

Subject Code
ECE

Number
6605PD

Is this course cross-listed?

No

Title
Power System Protection

Abbreviated Title
Power System Protection

Description
Power system protections schemes are designed primarily to minimize the duration of a fault as well as to minimize the number of customers affect by the fault. The scope of this course is to study the main elements and techniques for power system protection. The course is divided into two main parts; protective equipment and protective techniques. In the protective equipment; circuit breakers, relay, enclosures, fuses and isolating switches are discussed. Different protection techniques dedicated to protect feeders, transformers, generators and motors are discussed in the second part of the course. Recommended Background: Basic knowledge in power system engineering is required, basic knowledge in optimization techniques, statistics, and electric circuits.

Units
0.50

Exceptions to Fees or Academic Progress Units
No

Components
Lecture

Primary Component
Lecture

Grading Information

Grading Basis
Numerical Grading Basis

Repeatable Courses

Can this course be repeated for credit?
No

Enrolment Rules

Consent to Add
No consent required

Consent to Drop
No consent required

Prerequisites
- **Enrolled in:**
- **MEng in Electrical & Computer Engineering-Electric Power Engineering - Master of Engineering (MEng) in Electrical and Computer Engineering - Electric Power Engineering**
- **GDip in Electric Power Engineering (Type 3/Direct-entry) - Graduate Diploma (GDip) in Electric Power Engineering (Type 3/Direct-entry)**

Corequisites

Antirequisites

- **Not completed nor concurrently enrolled in any of the following:**
  - ECE661 - Power System Protection and Relaying (0.50)

Course Notes

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Engineering

Dependencies

Coursework Option: Course Requirements

- MEng in Electrical & Computer Engineering-Electric Power Engineering - Master of Engineering (MEng) in Electrical and Computer Engineering - Electric Power Engineering View Program

Graduate Diploma: Course Requirements

- GDip in Electric Power Engineering (Type 3/Direct-entry) - Graduate Diploma (GDip) in Electric Power Engineering (Type 3/Direct-entry) View Program

ECE 6607PD - Power System Operation and Electricity Markets

Top

Effective Date & Career

Career
Graduate

Effective Term and Year

Proposed

Effective Term and Year
Winter 2027

Existing

Effective Term and Year
Fall 2023

Quest Course ID
12056

Offering Number
1

Proposal Details

Proposal Type

Academic Unit Approval

Change 2026-04-23

Unit Weight/Number Changes
No

Rationale and Background for Change

Changing the name of ECE 6607PD Operation and Control of Restructured Power Systems to ECE 6607PD Power System Operation and Electricity Markets. Changing the course description and adding ECE 666 or ECE 467 as antirequisites.

The content of this course has evolved over the years, updates are being made to keep in line with the developments in the topics discussed in them.

These courses overlap. We need to make sure that students who may have previously taken one or more of these courses in one of our programs (BSc, MASc, Ph D, MENG, MENG PWR) do not retake equivalent courses to them if/when they enroll in another one of our programs.

Note: The ECE 6607PD course title will also be updated on the following program pages in the GSAC:
Graduate Diploma (GDip) in Electric Power Engineering (Type 3)
Master of Engineering (MEng) in Electrical and Computer Engineering - Electric Power Engineering

Course Information

Faculty
Faculty of Engineering

Academic Unit
Department of Electrical and Computer Engineering

Subject Code
ECE

Number
6607PD

Is this course cross-listed?
No

Title

Proposed

Title
Power System Operation and Electricity Markets

Existing

Title
Operation and Control of Restructured Power Systems

Abbreviated Title

Proposed

Abbreviated Title

Pwr Sstm Oprtn & Eltcty Mrkts

Existing

Abbreviated Title
Opn. of Restructured Pwr. Sys.

Description

Proposed

Description
This course covers the following topics: The operation of power systems in regulated and competitive electricity market environments. Basics of system operation; economic load dispatch, unit commitment and optimal power flow. Structure and operation of electricity markets, auction models, price formations, and the role of ISOs. Transmission system operations; open access, pricing paradigms and methods. Use of power transfer distribution factors in transmission pricing. Congestion management and firm transmission rights. Ancillary services; procurement, demand response and capacity markets.

Existing

Description
The course deals in detail with power system operation and control in the deregulated electricity market environment. The topics include electricity market design and auction mechanisms, price formation, role of the independent system operator in pool versus bilateral markets, generation scheduling in deregulation, transmission pricing paradigms, congestion management, transmission rights, ancillary services procurement and pricing, and security management in deregulation. A highlight of the course is the country- specific information provided on various operational aspects of restructured power systems worldwide. Recommended Background: Basic understanding of power system engineering is required. Knowledge of mathematical programming is desirable.

Units
0.50

Exceptions to Fees or Academic Progress Units
No

Components
Lecture

Primary Component
Lecture

Grading Information

Grading Basis
Numerical Grading Basis

Repeatable Courses

Can this course be repeated for credit?
No

Enrolment Rules

Consent to Add
No consent required

Consent to Drop
No consent required

Prerequisites

- **Enrolled in:**
- **MEng in Electrical & Computer Engineering-Electric Power Engineering - Master of Engineering (MEng)**

in Electrical and Computer Engineering - Electric Power Engineering
- GDip in Electric Power Engineering (Type 3/Direct-entry) - Graduate Diploma (GDip) in Electric Power Engineering (Type 3/Direct-entry)

Corequisites

Antirequisites

- Not completed nor concurrently enrolled in: ECE467 or ECE666

Course Notes

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Engineering

Dependencies

Coursework Option: Course Requirements

- MEng in Electrical & Computer Engineering-Electric Power Engineering - Master of Engineering (MEng) in Electrical and Computer Engineering - Electric Power Engineering View Program

Graduate Diploma: Course Requirements

- GDip in Electric Power Engineering (Type 3/Direct-entry) - Graduate Diploma (GDip) in Electric Power Engineering (Type 3/Direct-entry) View Program

ECE 6608PD - Electrical Insulation in Power System Components

Top

Effective Date & Career

Career	Effective Term and Year	Quest Course ID	Offering Number
Graduate		12057	1

Proposed

Effective Term and Year
Winter 2027

Existing

Effective Term and Year
Fall 2023

Proposal Details

Proposal Type
Change

Academic Unit Approval
2026-04-23

Unit Weight/Number Changes
No

Rationale and Background for Change

Changing the name of ECE 6608PD Dielectrics and Electrical Insulation to ECE 6608PD Electrical Insulation in Power System Components. Changing the course description and adding ECE 669 as an antirequisite.

The content of this course has evolved over the years, updates are being made to keep in line with the developments in the topics discussed in them.

These courses overlap. We need to make sure that students who may have previously taken one or more of these courses in one of our programs (BSc, MASc, Ph D, MENG, MENG PWR) do not retake equivalent courses to them if/when they enroll in another one of our programs.

Note: The ECE 6608PD course title will also be updated on the following program pages in the GSAC:
Graduate Diploma (GDip) in Electric Power Engineering (Type 3)
Master of Engineering (MEng) in Electrical and Computer Engineering - Electric Power Engineering

Course Information

Faculty
Faculty of Engineering

Academic Unit
Department of Electrical and Computer Engineering

Subject Code
ECE

Number
6608PD

Is this course cross-listed?
No

Title

Proposed

Title
Electrical Insulation in Power System Components

Existing

Title
Dielectrics and Electrical Insulation

Abbreviated Title

Proposed

Abbreviated Title
Elctrc Insltn in Pwr Sstm Comp

Existing

Abbreviated Title
Dielectrics & Electl. Insul.

Description

Proposed

Description
This course covers the following topics: The behavior and application of insulating materials in power systems. Gaseous, liquid, and solid dielectrics. Conduction, breakdown, ageing mechanisms and diagnostic/testing techniques under high electric fields. Insulation systems in transformers, machines, and transmission and distribution networks. Grid reliability and modernization. Challenges arising from renewable energy integration and transport electrification.

Existing

Description
Theory of gases. Photoelectric, thermal and field emission. Ionization by collision, photoionization, thermal ionization and ionization by x-rays and cosmic rays. Deionization becuase of recombination, negative ion formation, and diffusion. Behaviour of charged particles in electric fields of low E/P and high E/P (E=electric field and P=pressure). Breakdown Processes: Townsend mechanism, secondary effect, streamer formation from self sustained discharges to breakdown, breakdown in non-uniform fields, temporal development of breakdown, partial breakdown or corona discharges. Solid and Liquid Dielectrics: Types of solid and liquid insulating materials, their electrical thermal, chemical and mechanical properties; charge transport; surface discharges; breakdown mechanisms; effects of impurities on breakdown strength. Electrohydrodynamics and its influence on breakdown mechanisms in liquids; electromechanical and intrinsic breakdown strength of solids. Recommended Background: Basic knowledge of physics of materials for Electrical Engineers (ECE 209 or equivalent). Familiarity with electrical power system components is useful.

Units
0.50

Exceptions to Fees or Academic Progress Units
No

Components
Lecture

Primary Component
Lecture

Grading Information

Grading Basis

Numerical Grading Basis

Repeatable Courses

Can this course be repeated for credit?
No

Enrolment Rules

Consent to Add
No consent required

Consent to Drop
No consent required

Prerequisites

- **Enrolled in:**
- **MEng in Electrical & Computer Engineering-Electric Power Engineering - Master of Engineering (MEng) in Electrical and Computer Engineering - Electric Power Engineering**
- **GDip in Electric Power Engineering (Type 3/Direct-entry) - Graduate Diploma (GDip) in Electric Power Engineering (Type 3/Direct-entry)**

Corequisites

Antirequisites

- **Not completed nor concurrently enrolled in any of the following:**
  - ECE669 - Dielectric Materials (0.50)

Course Notes

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Engineering

Dependencies

Coursework Option: Course Requirements

- MEng in Electrical & Computer Engineering-Electric Power Engineering - Master of Engineering (MEng) in Electrical and Computer Engineering - Electric Power Engineering View Program

Graduate Diploma: Course Requirements

- GDip in Electric Power Engineering (Type 3/Direct-entry) - Graduate Diploma (GDip) in Electric Power Engineering (Type 3/Direct-entry) View Program

ECE 6609PD - High Voltage Engineering Applications

Top

Effective Date & Career

Career
Graduate

Effective Term and Year

Proposed

Effective Term and Year
Winter 2027

Existing

Effective Term and Year
Fall 2023

Quest Course ID
12058

Offering Number
1

Proposal Details

Proposal Type
Change

Academic Unit Approval
2026-04-23

Unit Weight/Number Changes
No

Rationale and Background for Change

Adding ECE 665 as an antirequisite to minimize content overlap.

These courses overlap. We need to make sure that students who may have previously taken one or more of these courses in one of our programs (BSc, MASc, Ph D, MENG, MENG PWR) do not retake equivalent courses to them if/when they enroll in another one of our programs.

Course Information

Faculty

Faculty of Engineering

Academic Unit

Department of Electrical and Computer Engineering

Subject Code
ECE

Number
6609PD

Is this course cross-listed?
No

Title
High Voltage Engineering Applications

Abbreviated Title
High Voltage Engrg. Appns.

Description
This course deals with generation and measurement aspects of high voltages and industrial applications of high voltage engineering. The first part concentrates on generation of high voltage ac, dc and impluse voltages of both switching and lightning surges. Measurements techniques based on different types of potential dividers and spark gaps for ac, dc, and impulse measurements will be covered. The second part deals with generation and measurements of special types of high voltages needed for industrial applications. The course also covers non-destructive measurements like surface and internal discharges, capacitance and loss factor and some optical techniques. Recommended Background: Basic knowledge of circuit analysis and low voltage measurement techniques is required. Familiarity with electrical power system components is useful.

Units
0.50

Exceptions to Fees or Academic Progress Units
No

Components

Lecture

Primary Component
Lecture

Grading Information

Grading Basis
Numerical Grading Basis

Repeatable Courses

Can this course be repeated for credit?
No

Enrolment Rules

Consent to Add

Consent to Drop

No consent required

No consent required

Prerequisites

- **Enrolled in:**
- **MEng in Electrical & Computer Engineering-Electric Power Engineering - Master of Engineering (MEng) in Electrical and Computer Engineering - Electric Power Engineering**
- **GDip in Electric Power Engineering (Type 3/Direct-entry) - Graduate Diploma (GDip) in Electric Power Engineering (Type 3/Direct-entry)**

Corequisites

Antirequisites

- **Not completed nor concurrently enrolled in any of the following:**
  - ECE665 - High Voltage Engineering Applications (0.50)

Course Notes

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow

Faculty of Engineering

Dependencies

Coursework Option: Course Requirements

- MEng in Electrical & Computer Engineering-Electric Power Engineering - Master of Engineering (MEng) in Electrical and Computer Engineering - Electric Power Engineering View Program

Graduate Diploma: Course Requirements

- GDip in Electric Power Engineering (Type 3/Direct-entry) - Graduate Diploma (GDip) in Electric Power Engineering (Type 3/Direct-entry) View Program

ECE 6610PD - Power Electronics Converters: Design and Applications

Top

Effective Date & Career

Career	Effective Term and Year	Quest Course ID	Offering Number
Graduate	Proposed **Effective Term and**	12059	1

Year
Winter 2027

Existing

Effective Term and Year
Fall 2023

Proposal Details

Proposal Type
Change

Academic Unit Approval
2026-04-23

Unit Weight/Number Changes
No

Rationale and Background for Change

Adding ECE 663 as an antirequisite to minimize content overlap and updating the course title.

These courses overlap. We need to make sure that students who may have previously taken one or more of these courses in one of our programs (BSc, MASc, Ph D, MENG, MENG PWR) do not retake equivalent courses to them if/when they enroll in another one of our programs.

Note: The ECE 6610PD course title will also be updated on the following program pages in the GSAC:
Graduate Diploma (GDip) in Electric Power Engineering (Type 3)
Master of Engineering (MEng) in Electrical and Computer Engineering - Electric Power Engineering

Course Information

Faculty
Faculty of Engineering

Academic Unit
Department of Electrical and Computer Engineering

Subject Code
ECE

Number
6610PD

Is this course cross-listed?
No

Title

Proposed

Title
Power Electronics Converters: Design and Applications

Existing

Title
Power Electronic Converters

Abbreviated Title

Proposed

Abbreviated Title
Pwr Elecs Cnvrts: Dsgn & Apps

Existing

Abbreviated Title
Power Electronic Converters

Description
This course covers a wide range of topics in power electronics including: power semiconductor devices with emphasis on their operating characteristics, power converter topologies for ac-to-dc, dc-to-dc, dc-to-ac and ac-to-ac conversions, multi-converters and multi-level converters, control techniques in power converters, modeling of power converters, applications of power converters, converter design aspects (snubber circuits, gate/base-drive circuits, thermal management, series/parallel combinations of switches), and computer simulation of power electronic systems. Recommended Background: Basic understanding of circuit analysis and control theory is required. Familiarity with electric machinery and power systems is desirable.

Units
0.50

Exceptions to Fees or Academic Progress Units
No

Components
Lecture

Primary Component
Lecture

Grading Information

Grading Basis
Numerical Grading Basis

Repeatable Courses

Can this course be repeated for credit?
No

Enrolment Rules

Consent to Add
No consent required

Consent to Drop
No consent required

Prerequisites

- **Enrolled in:**
- **MEng in Electrical & Computer Engineering-Electric Power Engineering - Master of Engineering (MEng) in Electrical and Computer Engineering - Electric Power Engineering**

- **GDip in Electric Power Engineering (Type 3/Direct-entry) - Graduate Diploma (GDip) in Electric Power Engineering (Type 3/Direct-entry)**

Corequisites

Antirequisites

- **Not completed nor concurrently enrolled in any of the following:**
  - ECE663 - Energy Processing (0.50)

Course Notes

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Engineering

Dependencies

Coursework Option: Course Requirements

- MEng in Electrical & Computer Engineering-Electric Power Engineering - Master of Engineering (MEng) in Electrical and Computer Engineering - Electric Power Engineering View Program

Graduate Diploma: Course Requirements

- GDip in Electric Power Engineering (Type 3/Direct-entry) - Graduate Diploma (GDip) in Electric Power Engineering (Type 3/Direct-entry) View Program

ECE 6613PD - Power System Analysis

Top

Effective Date & Career

Career
Graduate

Effective Term and Year

Proposed

Effective Term and Year
Winter 2027

Existing

Effective Term and Year
Fall 2023

Quest Course ID
13345

Offering Number
1

Proposal Details

Proposal Type
Change

Academic Unit Approval
2026-04-23

Unit Weight/Number Changes
No

Rationale and Background for Change

Adding ECE 662 as an antirequisite to minimize content overlap.

These courses overlap. We need to make sure that students who may have previously taken one or more of these courses in one of our programs (BSc, MASc, Ph D, MENG, MENG PWR) do not retake equivalent courses to them if/when they enroll in another one of our programs.

Course Information

Faculty
Faculty of Engineering

Academic Unit
Department of Electrical and Computer Engineering

Subject Code
ECE

Number
6613PD

Is this course cross-listed?
No

Title
Power System Analysis

Abbreviated Title
Power System Analysis

Description
Understand the basic definitions and concepts associated with power systems analysis. Discuss in detail techniques and tools for power system analysis, with a practical perspecitve. The course will cover short circuit power flow, stability concepts including voltage, oscillatory, transcient and frequency stability.

Units
0.50

Exceptions to Fees or Academic Progress Units
No

Components

Primary Component

Lecture

Lecture

Grading Information

Grading Basis
Numerical Grading Basis

Repeatable Courses

Can this course be repeated for credit?
No

Enrolment Rules

Consent to Add
No consent required

Consent to Drop
No consent required

Prerequisites

- **Enrolled in:**
- **MEng in Electrical & Computer Engineering-Electric Power Engineering - Master of Engineering (MEng) in Electrical and Computer Engineering - Electric Power Engineering**
- **GDip in Electric Power Engineering (Type 3/Direct-entry) - Graduate Diploma (GDip) in Electric Power Engineering (Type 3/Direct-entry)**

Corequisites

Antirequisites

- **Not completed nor concurrently enrolled in any of the following:**
  - ECE662 - Power Systems Analysis and Control (0.50)

Course Notes

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow

Faculty of Engineering

Dependencies

Coursework Option: Course Requirements

- MEng in Electrical & Computer Engineering-Electric Power Engineering - Master of Engineering (MEng) in Electrical and Computer Engineering - Electric Power Engineering View Program

Graduate Diploma: Course Requirements

- GDip in Electric Power Engineering (Type 3/Direct-entry) - Graduate Diploma (GDip) in Electric Power Engineering (Type 3/Direct-entry) View Program

Master of Architecture (MArch) - Master of Architecture (MArch)

Top

Effective Date and Career

Career
Graduate

Effective Term and Year

Proposed

Effective Term and Year
Spring 2027

Existing

Effective Term and Year
Fall 2025

Proposal Details

Proposal Type
Change

Academic Unit Approval
2026-07-22

Quality Assurance Designation
Minor Modification Qad

Is there an impact to existing students?
No

Is the credential name changing?
No

Graduate Co-operative Requirements
Not Applicable

Change to Learning Outcomes
No

Rationale and Background for Change(s)

Updating the admission requirements and degree requirements to reflect current practice. The School of Architecture is proposing the following program changes to articulate the requirements more clearly and clarify the coding of students entering the different streams of the MArch program. Currently there is not a clear differentiation in coding between students entering into A) the two-year MArch stream (International students and Canadian students not coming from an accredited pre-professional program) and B) the one-year MArch stream (UW architecture undergrads and other Canadian CACB accredited pre-professional undergraduate programs). These updates are being made to align with the current practice of the program which distinguishes requirements based on a student's academic background. For the standard stream, the order of the two first year design studio courses, ARCH 690 and ARCH 691 will be reversed, so that ARCH 690 will be taught in the fall of first year, and the more technically challenging ARCH 691 will be taught in the winter of first year. This will make the fall term lighter and more introductory, and the second term can build on the more general knowledge of this first design studio course. This new order is the same as the order in which we teach equivalent undergraduate studio courses. To synchronize better with this, ARCH 662 will be moved to the fall term where it can complement ARCH 690, and ARCH 673 will be moved to the spring term where it can complement ARCH 691. Finally, ARCH 640 is moving from the fall term of second year, where it overloads our standard stream students with an extra half credit in comparison to their advanced stream classmates, to the first term of the program alongside ARCH 690.

General Program/Plan Information

Faculty
Faculty of Engineering

Academic Unit
School of Architecture

Graduate Field of Study
Architecture

Faculty
Faculty of Engineering

Program/Plan Name
Master of Architecture (MArch)

Graduate Credential Type
Master's

Accelerated Program
Not applicable

Study Options (New)
Thesis

Admit Term(s)
Fall

Delivery Mode

Delivery Mode Information

Cambridge campus

On-campus

Length of Program

Proposed

Length of Program

- Students can complete the program within a minimum of three terms and up to a maximum of six terms. Note that students need to submit a Request for extension beyond program time limits after term six.

Existing

Length of Program

- The Master of Architecture is a two-year degree program. The program accepts applicants from pre-professional architecture programs, in which students are expected to have completed the majority of the courses required for professional accreditation. Students holding a pre-professional Bachelor of Architectural Studies (BAS) from the University of Waterloo (or an equivalent degree to the BAS from another university) can complete the Master of Architecture degree requirements in a minimum of three terms and up to a maximum of six terms. All other students with a pre-professional Architecture degree admitted into the Master of Architecture, will be required to complete two terms of transitional coursework in preparation for the thesis year and are expected to complete degree requirements in a maximum of six academic terms.

Registration Option(s)

Full-time

Additional Program Information

Proposed

Additional Program Information

- In Canada, all provincial/territorial associations/institutes/orders recommend a degree from an accredited professional degree program as a prerequisite for licensure. The Canadian Architectural Certification Board (CACB) is the sole agency authorized to accredit Canadian professional degree programs in architecture for the purposes of architectural licensure.
- The professional Master of Architecture in conjunction with the pre-professional Bachelor of Architectural Studies degree from the University of Waterloo or other equivalent accredited architecture programs, together constitute an accredited professional education.
- A program may be granted a six-year, three year, or two-year term of accreditation, depending on its degree of conformance with established educational standards. The professional Master of Architecture in conjunction with the pre-professional Bachelor of Architectural Studies degree from the University of Waterloo is accredited by the Canadian Architectural Certification Board.
- Note: The Master of Architecture curriculum covers the following key areas: Design; History and Theory; Building Technology; Professional Practice.

Existing

Additional Program Information

- The professional Master of Architecture in conjunction with the pre-professional Bachelor of Architectural Studies degree from the University of Waterloo together constitute an accredited professional education.
- In Canada, all provincial/territorial associations/institutes/orders recommend a degree from an accredited professional degree program as a prerequisite for licensure. The Canadian Architectural Certification Board (CACB), which is the sole agency authorized to accredit Canadian professional degree programs in architecture, recognizes two types of accredited degrees: the Master of Architecture (MArch) and the Bachelor of Architecture (BArch). A program may be granted a six-year, three-year, or two-year term of accreditation, depending on its degree of conformance with established educational standards.
- Master's degree programs may consist of a pre-professional undergraduate degree and a professional graduate degree, which, when earned sequentially, comprise an accredited professional education. However, the pre-professional degree is not, by itself, recognized as an accredited degree.
- The program in Architecture at the University of Waterloo received accreditation for a 6-year term by the Canadian Architectural Certification Board (CACB).

Admission Requirements: Minimum Requirements

Proposed

Admission Requirements: Minimum Requirements

- **Advanced stream:**
- Successful completion of any of the following pre-professional four-year Honours Bachelor of Architectural Studies (BAS) undergraduate degrees with a minimum overall average of 75%:
  - University of Waterloo Honours Bachelor of Architectural Studies.
  - Canadian Architectural Certification Board (CACB) accredited pre-professional program (which must include the Comprehensive Building Design Studio and related technical Student Performance Criteria (SPCs) noted in the Canadian Architectural Certification Board).
  - National Architectural Accrediting Board (NAAB) accredited Bachelor of Architecture (BArch) from a US architecture program.
- Note: University of Waterloo Honours Bachelor of Architectural Studies program graduates who maintained a 75% average are automatically accepted to the MArch program. These students must apply but do not need to submit a Portfolio (as part of their application materials) and are required to submit only one letter of reference.

- **Standard stream:**
- Successful completion of any of the following:
  - An approved accredited, professional Bachelor of Architecture degree from a school outside of Canada with a minimum overall average of 75% or equivalent.
  - An approved four-year, honours pre-professional undergraduate Architecture degree in Canada with a minimum overall average of 75%.
  - An approved pre-professional undergraduate architecture degree from a US architecture program with a minimum overall average of 75%.
- Applicants must have completed an undergraduate architecture degree that included either a co-op or internship experience within Canada, or they must have been employed by an architecture firm in Canada or have equivalent industry experience.
- Applicants to the Standard stream that do not meet the above conditions must apply to the Master of Architecture (MArch) - Co-operative Program (Standard stream).
- Applicants who have not completed three or more years of post-secondary study at an institution at which English was the language of instruction may be required to verify English Proficiency which may include a written exercise or interview as instructed by the School of Architecture. Details will be communicated when required after initial assessment of applications is complete. This is an additional departmental requirement and not a substitute for the English Language Proficiency Certification.
- English language proficiency (ELP) (if applicable)

Existing

Admission Requirements: Minimum Requirements

- A four-year, honours pre-professional undergraduate Architecture degree or professional Bachelor of Architecture degree with a minimum overall average of 75%.
- Applicants being considered for admission to the Master of Architecture who have not completed three or more years of post-secondary work at a Canadian institution, or at an institution at which English was the language of instruction may be required to verify English Proficiency which may include a written exercise or interview as instructed by the School of Architecture. Details will be communicated when required after initial assessment of applications is complete. This is an additional departmental requirement and not a substitute for the English Language Proficiency Certification.
- English language proficiency (ELP) (if applicable)

Admission Requirements: Application materials

Proposed

Admission Requirements: Application materials

- Portfolio
  - Portfolio of design work – uploaded directly to the program application.
- Résumé/Curriculum vitae
- Statement of interest
  - Including a statement of the students proposed research interest.
- Transcript(s)
  - From each post-secondary institution attended (past or current) showing all courses and marks, along with the transcript legends/keys/grading scales uploaded to the program application. Degree certificates (if obtained)

must be uploaded with the transcripts.

Existing

Admission Requirements: Application materials

- Portfolio
  - Portfolio of design work – uploaded directly to applicant Quest account.
- Résumé/Curriculum vitae
- Statement of interest
  - Including a statement of the students proposed research interest.
- Transcript(s)
  - From each post-secondary institution attended (past or current) showing all courses and marks, along with the transcript legends/keys/grading scales uploaded using Quest. Degree certificates (if obtained) must be uploaded with the transcripts.

Admission Requirements: References

- Number of references: 2
- Type of references: academic

Requirements Information

Graduate Degree Requirements

Proposed

Graduate Degree Requirements

- Students must complete the course and milestone requirements listed below in addition to the Graduate Academic Integrity Module (Graduate AIM).

Existing

Graduate Degree Requirements

- Students must complete the course and milestone requirements listed below in addition to the Graduate Academic Integrity Module (Graduate AIM).
- Note: The Master of Architecture curriculum covers six key areas: Design; History; Theory; Building Technology; Media and Methods; Professional Practice.

Thesis Option: Course Requirements

Thesis Option: Course Requirements

Proposed

Thesis Option: Course Requirements

- **Advanced stream:**
- Students must complete the following courses:
- Year 1: Fall
  - ARCH 610 Architectural Research and Analysis
  - ARCH 692 Thesis Research and Design Studio I
  - ARCH 6XX or 7XX elective
- Year 1: Winter
  - ARCH 655 Architectural Professional Practice: Ethics, Business, Legal Issues, and Contract Administration
  - ARCH 693 Thesis Research and Design Studio II
  - ARCH 6XX or 7XX elective
- Year 1: Spring
  - ARCH 6XX or 7XX elective
- Students are encouraged to use elective courses to explore areas of specialization in support of their thesis research. Students can substitute at most 1 ARCH 6XX or 7XX graduate elective with a graduate elective (0.50 unit weight) offered by another department/school. 1 course (0.50 unit weight) may be an independent Architecture Reading Course.

- **Standard stream:**
- Students must complete the following courses:
- Year 1: Fall
  - ARCH 640 Contemporary Theory, Culture and Criticism
  - ARCH 662 Steel & Concrete: Design, Structure and Construction
  - ARCH 690 Design Studio
- Year 1: Winter
  - ARCH 642 Modernism To The 21st Century
  - ARCH 671 Technical Report
  - ARCH 673 The Science of the Building Envelope
  - ARCH 691 Design Studio - Comprehensive Building Design
- Year 2: Fall
  - ARCH 610 Architectural Research and Analysis
  - ARCH 692 Thesis Research and Design Studio I
  - ARCH 6XX or 7XX elective
- Year 2: Winter
  - ARCH 655 Architectural Professional Practice: Ethics, Business, Legal Issues, and Contract Administration
  - ARCH 693 Thesis Research and Design Studio II
  - ARCH 6XX or 7XX elective
- Year 2: Spring
  - ARCH 6XX or 7XX elective
- Students are encouraged to use elective courses to explore areas of specialization in support of their thesis research. Students can substitute at most 1 ARCH 6XX or 7XX graduate elective with a graduate elective (0.50 unit weight) offered by another department/school. 1 course (0.50 unit weight) may be an independent Architecture Reading Course.

Existing

Thesis Option: Course Requirements

- Students must complete the following courses:
- Year 1:
  - ARCH 690 Design Studio
  - ARCH 673 The Science of the Building Envelope
  - ARCH 642 Modernism To The 21st Century
  - ARCH 671 Technical Report
  - ARCH 691 Design Studio - Comprehensive Building Design
  - ARCH 662 Steel & Concrete: Design, Structure and Construction
  - ARCH 640 Contemporary Theory, Culture and Criticism
- Year 2: Fall

    - ARCH 692 Thesis Research and Design Studio I
    - ARCH 610 Architectural Research and Analysis
    - ARCH 6XX Open graduate elective
- Year 2: Winter
    - ARCH 693 Thesis Research and Design Studio II
    - ARCH 655 Architectural Professional Practice: Ethics, Business, Legal Issues, and Contract Administration
    - ARCH 6XX Open graduate elective
- Year 2: Spring
    - ARCH 6XX Open graduate elective
- Students are encouraged to use elective courses to explore areas of specialization in support of their thesis research. Up to 1 half credit (0.50) elective may be taken in other departments. 1 half credit (0.50) course may be an independent Reading Course.

Thesis Option: Milestone Requirements

Proposed

Thesis Option: Milestone Requirements

Master's Thesis in Design

- Students must undertake and complete a research and design thesis. The thesis is developed within ARCH 692 and ARCH 693 and must be completed within 3 to 6 terms from the start of ARCH 692. The thesis is supervised by a faculty advisor, and supported by a committee of one additional faculty member. The thesis must be presented and defended successfully before an Examining Committee composed of:
    - the student's supervisor or co-supervisors; and
    - an additional tenured or tenure track faculty member from the University of Waterloo; and
    - at least one additional examiner whose expertise can support the evaluation of the Master's thesis.

Existing

Thesis Option: Milestone Requirements

Master's Thesis in Design

- Students must undertake and complete a research and design thesis (in Year 2: Spring). The thesis is developed within ARCH 692 and ARCH 693 and completed within the spring term. The thesis is supervised by a faculty advisor, and supported by a committee of one to two additional faculty members. The thesis must be presented and defended successfully before an Examining Committee composed of a minimum of the student's supervisor, one committee member and one reader as per the requirements listed in the Graduate Studies Academic Calendar.

Notes

- School of Architecture website
- Master of Architecture (MArch) future graduate students program page

Specializations

Undergraduate Plan Guidelines

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Engineering

Dependencies

Prerequisites

- ARCH 673 - The Science of the Building Envelope — View Program
- ARCH 692 - Thesis Research and Design Studio I — View Program
- ARCH 642 - Modernism to the 21st Century — View Program
- ARCH 693 - Thesis Research & Design Studio II — View Program
- ARCH 629 - Global Cities — View Program
- ARCH 662 - Steel & Concrete: Design, Structure and Construction — View Program
- ARCH 690 - Design Studio — View Program
- ARCH 610 - Architectural Research and Analysis — View Program
- ARCH 691 - Design Studio - Comprehensive Building Design — View Program
- ARCH 710 - Special Topics in Visual and Digital Media — View Program
- ARCH 720 - Special Topics in Urbanism and Landscape — View Program
- ARCH 740 - Special Topics in Architectural History and Theory — View Program
- ARCH 770 - Special Topics in Building Technology and Environment — View Program
- ARCH 780 - Special Topics in Race, Equity, and Environmental Justice — View Program
- ARCH 611 - Drawing, Representation and Practice — View Program
- ARCH 612 - Originality and Invention in Architecture — View Program
- ARCH 613 - Light, Colour and Darkness — View Program
- ARCH 622 - Urban Revitalization & Design — View Program
- ARCH 641 - The Inner Studio — View Program
- ARCH 643 - The Study and Design of Cultural Sites — View Program
- ARCH 672 - Energy Effective Design — View Program
- ARCH 675 - Sheltering Systems — View Program
- ARCH 676 - Lightweight Structures — View Program
- ARCH 677 - Survey of Digital Design Technologies for Architecture — View Program
- ARCH 686 - Competitions in Architecture — View Program

Master of Architecture (MArch)-Water - Master of Architecture (MArch) - Water

Top

Effective Date and Career

Career
Graduate

Effective Term and Year
Proposed

Effective Term and Year

Spring 2027

Existing

Effective Term and Year
Fall 2025

Proposal Details

Proposal Type
Change

Academic Unit Approval
2026-07-22

Quality Assurance Designation
Minor Modification Qad

Is there an impact to existing students?
No

Is the credential name changing?
No

Graduate Co-operative Requirements
Not Applicable

Change to Learning Outcomes
No

Rationale and Background for Change(s)

Updating the admission requirements and degree requirements to reflect current practice. clearly and clarify the coding of students entering the different streams of the MArch - Water program. Currently there is not a clear differentiation in coding between students entering into A) the two-year MArch stream (International students and Canadian students not coming from an accredited pre-professional program) and B) the one-year MArch stream (UW architecture undergrads and other Canadian CACB accredited pre-professional undergraduate programs). These updates are being made to align with the current practice of the program which distinguishes requirements based on a student's academic background. For the standard stream, the order of the two first year design studio courses, ARCH 690 and ARCH 691 will be reversed, so that ARCH 690 will be taught in the fall of first year, and the more technically challenging ARCH 691 will be taught in the winter of first year. This will make the fall term lighter and more introductory, and the second term can build on the more general knowledge of this first design studio course. This new order is the same as the order in which we teach equivalent undergraduate studio courses. To synchronize better with this, ARCH 662 will be moved to the fall term where it can complement ARCH 690, and ARCH 673 will be moved to the spring term where it can complement ARCH 691. Finally, ARCH 640 is moving from the fall term of second year, where it overloads our standard stream students with an extra half credit in comparison to their advanced stream classmates, to the first term of the program alongside ARCH 690.

General Program/Plan Information

Faculty

Faculty of Engineering

Academic Unit

School of Architecture

Graduate Field of Study

Architecture

Faculty

Faculty of Engineering

Program/Plan Name

Master of Architecture (MArch) - Water

Graduate Credential Type

Master's

Accelerated Program

Not applicable

Study Options (New)

Thesis

Program Types

Collaborative

Admit Term(s)

Fall

Delivery Mode

On-campus

Delivery Mode Information

Cambridge campus

Length of Program

Proposed

Length of Program

- Students can complete the program within a minimum of three terms and up to a maximum of six terms. Note that students need to submit a Request for extension beyond program time limits after term six.

Existing

Length of Program

- The Master of Architecture is a two-year degree program. The program accepts applicants from pre-professional architecture programs, in which students are expected to have completed the majority of the courses required for professional accreditation. Students holding a pre-professional Bachelor of Architectural Studies (BAS) from the University of Waterloo (or an equivalent degree to the BAS from another university) can complete the Master of Architecture degree requirements in a minimum of three terms and up to a maximum of six terms. All other students with a pre-professional Architecture degree admitted into the Master of Architecture, will be required to complete two terms of transitional coursework in preparation for the thesis year and are expected to complete degree requirements in a maximum of six academic terms.

Registration Option(s)

Full-time

Additional Program Information

Proposed

Additional Program Information

- In Canada, all provincial/territorial associations/institutes/orders recommend a degree from an accredited professional degree program as a prerequisite for licensure. The Canadian Architectural Certification Board (CACB) is the sole agency authorized to accredit Canadian professional degree programs in architecture for the purposes of architectural licensure.
- The professional Master of Architecture in conjunction with the pre-professional Bachelor of Architectural Studies degree from the University of Waterloo or other equivalent accredited architecture programs, together constitute an accredited professional education.
- A program may be granted a six-year, three year, or two-year term of accreditation, depending on its degree of conformance with established educational standards. The professional Master of Architecture in conjunction with the pre-professional Bachelor of Architectural Studies degree from the University of Waterloo is accredited by the Canadian Architectural Certification Board.
- Note: The Master of Architecture curriculum covers the following key areas: Design; History and Theory; Building Technology; Professional Practice.

Existing

Additional Program Information

- The professional Master of Architecture in conjunction with the pre-professional Bachelor of Architectural Studies degree from the University of Waterloo together constitute an accredited professional education.
- In Canada, all provincial/territorial associations/institutes/orders recommend a degree from an accredited professional degree program as a prerequisite for licensure. The Canadian Architectural Certification Board (CACB), which is the sole agency authorized to accredit Canadian professional degree programs in architecture, recognizes two types of accredited degrees: the Master of Architecture (MArch) and the Bachelor of Architecture (BArch). A program may be granted a six-year, three-year, or two-year term of accreditation, depending on its degree of conformance with established educational standards.
- Master's degree programs may consist of a pre-professional undergraduate degree and a professional graduate degree, which, when earned sequentially, comprise an accredited professional education. However, the pre-professional degree is not, by itself, recognized as an accredited degree.
- The program in Architecture at the University of Waterloo received accreditation for a 6-year term by the Canadian Architectural Certification Board (CACB).

Admissions

Admission Requirements: Minimum Requirements

Proposed

Admission Requirements: Minimum Requirements

- **Advanced stream:**
- Successful completion of any of the following pre-professional four-year Honours Bachelor of Architectural Studies (BAS) undergraduate degrees with a minimum overall average of 75%:
  - University of Waterloo Honours Bachelor of Architectural Studies.
  - Canadian Architectural Certification Board (CACB) accredited pre-professional program (which must include the Comprehensive Building Design Studio and related technical Student Performance Criteria (SPCs) noted in the Canadian Architectural Certification Board).
  - National Architectural Accrediting Board (NAAB) accredited Bachelor of Architecture (BArch) from a US architecture program.
- Note: University of Waterloo Honours Bachelor of Architectural Studies program graduates who maintained a 75% average are automatically accepted to the MArch program. These students must apply but do not need to submit a Portfolio (as part of their application materials) and are required to submit only one letter of reference.

- **Standard stream:**
- Successful completion of any of the following:
  - An approved accredited, professional Bachelor of Architecture degree from a school outside of Canada with a minimum overall average of 75% or equivalent.
  - An approved four-year, honours pre-professional undergraduate Architecture degree in Canada with a minimum overall average of 75%.
  - An approved pre-professional undergraduate architecture degree from a US architecture program with a minimum overall average of 75%.

- Applicants must have completed an undergraduate architecture degree that included either a co-op or internship experience within Canada, or they must have been employed by an architecture firm in Canada or have equivalent industry experience.
  Applicants to the Standard stream that do not meet the above conditions must apply to the Master of Architecture (MArch) - Water - Co-operative Program (Standard stream).
- Applicants who have not completed three or more years of post-secondary study at an institution at which English was the language of instruction may be required to verify English Proficiency which may include a written exercise or interview as instructed by the School of Architecture. Details will be communicated when required after initial assessment of applications is complete. This is an additional departmental requirement and not a substitute for the English Language Proficiency Certification.
- English language proficiency (ELP) (if applicable)

Existing

Admission Requirements: Minimum Requirements

- A four-year, honours pre-professional undergraduate Architecture degree or professional Bachelor of Architecture degree with a minimum overall average of 75%.
- Applicants being considered for admission to the Master of Architecture who have not completed three or more years of post-secondary work at a Canadian institution, or at an institution at which English was the language of instruction may be required to verify English Proficiency which may include a written exercise or interview as instructed by the School of Architecture. Details will be communicated when required after initial assessment of applications is complete. This is an additional departmental requirement and not a substitute for the English Language Proficiency Certification.
- English language proficiency (ELP) (if applicable)

Admission Requirements: Application materials

Proposed

Admission Requirements: Application materials

- Portfolio
  - Portfolio of design work – uploaded directly to the program application.
- Program-specific questions (PSQ)
- Résumé/Curriculum vitae
- Statement of interest
  - Including a statement of the students proposed research interest.
- Transcript(s)
  - From each post-secondary institution attended (past or current) showing all courses and marks, along with the transcript legends/keys/grading scales uploaded to the program application. Degree certificates (if obtained) must be uploaded with the transcripts.

Existing

Admission Requirements: Application materials

- Portfolio
  - Portfolio of design work – uploaded directly to applicant Quest account.
- Program-specific questions (PSQ)
- Résumé/Curriculum vitae
- Statement of interest
  - Including a statement of the students proposed research interest.
- Transcript(s)
  - From each post-secondary institution attended (past or current) showing all courses and marks, along with the transcript legends/keys/grading scales uploaded using Quest. Degree certificates (if obtained) must be uploaded with the transcripts.

Admission Requirements: References

- Number of references: 2
- Type of references: academic

Requirements Information

Graduate Degree Requirements

- Students must complete the course and milestone requirements listed below in addition to the Graduate Academic Integrity Module (Graduate AIM).

Thesis Option: Course Requirements

Thesis Option: Course Requirements

Proposed

Thesis Option: Course Requirements

- **Advanced stream:**
- Students must complete the following courses in addition to 2 Water core courses:
- Year 1: Fall
  - ARCH 610 Architectural Research and Analysis
  - ARCH 692 Thesis Research and Design Studio I
  - ARCH 6XX or 7XX elective
- Year 1: Winter
  - ARCH 655 Architectural Professional Practice: Ethics, Business, Legal Issues, and Contract Administration
  - ARCH 693 Thesis Research and Design Studio II
  - ARCH 6XX or 7XX elective
- Year 1: Spring
  - ARCH 6XX or 7XX elective
- Students are encouraged to use elective courses to explore areas of specialization in support of their thesis research. Students can substitute at most 1 ARCH 6XX or 7XX graduate elective with 1 WATER core course. 1 elective course (0.50 unit weight) may be an independent Architecture Reading Course.
- Water core courses (delivered at main campus in Waterloo):
  - WATER 601 Integrated Water Management (typically offered in Year 1: Winter)
  - WATER 602 Integrated Water Management Project (typically offered in Year 2: Fall)

- **Standard stream:**
- Students must complete the following courses in addition to 2 Water core courses:
- Year 1: Fall
  - ARCH 640 Contemporary Theory, Culture and Criticism
  - ARCH 662 Steel & Concrete: Design, Structure and Construction
  - ARCH 690 Design Studio
- Year 1: Winter
  - ARCH 642 Modernism To The 21st Century

    - ARCH 671 Technical Report
    - ARCH 673 The Science of the Building Envelope
    - ARCH 691 Design Studio - Comprehensive Building Design
- Year 2: Fall
    - ARCH 610 Architectural Research and Analysis
    - ARCH 692 Thesis Research and Design Studio I
    - ARCH 6XX or 7XX elective
- Year 2: Winter
    - ARCH 655 Architectural Professional Practice: Ethics, Business, Legal Issues, and Contract Administration
    - ARCH 693 Thesis Research and Design Studio II
    - ARCH 6XX or 7XX elective
- Year 2: Spring
    - ARCH 6XX or 7XX elective
- Students are encouraged to use elective courses to explore areas of specialization in support of their thesis research. Students can substitute at most 1 ARCH 6XX or 7XX graduate elective with 1 WATER core course. 1 course (0.50 unit weight) may be an independent Architecture Reading Course.
- Water core courses (delivered at main campus in Waterloo):
    - WATER 601 Integrated Water Management (typically offered in Year 1: Winter)
    - WATER 602 Integrated Water Management Project (typically offered in Year 2: Fall)
- This degree is offered through the Collaborative Water Program. This program, jointly offered by a range of departments across several academic faculties, promotes the development of interdisciplinary perspectives on water. Collaborative Water Program students complete their specialist training in their respective home departments, while working with colleagues from a variety of other departments in core interdisciplinary courses (WATER 601 and WATER 602).

Existing

Thesis Option: Course Requirements

- Students must complete the following courses in addition to 2 Water core courses:
- Year 1
    - ARCH 690 Design Studio
    - ARCH 673 The Science of the Building Envelope
    - ARCH 642 Modernism To The 21st Century
    - ARCH 671 Technical Report
    - ARCH 691 Design Studio - Comprehensive Building Design
    - ARCH 662 Steel & Concrete: Design, Structure and Construction
    - ARCH 640 Contemporary Theory, Culture and Criticism
- Year 2: Fall
    - ARCH 692 Thesis Research and Design Studio I
    - ARCH 610 Architectural Research and Analysis
    - ARCH 6XX Open graduate elective
- Year 2: Winter
    - ARCH 693 Thesis Research and Design Studio II
    - ARCH 655 Architectural Professional Practice: Ethics, Business, Legal Issues, and Contract Administration
    - ARCH 6XX Open graduate elective
- Year 2: Spring
    - ARCH 6XX Open graduate elective
- Students are encouraged to use elective courses to explore areas of specialization in support of their thesis research. 1 half credit (0.50) may be an independent Reading Course. Up to 1 half credit (0.50) elective may be taken in other departments. 1 half WATER credit (0.50) can be counted to fulfill 1 half (0.50) MArch elective requirement.
- Water core courses:
    - WATER 601 Integrated Water Management
    - WATER 602 Integrated Water Management Project
- This degree is offered through the Collaborative Water Program. This program, jointly offered by a range of departments across several academic faculties, promotes the development of interdisciplinary perspectives on water. Collaborative Water Program students complete their specialist training in their respective home departments, while working with colleagues from a variety of other departments in core interdisciplinary courses (WATER 601 and WATER 602).
- The Department will determine whether or not collaborative program courses can be used as electives. It is therefore possible that students will need to take additional courses in order to meet the specific requirements of the program.

Thesis Option: Milestone Requirements

Proposed

Thesis Option: Milestone Requirements

Collaborative Research Seminar I

- Students are required to present a seminar on their thesis or major paper research proposal and, if appropriate, early stage results to current and past Water students and Water Institute faculty members. Seminars will normally occur following the completion of WATER 601 and WATER 602. Seminars will provide the opportunity for students to discuss how learnings from Water courses were applied in, or influenced, research proposals or research work in the student's home department. Seminars will normally be poster presentations at Water Institute organized events. The seminar is not an oral examination of the thesis or paper; rather, its purpose is to develop the student's ability to communicate their research in an organized and informative manner.

Master's Thesis in Design

- Students must undertake and complete a research and design thesis. The thesis is developed within ARCH 692 and ARCH 693 and must be completed within 3 to 6 terms from the start of ARCH 692. The thesis is supervised by a faculty advisor, and supported by a committee of one additional faculty member. The thesis must be presented and defended successfully before an Examining Committee composed of:
  - the student's supervisor or co-supervisors; and
  - an additional tenured or tenure track faculty member from the University of Waterloo; and
  - at least one additional examiner whose expertise can support the evaluation of the Master's thesis.

Existing

Thesis Option: Milestone Requirements

Collaborative Research Seminar I

- Students are required to present a seminar on their thesis or major paper research proposal and, if appropriate, early stage results to current and past Water students and Water Institute faculty members. Seminars will normally occur following the completion of WATER 601 and WATER 602. Seminars will provide the opportunity for students to discuss how learnings from Water courses were applied in, or influenced, research proposals or research work in the student's home department. Seminars will normally be poster presentations at Water Institute organized events. The seminar is not an oral examination of the thesis or paper; rather, its purpose is to develop the student's ability to communicate their research in an organized and informative manner.

Master's Thesis in Design

- Students must undertake and complete a research and design thesis (in Year 2: Spring). The thesis is developed within ARCH 692 and ARCH 693 and completed within the spring term. The thesis is supervised by a faculty advisor, and supported by a committee of one to two additional faculty members. The thesis must be presented and defended successfully before an Examining Committee composed of a minimum of the student's supervisor, one committee member and one reader as per the requirements listed in the Graduate Studies Academic Calendar.

Notes

- School of Architecture website
- Master of Architecture (MArch) - Water future graduate students program page

Specializations

Undergraduate Plan Guidelines

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Engineering

Dependencies

Prerequisites

- ARCH 673 - The Science of the Building Envelope — View Program
- ARCH 692 - Thesis Research and Design Studio I — View Program
- ARCH 642 - Modernism to the 21st Century — View Program
- WATER 601 - Integrated Water Management — View Program
- ARCH 693 - Thesis Research & Design Studio II — View Program
- ARCH 629 - Global Cities — View Program
- ARCH 662 - Steel & Concrete: Design, Structure and Construction — View Program
- ARCH 690 - Design Studio — View Program
- ARCH 610 - Architectural Research and Analysis — View Program
- ARCH 691 - Design Studio - Comprehensive Building Design — View Program
- ARCH 710 - Special Topics in Visual and Digital Media — View Program
- ARCH 720 - Special Topics in Urbanism and Landscape — View Program
- ARCH 740 - Special Topics in Architectural History and Theory — View Program
- ARCH 770 - Special Topics in Building Technology and Environment — View Program
- ARCH 780 - Special Topics in Race, Equity, and Environmental Justice — View Program
- ARCH 611 - Drawing, Representation and Practice — View Program
- ARCH 612 - Originality and Invention in Architecture — View Program
- ARCH 613 - Light, Colour and Darkness — View Program
- ARCH 622 - Urban Revitalization & Design — View Program
- ARCH 641 - The Inner Studio — View Program
- ARCH 643 - The Study and Design of Cultural Sites — View Program
- ARCH 672 - Energy Effective Design — View Program
- ARCH 675 - Sheltering Systems — View Program
- ARCH 676 - Lightweight Structures — View Program
- ARCH 677 - Survey of Digital Design Technologies for Architecture — View Program
- ARCH 686 - Competitions in Architecture — View Program

Master of Architecture (MArch)-Co-op - Master of Architecture (MArch) - Co-operative Program

Top

Effective Date and Career

Career
Graduate

Effective Term and Year

Proposed

Effective Term and Year
Spring 2027

Existing

Effective Term and Year
Fall 2025

Proposal Details

Proposal Type
Change

Academic Unit Approval
2026-07-22

Quality Assurance Designation
Minor Modification Qad

Is there an impact to existing students?
Yes

Impact on Existing Students

1) No impact.

2) Effective Spring 2026, students have been completing the Graduate WIL Reflective Report milestone instead of the Graduate Studies Work Report milestone. Students were informed about the milestone changes.

Is the credential name changing?
No

Graduate Co-operative Requirements
Yes

Graduate Co-operative Education Consultation

The proposed co-op changes were made in collaboration with CEE.

Change to Learning Outcomes
No

Rationale and Background for Change(s)

1) Updating the admission requirements and degree requirements to reflect current practice. Changing the entry method of the co-operative program from transfer entry to direct entry. The School of Architecture is proposing the following program changes to articulate the requirements more clearly and clarify the coding of students entering the different streams of the MArch program. Currently there is not a clear differentiation in coding between students entering into A) the two-year MArch stream (International students and Canadian students not coming from an accredited pre-professional program) and B) the one-year MArch stream (UW architecture undergrads and other Canadian CACB accredited pre-professional undergraduate programs). These updates are being made to align with the current practice of the program which distinguishes requirements based on a student's academic background. Changing the entry method of the co-operative program from transfer to direct entry will create a better student experience. International students will also be able to apply for their work permit when they apply for their study permit. For the standard stream, the order of the two first year design studio courses, ARCH 690 and ARCH 691 will be reversed, so that ARCH 690 will be taught in the fall of first year, and the more technically challenging ARCH 691 will be taught in the winter of first year. This will make the fall term lighter and more introductory, and the second term can build on the more general knowledge of this first design studio course. This new order is the same as the order in which we teach equivalent undergraduate studio courses. To synchronize better with this, ARCH 662 will be moved to the fall term where it can complement ARCH 690, and ARCH 673 will be moved to the spring term where it can complement ARCH 691. Finally, ARCH 640 is moving from the fall term of second year, where it overloads our standard stream students with an extra half credit in comparison to their advanced stream classmates, to the first term of the program alongside ARCH 690.

2) Replacing the Department supported "Graduate Studies Work Report" milestone with the CEE supported "Graduate WIL

Reflective Report" milestone. A work/reflective report is a required degree milestone for Co-operative and Experiential Education (CEE) supported co-op programs. CEE has developed an alternative to the "Graduate Studies Work Report" milestone called a "Graduate WIL Reflective Report" milestone which Departments/Schools may choose to adopt. This option simplifies the administration of the milestone and provides more consistent experience for students across units.

General Program/Plan Information

Faculty

Faculty of Engineering

Academic Unit

School of Architecture

Graduate Field of Study

Architecture

Faculty

Faculty of Engineering

Program/Plan Name

Master of Architecture (MArch) - Co-operative Program

Graduate Credential Type

Master's

Accelerated Program

Not applicable

Study Options (New)

Thesis

Program Types

Co-operative

Admit Term(s)

Fall

Delivery Mode

On-campus

Delivery Mode Information

Cambridge campus

Length of Program

Proposed

Length of Program

- Students can complete the program within a minimum of four terms, and up to a maximum of nine terms. Note that students need to submit a Request for extension beyond program time limits after term six.

Existing

Length of Program

- The Master of Architecture is a two-year degree program. The program accepts applicants from pre-professional architecture programs, in which students are expected to have completed the majority of the courses required for professional accreditation. Students holding a pre-professional Bachelor of Architectural Studies (BAS) from the University of Waterloo (or an equivalent degree to the BAS from another university) can complete the Master of Architecture degree requirements in a minimum of three terms and up to a maximum of six terms. All other students with a pre-professional Architecture degree admitted into the Master of Architecture, will be required to complete two terms of transitional coursework in preparation for the thesis year and are expected to complete degree requirements in a maximum of six academic terms.

Registration Option(s)

Full-time

Additional Program Information

Proposed

Additional Program Information

- In Canada, all provincial/territorial associations/institutes/orders recommend a degree from an accredited professional degree program as a prerequisite for licensure. The Canadian Architectural Certification Board (CACB) is the sole agency authorized to accredit Canadian professional degree programs in architecture for the purposes of architectural licensure.
- The professional Master of Architecture in conjunction with the pre-professional Bachelor of Architectural Studies degree from the University of Waterloo or other equivalent accredited architecture programs, together constitute an accredited professional education.
- A program may be granted a six-year, three-year, or two-year term of accreditation, depending on its degree of conformance with established educational standards. The professional Master of Architecture in conjunction with the pre-professional Bachelor of Architectural Studies degree from the University of Waterloo is accredited by the Canadian Architectural Certification Board.
- Note: The Master of Architecture curriculum covers the following key areas: Design; History and Theory; Building Technology; Professional Practice.

Existing

Additional Program Information

- The professional Master of Architecture in conjunction with the pre-professional Bachelor of Architectural Studies degree from the University of Waterloo together constitute an accredited professional education.
- In Canada, all provincial/territorial associations/institutes/orders recommend a degree from an accredited professional degree program as a prerequisite for licensure. The Canadian Architectural Certification Board (CACB), which is the sole agency authorized to accredit Canadian professional degree programs in architecture, recognizes two types of accredited degrees: the Master of Architecture (MArch) and the Bachelor of Architecture (BArch). A program may be granted a six-year, three-year, or two-year term of accreditation, depending on its degree of conformance with established educational standards.
- Master's degree programs may consist of a pre-professional undergraduate degree and a professional graduate degree, which, when earned sequentially, comprise an accredited professional education. However, the pre-professional degree is not, by itself, recognized as an accredited degree.
- The program in Architecture at the University of Waterloo received accreditation for a 6-year term by the Canadian Architectural Certification Board (CACB).

Admissions

Admission Requirements: Minimum Requirements

Proposed

Admission Requirements: Minimum Requirements

- **Advanced stream:**
- Successful completion of any of the following pre-professional four-year Honours Bachelor of Architectural Studies (BAS) undergraduate degrees with a minimum overall average of 75%:
  - University of Waterloo Honours Bachelor of Architectural Studies.
  - Canadian Architectural Certification Board (CACB) accredited pre-professional program (which must include the Comprehensive Building Design Studio and related technical Student Performance Criteria (SPCs) noted in the Canadian Architectural Certification Board).
  - National Architectural Accrediting Board (NAAB) accredited Bachelor of Architecture (BArch) from a US architecture program.
- Note: University of Waterloo Honours Bachelor of Architectural Studies program graduates who maintained a 75% average are automatically accepted to the MArch program. These students must apply but do not need to submit a Portfolio (as part of their application materials) and are required to submit only one letter of reference.

- **Standard stream:**
- Successful completion of any of the following:
  - An approved accredited, professional Bachelor of Architecture degree from a school outside of Canada with a minimum overall average of 75% or equivalent.
  - An approved four-year, honours pre-professional undergraduate Architecture degree in Canada with a minimum overall average of 75%.
  - An approved pre-professional undergraduate architecture degree from a US architecture program with a minimum overall average of 75%.
- Applicants who have not completed three or more years of post-secondary study at an institution at which English was the language of instruction may be required to verify English Proficiency which may include a written exercise or interview as instructed by the School of Architecture. Details will be communicated when required after initial assessment of applications is complete. This is an additional departmental requirement and not a substitute for the English Language Proficiency Certification.
- English language proficiency (ELP) (if applicable)
- Applicants to the Standard stream, who meet the above admission conditions and who have completed an undergraduate architecture degree that included either a co-op or internship experience within Canada, or who have been employed by an architecture firm in Canada or have equivalent industry experience can apply to the Master of Architecture (MArch) Program (standard stream).

Existing

Admission Requirements: Minimum Requirements

- A four-year, honours pre-professional undergraduate Architecture degree or professional Bachelor of Architecture degree with a minimum overall average of 75%.
- Applicants being considered for admission to the Master of Architecture who have not completed three or more years of post-secondary work at a Canadian institution, or at an institution at which English was the language of instruction may be required to verify English Proficiency which may include a written exercise or interview as instructed by the School of Architecture. Details will be communicated when required after initial assessment of applications is complete. This is an additional departmental requirement and not a substitute for the English Language Proficiency Certification.
- English language proficiency (ELP) (if applicable)

Admission Requirements: Application materials

Proposed

Admission Requirements: Application materials

- Portfolio
  - Portfolio of design work – uploaded directly to the program application.
- Résumé/Curriculum vitae
- Statement of interest
  - Including a statement of the students proposed research interest.
- Transcript(s)
  - From each post-secondary institution attended (past or current) showing all courses and marks, along with the transcript legends/keys/grading scales uploaded to the program application. Degree certificates (if obtained) must be uploaded with the transcripts.

Existing

Admission Requirements: Application materials

- Portfolio
  - Portfolio of design work – uploaded directly to applicant Quest account.
- Résumé/Curriculum vitae
- Statement of interest
  - Including a statement of the students proposed research interest.
- Transcript(s)
  - From each post-secondary institution attended (past or current) showing all courses and marks, along with the transcript legends/keys/grading scales uploaded using Quest. Degree certificates (if obtained) must be uploaded with the transcripts.

Admission Requirements: References

- Number of references: 2
- Type of references: academic

Requirements Information

Graduate Degree Requirements

Proposed

Graduate Degree Requirements

- Students must complete the course and milestone requirements listed below in addition to the Graduate Academic Integrity Module (Graduate AIM).
- The program requires successful completion of one credited standard work term. The work term takes place in term 3 (the Spring term in year 1). Note: the program must start and end on an academic term.
- Students are required to complete WIL 601 Career Foundations for Work-Integrated Learning in their first academic term of their co-op program. Students must complete WIL 601 in addition to the program's course requirements.

Existing

Graduate Degree Requirements

- Students must complete the course and milestone requirements listed below in addition to the Graduate Academic Integrity Module (Graduate AIM).
- Students are required to complete WIL 601 Career Foundations for Work-Integrated Learning in their first academic term of their co-op program. Students must complete WIL 601 in addition to the program's course requirements.
- Note: The Master of Architecture curriculum covers six key areas: Design; History; Theory; Building Technology; Media and Methods; Professional Practice.

Thesis Option: Course Requirements

Thesis Option: Course Requirements

Proposed

Thesis Option: Course Requirements

- **Advanced stream:**
- Students must complete the following courses:
- Year 1: Fall
  - ARCH 610 Architectural Research and Analysis
  - ARCH 692 Thesis Research and Design Studio I
  - ARCH 7XX elective
- Year 1: Winter
  - ARCH 655 Architectural Professional Practice: Ethics, Business, Legal Issues, and Contract Administration
  - ARCH 693 Thesis Research and Design Studio II
  - ARCH 6XX or 7XX elective
- Year 1: Spring: Co-op Work Term
- Year 2: Fall
  - ARCH 6XX or 7XX elective
- Students are encouraged to use elective courses to explore areas of specialization in support of their thesis research. Students can substitute at most 1 ARCH 6XX or 7XX graduate elective with a graduate elective (0.50 unit weight) offered by another department/school. 1 course (0.50 unit weight) may be an independent Architecture Reading Course.

- **Standard stream:**
- Students must complete the following courses:
- Year 1: Fall
  - ARCH 640 Contemporary Theory, Culture and Criticism
  - ARCH 662 Steel & Concrete: Design, Structure and Construction
  - ARCH 690 Design Studio
- Year 1: Winter
  - ARCH 642 Modernism To The 21st Century
  - ARCH 671 Technical Report
  - ARCH 673 The Science of the Building Envelope
  - ARCH 691 Design Studio - Comprehensive Building Design
- Year 1: Spring: Co-op Work Term
- Year 2: Fall
  - ARCH 610 Architectural Research and Analysis
  - ARCH 692 Thesis Research and Design Studio I
  - ARCH 6XX or 7XX elective
- Year 2: Winter
  - ARCH 655 Architectural Professional Practice: Ethics, Business, Legal Issues, and Contract Administration
  - ARCH 693 Thesis Research and Design Studio II
  - ARCH 6XX or 7XX elective
- Year 2: Spring
  - ARCH 6XX or 7XX elective
- Students are encouraged to use elective courses to explore areas of specialization in support of their thesis research. Students can substitute at most 1 ARCH 6XX or 7XX graduate elective with a graduate elective (0.50 unit weight) offered by another department/school. 1 course (0.50 unit weight) may be an independent Architecture Reading Course.

Existing

Thesis Option: Course Requirements

- Students must complete the following courses:
- Year 1:
  - ARCH 690 Design Studio
  - ARCH 673 The Science of the Building Envelope
  - ARCH 642 Modernism To The 21st Century
  - ARCH 671 Technical Report
  - ARCH 691 Design Studio - Comprehensive Building Design
  - ARCH 662 Steel & Concrete: Design, Structure and Construction
  - ARCH 640 Contemporary Theory, Culture and Criticism
  - Co-op/Graduate Research Assistantship
- Year 2: Fall
  - ARCH 692 Thesis Research and Design Studio I
  - ARCH 610 Architectural Research and Analysis
  - ARCH 6XX Open graduate elective
- Year 2: Winter
  - ARCH 693 Thesis Research and Design Studio II
  - ARCH 655 Architectural Professional Practice: Ethics, Business, Legal Issues, and Contract Administration
  - ARCH 6XX Open graduate elective
- Year 2: Spring
  - ARCH 6XX Open graduate elective
- Students are encouraged to use elective courses to explore areas of specialization in support of their thesis research.

Up to 1 half credit (0.50) elective may be taken in other departments. 1 half credit (0.50) course may be an independent Reading Course.

Thesis Option: Milestone Requirements

Proposed

Thesis Option: Milestone Requirements

Graduate WIL Reflective Report

- The Graduate WIL Reflective Report requires students to critically reflect on their co-op work term experience, connecting academic knowledge to practical tasks and professional development. Students must complete one reflective report per required work term. The report is administered, evaluated, and graded by the Centre for Work-Integrated Learning.
- Students are responsible for following the roles and responsibilities of Cooperative and Experiential Education (CEE).

Master's Thesis in Design

- Students must undertake and complete a research and design thesis (in Year 2). The thesis is developed within ARCH 692 and ARCH 693 and must be completed within 3 to 6 terms from the start of ARCH 692. The thesis is supervised by a faculty advisor, and supported by a committee of one additional faculty member. The thesis must be presented and defended successfully before an Examining Committee composed of a minimum of:
  - the student's supervisor or co-supervisors; and
  - an additional tenured or tenure track faculty member from the University of Waterloo; and
  - at least one additional examiner whose expertise can support the evaluation of the Master's thesis.

Existing

Thesis Option: Milestone Requirements

Graduate Studies Work Report

Master's Thesis in Design

- Students must undertake and complete a research and design thesis (in Year 2: Spring). The thesis is developed within ARCH 692 and ARCH 693 and completed within the spring term. The thesis is supervised by a faculty advisor, and supported by a committee of one to two additional faculty members. The thesis must be presented and defended successfully before an Examining Committee composed of a minimum of the student's supervisor, one committee member and one reader as per the requirements listed in the Graduate Studies Academic Calendar.

Notes

- School of Architecture website

Specializations

Undergraduate Plan Guidelines

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Engineering

Dependencies

Prerequisites

- ARCH 673 - The Science of the Building Envelope — View Program
- ARCH 692 - Thesis Research and Design Studio I — View Program
- ARCH 642 - Modernism to the 21st Century — View Program
- ARCH 693 - Thesis Research & Design Studio II — View Program
- ARCH 629 - Global Cities — View Program
- ARCH 662 - Steel & Concrete: Design, Structure and Construction — View Program
- ARCH 690 - Design Studio — View Program
- ARCH 610 - Architectural Research and Analysis — View Program
- ARCH 691 - Design Studio - Comprehensive Building Design — View Program
- ARCH 710 - Special Topics in Visual and Digital Media — View Program
- ARCH 720 - Special Topics in Urbanism and Landscape — View Program
- ARCH 740 - Special Topics in Architectural History and Theory — View Program
- ARCH 770 - Special Topics in Building Technology and Environment — View Program
- ARCH 780 - Special Topics in Race, Equity, and Environmental Justice — View Program
- ARCH 611 - Drawing, Representation and Practice — View Program
- ARCH 612 - Originality and Invention in Architecture — View Program
- ARCH 613 - Light, Colour and Darkness — View Program
- ARCH 622 - Urban Revitalization & Design — View Program
- ARCH 641 - The Inner Studio — View Program
- ARCH 643 - The Study and Design of Cultural Sites — View Program
- ARCH 672 - Energy Effective Design — View Program
- ARCH 675 - Sheltering Systems — View Program
- ARCH 676 - Lightweight Structures — View Program
- ARCH 677 - Survey of Digital Design Technologies for Architecture — View Program
- ARCH 686 - Competitions in Architecture — View Program

PhD in Chemical Engineering - Doctor of Philosophy (PhD) in Chemical Engineering

Top

Effective Date and Career

Career
Graduate

Effective Term and Year
Proposed

Effective Term and Year

Winter 2027

Existing

Effective Term and Year
Fall 2025

Proposal Details

Proposal Type
Change

Academic Unit Approval
2026-05-11

Quality Assurance Designation
Minor Modification Qad

Is there an impact to existing students?
Yes

Impact on Existing Students

Current students will be permitted to follow these new degree requirements immediately.

Is the credential name changing?
No

Graduate Co-operative Requirements
Not Applicable

Change to Learning Outcomes
No

Rationale and Background for Change(s)

Updating the admission and degree requirements to align with current practice and to articulate the requirements of the program more clearly. The intention is to provide greater clarity for students and to remove wording that already appears in the Faculty and University regulations.

The wording in our requirements has grown via incremental additions to become overly verbose. This change is to reduce the wording to the minimal possible by removing references to policies which are dictated elsewhere, such as the Faculty or University level regulations. In addition to these changes we will also remove the requirement that students from a discipline outside of chemical engineering be required to take an extra course, as reliable determination and tracking of which students are deemed to be ‘outside’ of chemical engineering is not feasible.

General Program/Plan Information

Faculty

Faculty of Engineering

Academic Unit

Department of Chemical Engineering

Graduate Field of Study

Chemical Engineering

Faculty

Faculty of Engineering

Program/Plan Name

Doctor of Philosophy (Ph D) in Chemical Engineering

Graduate Credential Type

PhD

Accelerated Program

Not applicable

Admit Term(s)

Fall, Winter, Spring

Delivery Mode

On-campus

Length of Program

Proposed

Length of Program

- Students are required to complete the program in accordance with the University program time limits.

Existing

Length of Program

- The minimum period of registration for the Ph D degree is four terms. Degree requirements must be satisfied within four calendar years following the date of admission into the Ph D program, unless extensions are approved by the Associate Dean for Graduate Studies and Research, Engineering. Requests for extension must be supported by a written departmental recommendation along with a realistic timetable for the completion of the degree and evidence of adequate progress in research. Extensions are not granted automatically and will be refused in the case of inadequate progress. University of Waterloo regulations stipulate that approval of an extension past three extended terms is at the discretion of the Associate Provost, Graduate Studies.
- A minimum of two terms of full-time residence is expected from students who wish to proceed on a part-time basis. Full-time residency means that a student is present on campus for at least three days a week, or a sufficient period of time per week to satisfy the supervisor. The most appropriate time for this residence period will be established in consultation with the supervisor(s) and the Associate Chair Graduate Studies.
- Part-time students should be advised that the Faculty of Engineering expects at least 20 hours per week to be devoted to advanced study and research.

Registration Option(s)

Full-time, Part-time

Graduate Research Fields

- Biotechnology and Biomedical Engineering
- Electrochemical Engineering
- Nanotechnology for Advanced Materials
- Process Systems Engineering
- Soft Matter and Polymer Engineering
- Sustainable Reaction Engineering

Admissions

Admission Requirements: Minimum Requirements

Proposed

Admission Requirements: Minimum Requirements

- At the time of admission, each student must have an approved Ph D supervisor who has agreed in writing to supervise their academic program or co-supervisors, at least one of whom is an approved Ph D supervisor.
- Applicants must demonstrate excellence of background preparation and academic achievement in prior degrees and, usually, possess a relevant, thesis-based Master's degree. A minimum 80% standing in an applicant's appropriate Master's program is the usual requirement. A Master's degree obtained without a full research thesis is normally an inadequate qualification for admission to the Ph D program.
- Transfer to the Ph D program without completion of the MASc program: A student enrolled in a MASc program at the University of Waterloo may apply for transfer to the Ph D program without completing a Master's degree. Transfer from a MASc program to a Ph D program will normally be initiated at the Department level.
- In exceptional cases, applicants who have spent at least three years pursuing an appropriate Honours Bachelor's degree may be considered for admission to a Ph D program, upon request from the Chemical Engineering Department.
- English language proficiency (ELP) (if applicable)

Existing

Admission Requirements: Minimum Requirements

- At the time of admission, each student must have an approved Ph D supervisor who has agreed in writing to supervise their academic program or co-supervisors, at least one of whom is an approved Ph D supervisor. The Faculty of Engineering maintains a list of individually approved research supervisors, known as Approved Doctoral Dissertation Supervisors (ADDS). Additions to and deletions from this list are made by the Engineering Graduate Studies Sub-Committee upon the recommendation of the Chemical Engineering Department's Associate Chair for Graduate Studies.
- Applicants must demonstrate excellence of background preparation and academic achievement in prior degrees and, usually, possess a relevant, thesis-based Master's degree. In the Faculty of Engineering, a minimum 80% standing in an applicant's appropriate Master's program is the usual requirement. A Master's degree obtained without a full research thesis is normally an inadequate qualification for admission to the Ph D program.
- Within the three required references for admission to Graduate Studies, the opinions on academic preparation and research ability must refer to the applicant's demonstrated ability to formulate research problems and execute the research required to solve problems, as indicated by a Master's of Applied Science (MASc) research thesis or published scientific/technical paper. The references should also refer to the applicant having adequate English language skills to pursue a doctoral program, with all of its requirements, at the University of Waterloo.
- The Engineering Graduate Studies Sub-Committee requires objective evidence of English language skills. Technical publications that have been written principally by an applicant and published in refereed English language journals, a thesis written in English, or a personal interview with the Chemical Engineering Department's Associate Chair for Graduate Studies are also considered as evidence.
- Transfer to the Ph D program without completion of the MASc program: A student enrolled in a MASc program at the University of Waterloo may apply for transfer to the Ph D program without completing a Master's degree. Transfer from a MASc program to a Ph D program will normally be initiated at the Department level.
- The supervisor shall prepare for the Chemical Engineering Department's Graduate Review Committee a memorandum that summarizes the applicant's qualifications for transfer. At least one additional written recommendation from another Chemical Engineering Department faculty member will facilitate a decision on the transfer request.
- Admission to the Ph D program from a BASc program: In exceptional cases, applicants who have spent at least three years pursuing an appropriate Honours Bachelor's degree may be considered for admission to a Ph D program, upon request from the Chemical Engineering Department.
- English language proficiency (ELP) (if applicable)

Admission Requirements: Application materials

- Résumé
- Statement of interest
- Transcript(s)

Admission Requirements: References

- Number of references: 3
- Type of references: at least 2 academic

Requirements Information

Graduate Degree Requirements

- Students must complete the course and milestone requirements listed below in addition to the Graduate Academic Integrity Module (Graduate AIM).

Graduate Course Requirements

No Rules

Graduate Course Requirements

Proposed

Graduate Course Requirements

- Students with a Master's degree in an appropriate discipline, must complete 1.75 units meeting the following criteria:
  - CHE 600 Engineering and Research Methods, Ethics, Practice, and Law (0.25 unit weight)
  - 3 graduate level elective courses at the 600 level or higher (0.5 unit weight). Of these 2 must be CHE courses. Note that 1 500 level course may be substituted here if recommended by the student's supervisor, and approved by the Associate Chair, Graduate Studies and the Associate Dean, Graduate Studies.
  - No more than 1 may be taught by supervisor(s).
  - No more than 1 may be a reading course.
- Students entering directly from their undergraduate degree must complete 3.75 units meeting the following criteria:
  - CHE 600 Engineering and Research Methods, Ethics, Practice, and Law (0.25 unit weight)
  - 7 elective courses (0.5 unit weight) at a 600 level or higher. At least 4 of these must be CHE courses. Note that 2 500 level courses may be substituted here if recommended by the student's supervisor, and approved by the Associate Chair, Graduate Studies and the Associate Dean, Graduate Studies.
  - No more than 3 may be taught by supervisor(s).
  - No more than 2 may be reading courses.
- Students may be required to take more than the number of courses specified above, if requested by the supervisor and approved by the Department of Chemical Engineering.

Existing

Graduate Course Requirements

- Students with a Master's degree in a discipline closely related to Chemical Engineering as deemed by the Associate Chair Graduate Studies, must complete 1.75 units meeting the following criteria:
  - CHE 600 Engineering and Research Methods, Ethics, Practice, and Law (0.25 unit weight)
  - 3 graduate level elective courses at the 600 level or higher (0.5 unit weight). Of these 2 must be CHE courses. Note that 1 500 level course may be substituted here if recommended by the student's supervisor, and approved by the Associate Chair, Graduate Studies and the Associate Dean, Graduate Studies.
  - No more than 1 may be taught by supervisor(s).
  - No more than 1 may be a reading course.
- Students entering directly from their undergraduate degree must complete 3.75 units meeting the following criteria:
  - CHE 600 Engineering and Research Methods, Ethics, Practice, and Law (0.25 unit weight)
  - 7 graduate level elective courses (0.5 unit weight). Of these 6 must be 600 level or higher and 1 can be 500 level or higher. At least 4 of these must be CHE courses. Note that 1 additional 500 level course may be substituted here if recommended by the student's supervisor, and approved by the Associate Chair, Graduate Studies and the Associate Dean, Graduate Studies.
  - No more than 2 may be taught by supervisor(s).
  - No more than 1 may be a reading course.
- Students with a Master's degree in a discipline outside of Chemical Engineering, as deemed by the Associate Chair of Graduate Studies, must complete 2.25 units meeting the following criteria:
  - CHE 600 Engineering and Research Methods, Ethics, Practice, and Law (0.25 unit weight)
  - 4 graduate level elective courses at the 600 level or higher (0.5 unit weight). All of these must be CHE courses. Note that 1 500 level course may be substituted here if recommended by the student's supervisor, and approved by the Associate Chair, Graduate Studies and the Associate Dean, Graduate Studies.
  - No more than 1 may be taught by supervisor(s).
  - No more than 1 may be a reading course.
- The Chemical Engineering Department may require students to take more than the number of courses specified above. In every case, a graduate course program is established by the supervisor(s) in consultation with the student and, if deemed necessary, with the Associate Chair Graduate Studies of the Department. Students may also be required to take additional courses as a result of a comprehensive examination.
- Graduate courses offered by the Faculty of Engineering are numbered as 600 or 700 series courses and are assigned a unit weight of 0.50, which means that they are one-term courses as defined in the Graduate Studies Academic Calendar.

- Only courses taken within five years prior to the completion of the Ph D degree may be counted for credit towards a degree, unless a request for revalidation is granted.
- Students must achieve a:
  - Minimum cumulative average of 70%.
  - Minimum grade of 65% in each individual course.
- Each student is responsible for monitoring their own academic records and must immediately notify their Graduate Coordinator of any inadequate grade or average.

Milestone Requirements

Proposed

Milestone Requirements

Seminar Attendance

- Over the course of their degree program, students must attend 24 seminars from departments and research institutions where Chemical Engineering faculty members have membership.

Ph D Advisory Committee Meeting and Report

- Students are required to engage in a 30-60 minute, in-person or remote, Ph D Advisory Committee meeting, composed of a 15-minute presentation by the student to report research progress along with a written summary of courses and milestones completed.
- Students with a MASc degree must complete a Ph D Advisory Committee meeting during the 3rd term after completing their Ph D comprehensive examination.
- Students without a MASc degree must complete a Ph D Advisory Committee Meeting during (i) the 4th term from the start of their program and (ii) the 3rd term after completing their Ph D comprehensive examination.
- All Ph D students will be required to complete a 2nd Ph D Advisory Committee Meeting the 3rd term after completion of a previous Ph D Advisory Committee Meeting in which their overall progress was assessed as “unsatisfactory” unless they have scheduled a Ph D comprehensive examination or defense during that term.

Ph D Comprehensive Examination

- Students are required to meet the University-level Ph D Comprehensive Examination minimum requirements, with certain noted differences that are specific to the Faculty of Engineering Comprehensive Examination minimum requirements:
  - Comprehensive examination purpose: Consistent with University-level minimum requirements.
  - Timing: Students must follow the Faculty of Engineering completion timelines whereby students shall complete their comprehensive examination before the end of their 4th term or 6th term in cases where the student is admitted to the Ph D program without a completed Master’s degree.
  - Committee: Students must follow the Faculty of Engineering committee composition guidelines which differ from the University-level minimum requirements in both number of committee members and committee makeup.
  - Who Chairs an examination: Consistent with University-level minimum requirements.
  - Format / Content: Consistent with University-level minimum requirements but with additional information provided in the Faculty of Engineering Comprehensive Examination minimum requirements.
  - Academic integrity: Consistent with University-level minimum requirements.

Ph D Thesis

- The primary objective of the program is the accomplishment of independent and original research work and reporting thereon in a research thesis.
- Students are required to meet the University-level Ph D Thesis examination and Thesis defence minimum requirements and the Faculty of Engineering minimum requirements.

Existing

Milestone Requirements

Seminar Attendance

- Over the course of their degree program, all Ph D students should attend 24 seminars from departments and research institutions where Chemical Engineering faculty members have a membership. The Chemical Engineering seminars are documented in the Events section of the Chemical Engineering Department.
- Note: At Chemical Engineering seminars, attendance is documented. At other approved seminars, students must complete an attendance form and get it signed by the seminar organizer. Full instructions are available on the Department website.

Ph D Advisory Committee Meeting and Report

- Students are required to engage in a 30-60 minute, in-person or remote, Ph D Advisory Committee meeting, composed of a 15-minute presentation by the student to report research progress along with a written summary of courses and milestones completed.
- The Ph D Advisory Committee provides the student with a Ph D Advisory Committee Report describing progress on coursework and milestones completed and an assessment by each committee member of the student’s progress (excellent, satisfactory, unsatisfactory) in the following areas:

    - Understanding of material
    - Ability to handle discussion
    - Preparation, presentation, and organization
    - Research progress
    - Coursework progress
    - Overall
- Students with a MASc degree must complete a Ph D Advisory Committee meeting during the 3rd term after completing their Ph D comprehensive examination, with no extensions.
- Students without a MASc degree must complete a Ph D Advisory Committee Meeting during (i) the 4th term from the start of their program and (ii) the 3rd term after completing their Ph D comprehensive examination, with no extensions.
- All Ph D students will be required to complete a 2nd Ph D Advisory Committee Meeting the 3rd term after completion of a previous Ph D Advisory Committee Meeting in which their overall progress was assessed as "unsatisfactory" unless they have scheduled a Ph D comprehensive examination or defense during that term.

Ph D Comprehensive Examination

- Students are required to meet the University-level Ph D Comprehensive Examination minimum requirements, with certain noted differences that are specific to the Faculty of Engineering Comprehensive Examination minimum requirements:
    - Comprehensive examination purpose: Consistent with University-level minimum requirements.
    - Timing: Students must follow the Faculty of Engineering completion timelines whereby students shall complete their comprehensive examination before the end of their 4th term or 6th term in cases where the student is admitted to the Ph D program without a completed Master's degree.
    - Committee: Students must follow the Faculty of Engineering committee composition guidelines which differ from the University-level minimum requirements in both number of committee members and committee makeup.
    - Who Chairs an examination: Consistent with University-level minimum requirements.
    - Format / Content: Consistent with University-level minimum requirements but with additional information provided in the Faculty of Engineering Comprehensive Examination minimum requirements.
    - Academic integrity: Consistent with University-level minimum requirements.

Ph D Thesis

- Students are expected to maintain continuous registration until the thesis is submitted to Graduate Studies and Postdoctoral Affairs. Under exceptional circumstances, students may request Departmental approval for inactive terms.
- The role of a supervisor is to help a student establish a research problem with an appropriate scope, suggest alternative general approaches to the solution of a problem, and provide general advice on the structure and content of a thesis. The professional engineering code of ethics must be strictly observed in the supervisor-student relationship.

Notes

- Department of Chemical Engineering website
- Doctor of Philosophy (Ph D) in Chemical Engineering future graduate students program page

Specializations

Undergraduate Plan Guidelines

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Engineering

Dependencies

Prerequisites

- CHE 661 - Advances in Biochemical Engineering View Program
- CHE 730 - Special Topics in Chemical Kinetics,Catalysis and Advanced Reactor Engineering View Program
- CHE 720 - Special Topics in Analysis of Chemical Processes View Program
- CHE 710 - Special Topics in Transport Phenomena View Program
- CHE 750 - Special Topics in Electrochemical Engineering, Interfacial Engineering & Materials Science
- CHE 760 - Special Topics in Biochemical Engineering View Program View Program
- CHE 740 - Special Topics in Polymer Science and Engineering View Program
- CHE 770 - Special Topics in Environmental Engineering and Pollution Control View Program
- CHE 612 - Interfacial Phenomena View Program
- CHE 620 - Applied Engineering Mathematics View Program
- CHE 600 - Engineering and Research Methods, Ethics, Practice, and Law View Program

PhD in Chemical Engineering-Nanotechnology - Doctor of Philosophy (PhD) in Chemical Engineering - Nanotechnology

Top

Effective Date and Career

Career
Graduate

Effective Term and Year

Proposed

Effective Term and Year
Winter 2027

Existing

Effective Term and Year
Winter 2026

Proposal Details

Proposal Type
Change

Academic Unit Approval
2026-05-11

Quality Assurance Designation
Minor Modification Qad

Is there an impact to existing students?
Yes

Impact on Existing Students

Current students will be permitted to follow these new degree requirements immediately.

Is the credential name changing?
No

Graduate Co-operative Requirements
Not Applicable

Change to Learning Outcomes
No

Rationale and Background for Change(s)

Updating the admission and degree requirements to align with current practice and to articulate the requirements of the program more clearly. The intention is to provide greater clarity for students and to remove wording that already appears in the Faculty and University regulations.

The wording in our requirements has grown via incremental additions to become overly verbose. This change is to reduce the wording to the minimal possible by removing references to policies which are dictated elsewhere, such as the Faculty or University level regulations. In addition to these changes we will also remove the requirement that students from a discipline outside of chemical engineering be required to take an extra course, as reliable determination and tracking of which students are deemed to be ‘outside’ of chemical engineering is not feasible.

General Program/Plan Information

Faculty

Academic Unit

Faculty of Engineering

Department of Chemical Engineering

Graduate Field of Study

Chemical Engineering

Faculty

Faculty of Engineering

Program/Plan Name

Doctor of Philosophy (Ph D) in Chemical Engineering - Nanotechnology

Graduate Credential Type

PhD

Accelerated Program

Not applicable

Program Types

Collaborative

Admit Term(s)

Fall, Winter, Spring

Delivery Mode

On-campus

Length of Program

Proposed

Length of Program

- Students are required to complete the program in accordance with the University program time limits.

Existing

Length of Program

- The minimum period of registration for the Ph D degree is four terms. Degree requirements must be satisfied within four calendar years following the date of admission into the Ph D program, unless extensions are approved by the Associate Dean for Graduate Studies and Research, Engineering. Requests for extension must be supported by a written departmental recommendation along with a realistic timetable for the completion of the degree and evidence of adequate progress in research. Extensions are not granted automatically and will be refused in the case of inadequate progress. University of Waterloo regulations stipulate that approval of an extension past three extended terms is at the discretion of the Associate Provost, Graduate Studies.

Registration Option(s)

Full-time

Admissions

Admission Requirements: Minimum Requirements

Proposed

Admission Requirements: Minimum Requirements

- At the time of admission, each student must have an approved Ph D supervisor, who has agreed in writing to supervise their academic program, or co-supervisors, at least one of whom is an approved Ph D supervisor.
- Applicants must demonstrate excellence of background preparation and academic achievement in prior degrees and, usually, possess a relevant, thesis-based Master's degree. A minimum 80% standing in an applicant's appropriate Master's program is the usual requirement. A Master's degree obtained without a full research thesis is normally an inadequate qualification for admission to the Ph D program.
- Transfer to the Ph D program without completion of the MASc program: A student enrolled in a MASc program at the University of Waterloo may apply for transfer to the Ph D program without completing a Master's degree. Transfer from a MASc program to a Ph D program will normally be initiated at the Department level.
- In exceptional cases, applicants who have spent at least three years pursuing an appropriate bachelor's degree may be considered for admission to a Ph D program upon request from the Chemical Engineering Department.
- English language proficiency (ELP) (if applicable)

Existing

Admission Requirements: Minimum Requirements

- At the time of admission, each student must have an approved Ph D supervisor, who has agreed in writing to supervise their academic program, or co-supervisors, at least one of whom is an approved Ph D supervisor. The Faculty of Engineering maintains a list of individually approved research supervisors called Approved Doctoral Dissertation Supervisors (ADDS) and additions to and deletions from this list are made by the Engineering Graduate Studies Sub-Committee upon the recommendation of the Chemical Engineering Department's Associate Chair for Graduate Studies.
- Applicants must demonstrate excellence of background preparation and academic achievement in prior degrees and, usually, possess a relevant, thesis-based Master's degree. In the Faculty of Engineering, a minimum 80% standing in an applicant's appropriate Master's program is the usual requirement. A Master's degree obtained without a full research thesis is normally an inadequate qualification for admission to the Ph D program.
- Within the three required references for admission to Graduate Studies, the opinions on academic preparation and research ability must refer to the applicant's demonstrated ability to formulate research problems and execute the research required to solve problems, as indicated by a Master's of Applied Science (MASc) research thesis or published scientific/technical papers. The references should also refer to the applicant having adequate English language skills to pursue a doctoral program, with all of its requirements, at the University of Waterloo.
- Engineering Graduate Studies Sub-Committee requires objective evidence of English language skills. Technical publications that have been written principally by a student and published in refereed English language journals, and/or a thesis written in English, or a personal interview with the Chemical Engineering Department's Associate Chair for Graduate Studies are also considered as evidence.
- Transfer to the Ph D program without completion of the MASc program: A student enrolled in a MASc program at the University of Waterloo may apply for transfer to the Ph D program without completing a Master's degree. Transfer from a MASc program to a Ph D program will normally be initiated at the Department level. The supervisor shall prepare for the Department Graduate Review Committee a memorandum that summarizes the student's qualifications for transfer. At least one additional written recommendation from a Faculty member of the same Department will facilitate a decision on the transfer request.
- Admission to the Ph D program from a BASc program: In exceptional cases, applicants who have spent at least three years pursuing an appropriate bachelor's degree may be considered for admission to a Ph D program upon request from the Chemical Engineering Department.
- English language proficiency (ELP) (if applicable)

Admission Requirements: Application materials

- Résumé
- Statement of interest
- Transcript(s)

Admission Requirements: References

- Number of references: 3
- Type of references: at least 2 academic. Note: The Department reserves the right to request an additional reference.

Requirements Information

Graduate Degree Requirements

- Students must complete the course and milestone requirements listed below in addition to the Graduate Academic Integrity Module (Graduate AIM).

Graduate Course Requirements

No Rules

Graduate Course Requirements

Proposed

Graduate Course Requirements

- Students with a Master's degree in an appropriate discipline, must complete 1.75 units meeting the following criteria:
  - CHE 600 Engineering and Research Methods, Ethics, Practice, and Law (0.25 unit weight)
  - NANO 600 Introduction to Nanotechnology (0.5 unit weight)
  - 1 nanotechnology graduate level elective course (0.5 unit weight)
  - 1 graduate level CHE elective course at the 600 level or higher (0.5 unit weight). Note that 1 500 level course may be substituted here if recommended by the student's supervisor, and approved by the Associate Chair, Graduate Studies and the Associate Dean, Graduate Studies.
  - No more than 1 may be taught by supervisor(s).
  - No more than 1 may be a reading course.
- Students entering directly from their undergraduate degree, must complete 3.75 units meeting the following criteria:
  - CHE 600 Engineering and Research Methods, Ethics, Practice, and Law (0.25 unit weight)
  - NANO 600 Introduction to Nanotechnology (0.5 unit weight)
  - 1 nanotechnology graduate level elective course at the 600 level or higher (0.5 unit weight)
  - 5 elective courses (0.5 unit weight) at the 600 level or higher (0.5 unit weight). At least 2 of these must be CHE courses. Note that 2 500 level courses may be substituted if recommended by the student's supervisor, and approved by the Associate Chair, Graduate Studies and the Associate Dean, Graduate Studies.
  - No more than 3 may be taught by supervisor(s).
  - No more than 2 may be reading courses.
- Note: Students who have a Bachelor of Applied Science (BASc) in Nanotechnology Engineering or MASc in Nanotechnology from the University of Waterloo are not allowed to take NANO 600. Instead, they may choose 1 additional course at the 600 level or higher from the list of nanotechnology elective courses.
- Nanotechnology elective courses:
  - BME 611/NANO 608/SYDE 684 Materials Biocompatibility
  - NANO 601 Characterization of Nanomaterials
  - NANO 602 Structure and Spectroscopy of Nanoscale Materials
  - NANO 603 Nanocomposites
  - NANO 604 Nanomechanics and Molecular Dynamics Simulations
  - NANO 605/SYDE 683 Design of MEMS & NEMS
  - NANO 606/SYDE 682 Advanced Micro Electro Mechanical Systems: Physics, Design & Fabrication
  - NANO 707 From Atoms to Crystals, Quantum Wells, Wires and Dots
- Students may be required to take more than the number of courses specified above, if requested by the supervisor

and approved by the Department of Chemical Engineering.

Existing

Graduate Course Requirements

- Students with a Master's degree in a discipline closely related to Chemical Engineering as deemed by the Associate Chair Graduate Studies, must complete 1.75 units meeting the following criteria:
  - CHE 600 Engineering and Research Methods, Ethics, Practice, and Law (0.25 unit weight)
  - NANO 600 Introduction to Nanotechnology (0.5 unit weight)
  - 1 nanotechnology graduate level elective course (0.5 unit weight)
  - 1 graduate level CHE elective course at the 600 level or higher (0.5 unit weight). Note that 1 500 level course may be substituted here if recommended by the student's supervisor, and approved by the Associate Chair, Graduate Studies and the Associate Dean, Graduate Studies.
  - No more than 1 may be taught by supervisor(s).
  - No more than 1 may be a reading course.
- Students entering directly from their undergraduate degree, must complete 3.75 units meeting the following criteria:
  - CHE 600 Engineering and Research Methods, Ethics, Practice, and Law (0.25 unit weight)
  - NANO 600 Introduction to Nanotechnology (0.5 unit weight)
  - 1 nanotechnology graduate level elective course at the 600 level or higher (0.5 unit weight)
  - 5 graduate-level elective courses (0.5 unit weight). Of these, 4 must be 600 level or higher and 1 can be 500 level or higher. At least 4 of these must be CHE courses. 1 additional 500 level course may be substituted if recommended by the student's supervisor, and approved by the Associate Chair, Graduate Studies and the Associate Dean, Graduate Studies.
  - No more than 2 may be taught by supervisor(s).
  - No more than 1 may be a reading course.
- Students with a Master's degree in a discipline outside of Chemical Engineering, as deemed by the Associate Chair of Graduate Studies, must complete 2.25 units meeting the following criteria:
  - CHE 600 Engineering and Research Methods, Ethics, Practice, and Law (0.25 unit weight)
  - NANO 600 Introduction to Nanotechnology (0.5 unit weight)
  - 1 nanotechnology graduate level elective course (0.5 unit weight)
  - 2 graduate-level elective courses at the 600 level or higher (0.5 unit weight). All of these must be CHE courses. Note that 1 500 level course may be substituted if recommended by the student's supervisor, and approved by the Associate Chair, Graduate Studies and the Associate Dean, Graduate Studies.
  - No more than 1 may be taught by supervisor(s).
  - No more than 1 may be a reading course.
- Note: Students who have a Bachelor of Applied Science (BASc) in Nanotechnology Engineering or MASc in Nanotechnology from the University of Waterloo are not allowed to take NANO 600. Instead, they may choose 1 additional course at the 600 level or higher from the list of nanotechnology elective courses.
- Nanotechnology elective courses:
  - BME 611/NANO 608/SYDE 684 Materials Biocompatibility
  - NANO 601 Characterization of Nanomaterials
  - NANO 602 Structure and Spectroscopy of Nanoscale Materials
  - NANO 603 Nanocomposites
  - NANO 604 Nanomechanics and Molecular Dynamics Simulations
  - NANO 605/SYDE 683 Design of MEMS & NEMS
  - NANO 606/SYDE 682 Advanced Micro Electro Mechanical Systems: Physics, Design & Fabrication
  - NANO 707 From Atoms to Crystals, Quantum Wells, Wires and Dots
- The Chemical Engineering Department may require students to take more than the number of courses specified above. In every case, a graduate course program is established by the supervisor(s) in consultation with the student and, if deemed necessary, with the Associate Chair Graduate Studies of the Department. Students may also be required to take additional courses as a result of a comprehensive examination.
- Graduate courses offered by the Faculty of Engineering are numbered as 600 or 700 series courses and are assigned a unit weight of 0.50, which means that they are one-term courses as defined in the Graduate Studies Academic Calendar.
- Only courses taken within five years prior to the completion of the Ph D degree may be counted for credit towards a degree, unless a request for revalidation is granted.
- Students must achieve a:
  - Minimum cumulative average of 70%.
  - Minimum grade of 65% in each individual course.
- Each student is responsible for monitoring their own academic records and must immediately notify the Graduate Studies Manager of any inadequate grade or average.

Milestone Requirements

Proposed

Milestone Requirements

Seminar Attendance

- Over the course of their degree program, students must attend 24 seminars:
  - 8 seminars from the Waterloo Institute for Nanotechnology (WIN).
  - 16 seminars from departments and research institutions where Chemical Engineering faculty members have membership.

Ph D Advisory Committee Meeting and Report

- Students are required to engage in a 30-60 minute, in-person or remote, Ph D Advisory Committee meeting, composed of a 15-minute presentation by the student to report research progress along with a written summary of courses and milestones completed.
- Students with a MASc degree must complete a Ph D Advisory Committee meeting during the 3rd term after completing their Ph D comprehensive examination.
- Students without a MASc degree must complete a Ph D Advisory Committee Meeting during (i) the 4th term from the start of their program and (ii) the 3rd term after completing their Ph D comprehensive examination.
- All Ph D students will be required to complete a 2nd Ph D Advisory Committee Meeting the 3rd term after completion of a previous Ph D Advisory Committee Meeting in which their overall progress was assessed as "unsatisfactory" unless they have scheduled a Ph D comprehensive examination or defense during that term.

Ph D Comprehensive Examination

- Students are required to meet the University-level Ph D Comprehensive Examination minimum requirements, with certain noted differences that are specific to the Faculty of Engineering Comprehensive Examination minimum requirements:
  - Comprehensive examination purpose: Consistent with University-level minimum requirements.
  - Timing: Students must follow the Faculty of Engineering completion timelines whereby students shall complete their comprehensive examination before the end of their 4th term or 6th term in cases where the student is admitted to the Ph D program without a completed Master's degree.
  - Committee: Students must follow the Faculty of Engineering committee composition guidelines which differ from the University-level minimum requirements in both number of committee members and committee makeup.
  - Who Chairs an examination: Consistent with University-level minimum requirements.
  - Format / Content: Consistent with University-level minimum requirements but with additional information provided in the Faculty of Engineering Comprehensive Examination minimum requirements.
  - Academic integrity: Consistent with University-level minimum requirements.

Ph D Thesis

- The primary objective of the program is the accomplishment of independent and original research work and reporting thereon in a research thesis.
- Students are required to meet the University-level Ph D Thesis examination and Thesis defence minimum requirements and the Faculty of Engineering minimum requirements.

Existing

Milestone Requirements

Seminar Attendance

- Over the course of their degree program, all students must attend 24 seminars:
  - 8 seminars from the Waterloo Institute for Nanotechnology (WIN)
  - 16 seminars from departments and research institutions where Chemical Engineering faculty members have a membership. The Chemical Engineering seminars are documented in the Events section of the Chemical Engineering Department website.
- Note: At Chemical Engineering seminars, attendance is documented. At other approved seminars, students complete an attendance form and get it signed by the seminar organizer. Full instructions are available on the Department website.

Ph D Advisory Committee Meeting and Report

- Students are required to engage in a 30-60 minute, in-person or remote, Ph D Advisory Committee meeting, composed of a 15-minute presentation by the student to report research progress along with a written summary of courses and milestones completed.
- The Ph D Advisory Committee provides the student with a Ph D Advisory Committee Report describing progress on coursework and milestones completed and an assessment by each committee member of the student's progress (excellent, satisfactory, unsatisfactory) in the following areas:
  - Understanding of material
  - Ability to handle discussion
  - Preparation, presentation, and organization
  - Research progress
  - Coursework progress
  - Overall
- Students with a MASc degree must complete a Ph D Advisory Committee meeting during the 3rd term after completing their Ph D comprehensive examination, with no extensions.
- Students without a MASc degree must complete a Ph D Advisory Committee Meeting during (i) the 4th term from the start of their program and (ii) the 3rd term after completing their Ph D comprehensive examination, with no extensions.
- All Ph D students will be required to complete a 2nd Ph D Advisory Committee Meeting the 3rd term after completion of a previous Ph D Advisory Committee Meeting in which their overall progress was assessed as "unsatisfactory" unless they have scheduled a Ph D comprehensive examination or defense during that term.

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- Students are required to meet the University-level Ph D Comprehensive Examination minimum requirements, with certain noted differences that are specific to the Faculty of Engineering Comprehensive Examination minimum requirements:
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  - Timing: Students must follow the Faculty of Engineering completion timelines whereby students shall complete their comprehensive examination before the end of their 4th term or 6th term in cases where the

student is admitted to the Ph D program without a completed Master's degree.
    - Committee: Students must follow the Faculty of Engineering committee composition guidelines which differ from the University-level minimum requirements in both number of committee members and committee makeup.
    - Who Chairs an examination: Consistent with University-level minimum requirements.
    - Format / Content: Consistent with University-level minimum requirements but with additional information provided in the Faculty of Engineering Comprehensive Examination minimum requirements.
    - Academic integrity: Consistent with University-level minimum requirements.

Ph D Thesis

- Students are expected to maintain continuous registration until their thesis is submitted to Graduate Studies and Postdoctoral Affairs. Under exceptional circumstances, students may request Departmental approval for inactive terms.
- The role of a supervisor is to help a student establish a research problem with an appropriate scope, suggest alternative general approaches to the solution of a problem, and provide general advice on the structure and content of a thesis. The professional engineering code of ethics must be strictly observed in the supervisor-student relationship.

Notes

- Department of Chemical Engineering website
- Doctor of Philosophy (Ph D) in Chemical Engineering - Nanotechnology future graduate students program page

Specializations

Undergraduate Plan Guidelines

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Engineering

Dependencies

Prerequisites

- CHE 661 - Advances in Biochemical Engineering View Program
- CHE 730 - Special Topics in Chemical Kinetics,Catalysis and Advanced Reactor Engineering View Program
- CHE 720 - Special Topics in Analysis of Chemical Processes View Program
- CHE 710 - Special Topics in Transport Phenomena View Program
- CHE 750 - Special Topics in Electrochemical Engineering, Interfacial Engineering & Materials Science
- CHE 760 - Special Topics in Biochemical Engineering View Program View Program
- CHE 740 - Special Topics in Polymer Science and Engineering View Program
- CHE 770 - Special Topics in Environmental Engineering and Pollution Control View Program
- CHE 612 - Interfacial Phenomena View Program
- CHE 620 - Applied Engineering Mathematics View Program
- CHE 600 - Engineering and Research Methods, Ethics, Practice, and Law View Program

PhD in Chemical Engineering-Water - Doctor of Philosophy (PhD) in Chemical Engineering - Water

Top

Effective Date and Career

Career
Graduate

Effective Term and Year

Proposed

Effective Term and Year
Winter 2027

Existing

Effective Term and Year
Fall 2025

Proposal Details

Proposal Type
Change

Academic Unit Approval
2026-05-11

Quality Assurance Designation
Minor Modification Qad

Is there an impact to existing students?
Yes

Impact on Existing Students

Current students will be permitted to follow these new degree requirements immediately.

Is the credential name changing?
No

Graduate Co-operative Requirements
Not Applicable

Change to Learning Outcomes
No

Rationale and Background for Change(s)

Updating the admission and degree requirements to align with current practice and to articulate the requirements of the program more clearly. The intention is to provide greater clarity for students and to remove wording that already appears in the Faculty and University regulations.

The wording in our requirements has grown via incremental additions to become overly verbose. This change is to reduce the wording to the minimal possible by removing references to policies which are dictated elsewhere, such as the Faculty or University level regulations. In addition to these changes we will also remove the requirement that students from a discipline outside of chemical engineering be required to take an extra course, as reliable determination and tracking of which students are deemed to be 'outside' of chemical engineering is not feasible.

General Program/Plan Information

Faculty
Faculty of Engineering

Academic Unit
Department of Chemical Engineering

Graduate Field of Study
Chemical Engineering

Faculty
Faculty of Engineering

Program/Plan Name
Doctor of Philosophy (Ph D) in Chemical Engineering - Water

Graduate Credential Type
PhD

Accelerated Program
Not applicable

Program Types

Admit Term(s)

Collaborative

Fall, Winter, Spring

Delivery Mode
On-campus

Length of Program

Proposed

Length of Program

- Students are required to complete the program in accordance with the University program time limits.

Existing

Length of Program

- The minimum period of registration for the Ph D degree is four terms. Degree requirements must be satisfied within four calendar years following the date of admission into the Ph D program, unless extensions are approved by the Associate Dean for Graduate Studies and Research, Engineering. Requests for extension must be supported by a written departmental recommendation along with a realistic timetable for the completion of the degree and evidence of adequate progress in research. Extensions are not granted automatically and will be refused in the case of inadequate progress. University of Waterloo regulations stipulate that approval of an extension past three extended terms is at the discretion of the Associate Provost, Graduate Studies.
- A minimum of two terms of full-time residence is expected from students who wish to proceed on a part-time basis. Full-time residency means that a candidate is present on campus for at least three days a week, or a sufficient period of time per week to satisfy the supervisor. The most appropriate time for this residence period will be established in consultation with the supervisor(s) and the Associate Chair Graduate Studies.
- Part-time students should be advised that the Faculty of Engineering expects at least 20 hours per week to be devoted to advanced study and research.

Registration Option(s)
Full-time, Part-time

Admissions

Admission Requirements: Minimum Requirements

Proposed

Admission Requirements: Minimum Requirements

- At the time of admission, each student must have an approved Ph D supervisor who has agreed in writing to supervise their academic program or co-supervisors, at least one of whom is an approved Ph D supervisor.
- Applicants must demonstrate excellence of background preparation and academic achievement in prior degrees and, usually, possess a relevant, thesis-based Master's degree. A minimum 80% standing in an applicant's appropriate Master's program is the usual requirement. A Master's degree obtained without a full research thesis is normally an inadequate qualification for admission to the Ph D program.
- Transfer to the Ph D program without completion of the MASc program: A student enrolled in a MASc program at the University of Waterloo may apply for transfer to the Ph D program without completing a Master's degree. Transfer from a MASc program to a Ph D program will normally be initiated at the Department level.
- In exceptional cases, applicants who have spent at least three years pursuing an appropriate bachelor’s degree may be considered for admission to a Ph D program upon request from the Chemical Engineering Department.
- English language proficiency (ELP) (if applicable)

Existing

Admission Requirements: Minimum Requirements

- At the time of admission, each student must have an approved Ph D supervisor who has agreed in writing to supervise their academic program or co-supervisors, at least one of whom is an approved Ph D supervisor. The Faculty of Engineering maintains a list of individually approved research supervisors, called Approved Doctoral Dissertation Supervisors (ADDS). Additions to and deletions from this list are made by the Engineering Graduate Studies Sub-Committee upon the recommendation of the Chemical Engineering Department's Associate Chair for Graduate Studies.
- Applicants must demonstrate excellence of background preparation and academic achievement in prior degrees and, usually, possess a relevant, thesis-based Master's degree. In the Faculty of Engineering, a minimum 80% standing in an applicant's appropriate Master's program is the usual requirement. A Master's degree obtained without a full research thesis is normally an inadequate qualification for admission to the Ph D program.
- Within the three required references for admission to Graduate Studies, the opinions on academic preparation and research ability must refer to the applicant's demonstrated ability to formulate research problems and execute the research required to solve problems, as indicated by a Master's of Applied Science (MASc) research thesis or published scientific/technical papers. The references should also refer to the applicant having adequate English language skills to pursue a doctoral program, with all of its requirements, at the University of Waterloo.
- The Engineering Graduate Studies Sub-Committee requires objective evidence of English language skills. Technical publications that have been written principally by an applicant and published in refereed English language journals, and/or a thesis written in English, or a personal interview with the Chemical Engineering Department's Associate Chair for Graduate Studies are also considered as evidence.
- Transfer to the Ph D program without completion of the MASc program: A student enrolled in a MASc program at the University of Waterloo may apply for transfer to the Ph D program without completing a Master's degree. Transfer from a MASc program to a Ph D program will normally be initiated at the Department level. The supervisor shall prepare for the Department Graduate Review Committee a memorandum that summarizes the candidate's qualifications for transfer. At least one additional written recommendation from another Chemical Engineering Department faculty member will facilitate a decision on the transfer request.
- Admission to the Ph D program from a BASc program: In exceptional cases, applicants who have spent at least three years pursuing an appropriate bachelor's degree may be considered for admission to a Ph D program upon request from the Chemical Engineering Department.
- English language proficiency (ELP) (if applicable)

Admission Requirements: Application materials

- Résumé
- Statement of interest
- Transcript(s)

Admission Requirements: References

- Number of references: 3
- Type of references: at least 2 academic

Requirements Information

Graduate Degree Requirements

- Students must complete the course and milestone requirements listed below in addition to the Graduate Academic Integrity Module (Graduate AIM).

Graduate Course Requirements

No Rules

Graduate Course Requirements

Proposed

Graduate Course Requirements

- Students with a Master's degree in an appropriate discipline, must complete 1.75 units meeting the following criteria:
  - CHE 600 Engineering and Research Methods, Ethics, Practice, and Law (0.25 unit weight)
  - WATER 601 Integrated Water Management (0.5 unit weight)
  - WATER 602 Integrated Water Management Project (0.5 unit weight)
  - 1 CHE elective course at the 600 level or higher (0.5 unit weight). Note that 1 500 level course may be substituted here if recommended by the student's supervisor, and approved by the Associate Chair, Graduate Studies and the Associate Dean, Graduate Studies.
  - No more than 1 may be taught by supervisor(s).
  - No more than 1 may be a reading course.
- Students entering directly from their undergraduate degree must complete 3.75 units meeting following criteria:
  - CHE 600 Engineering and Research Methods, Ethics, Practice, and Law (0.25 unit weight)
  - WATER 601 Integrated Water Management (0.5 unit weight)
  - WATER 602 Integrated Water Management Project (0.5 unit weight)
  - 5 elective courses at the 600 level or higher (0.5 unit weight). At least 4 of these must be CHE courses. Note that 2 500 level courses may be substituted here if recommended by the student's supervisor, and approved by the Associate Chair, Graduate Studies and the Associate Dean, Graduate Studies.
  - No more than 3 may be taught by supervisor(s).
  - No more than 2 may be reading courses.
- This degree is offered through the Collaborative Water Program. This program, jointly offered by a range of departments across several academic faculties, promotes the development of interdisciplinary perspectives on water. Collaborative Water Program students complete their specialist training in their respective home departments, while working with colleagues from a variety of other departments in core interdisciplinary courses (WATER 601 and WATER 602).
- Students who have already completed WATER 601 and WATER 602 as part of their Masters Water degree, must complete the following course requirement:
  - 1 graduate level water course from outside the student's home Faculty agreed to by the student's Supervisor and the Collaborative Water Program Director.
- Students may be required to take more than the number of courses specified above, if requested by the supervisor and approved by the Department of Chemical Engineering.

Existing

Graduate Course Requirements

- Students with a Master's degree in a discipline closely related to Chemical Engineering as deemed by the Associate Chair Graduate Studies, must complete 1.75 units meeting the following criteria:
  - CHE 600 Engineering and Research Methods, Ethics, Practice, and Law (0.25 unit weight)
  - WATER 601 Integrated Water Management (0.5 unit weight)
  - WATER 602 Integrated Water Management Project (0.5 unit weight)
  - 1 graduate level CHE elective course at the 600 level or higher (0.5 unit weight). Note that 1 500 level course may be substituted here if recommended by the student's supervisor, and approved by the Associate Chair, Graduate Studies and the Associate Dean, Graduate Studies.
  - No more than 1 may be taught by supervisor(s).
  - No more than 1 may be a reading course.
- Students entering directly from their undergraduate degree must complete 3.75 units meeting following criteria:
  - CHE 600 Engineering and Research Methods, Ethics, Practice, and Law (0.25 unit weight)
  - WATER 601 Integrated Water Management (0.5 unit weight)
  - WATER 602 Integrated Water Management Project (0.5 unit weight)
  - 5 graduate level elective courses (0.5 unit weight). Of these, 4 must be 600 level or higher and 1 can be 500 level or higher. At least 4 of these must be CHE courses. Note that 1 additional 500 level course may be

substituted here if recommended by the student's supervisor, and approved by the Associate Chair, Graduate Studies and the Associate Dean, Graduate Studies.
    - No more than 2 may be taught by supervisor(s).
    - No more than 1 may be a reading course.
- Students with a Master's degree in a discipline outside of Chemical Engineering, as deemed by the Associate Chair of Graduate Studies, must complete 2.25 units meeting the following criteria:
    - CHE 600 Engineering and Research Methods, Ethics, Practice, and Law (0.25 unit weight)
    - WATER 601 Integrated Water Management (0.5 unit weight)
    - WATER 602 Integrated Water Management Project (0.5 unit weight)
    - 2 graduate level elective courses at the 600 level or higher (0.5 unit weight). All of these must be CHE courses. Note that 1 500 level course may be substituted here if recommended by the student's supervisor, and approved by the Associate Chair, Graduate Studies and the Associate Dean, Graduate Studies.
    - No more than 1 may be taught by supervisor(s).
    - No more than 1 may be a reading course.
- This degree is offered through the Collaborative Water Program. This program, jointly offered by a range of departments across several academic faculties, promotes the development of interdisciplinary perspectives on water. Collaborative Water Program students complete their specialist training in their respective home departments, while working with colleagues from a variety of other departments in core interdisciplinary courses (WATER 601 and WATER 602).
- Students who have already completed WATER 601 and WATER 602 as part of their Masters Water degree, must complete the following course requirement:
    - 1 graduate level water course from outside the student's home Faculty agreed to by the student's Supervisor and the Collaborative Water Program Director.

- The Chemical Engineering Department may require students to take more than the number of courses specified above. In every case, a graduate course program is established by the supervisor(s) in consultation with the student and, if deemed necessary, with the Associate Chair Graduate Studies of the Department. Students may also be required to take additional courses as a result of a comprehensive examination.

- Graduate courses offered by the Faculty of Engineering are numbered as 600 or 700 series courses and are assigned a unit weight of 0.50, which means that they are one-term courses as defined in the Graduate Studies Academic Calendar.

- Only courses taken within five years prior to the completion of the Ph D degree may be counted for credit towards a degree, unless a request for revalidation is granted.

- Students must achieve a:
    - Minimum cumulative average of 70%.
    - Minimum grade of 65% in each individual course.
- Each student is responsible for monitoring their own academic records and must immediately notify their Graduate Coordinator of any inadequate grade or average.
- The Chemical Engineering Department will determine whether or not collaborative program courses can be used as electives. It is therefore possible that students will need to take additional courses in order to meet the specific requirements of this program.

Milestone Requirements

Proposed

Milestone Requirements

Seminar Attendance

- Over the course of their degree program, students must attend 24 seminars from departments and research institutions where Chemical Engineering faculty members have membership.

Collaborative Research Seminar I

- Students are required to present a seminar on their thesis or major paper research proposal and, if appropriate, early stage results to current and past Water students and Water Institute faculty members. Seminars will normally occur following the completion of WATER 601 and WATER 602. Seminars will provide the opportunity for students to discuss how learnings from Water courses were applied in, or influenced, research proposals or research work in the student's home department. Seminars will normally be poster presentations at Water Institute organized events. The seminar is not an oral examination of the thesis or paper; rather, its purpose is to develop the student's ability to communicate their research in an organized and informative manner.

Collaborative Research Seminar II

- Students who have completed the Collaborative Research Seminar 1 as part of their Masters Water degree, must complete the Collaborative Research Seminar 2.
- Students are required to present a seminar on their Ph D thesis proposal to current and past water students and Water Institute faculty members. Seminars will normally occur following the completion of required courses and the comprehensive exam. Seminars should present how learnings from the Collaborative Water Program were applied in, or influenced, thesis proposals. Seminars will normally be poster presentations or talks at Water Institute organized events. The seminar is not an oral examination of the thesis proposal; rather, its purpose is to develop the student's ability to communicate their research in an organized and informative manner.

Collaborative Academic Contribution

- Students who have completed the Collaborative Water Program Research Seminar 1 as part of their Masters Water degree, must complete the Collaborative Academic Contribution milestone.
- Students are required to make an academic contribution to the Collaborative Water Program. The proposed contribution will be documented by the student and approved by the student's Supervisor and the Collaborative Water Program Director. Potential contributions may include, but not be limited to:
  - Development of new or improved curricula or course content;
  - Delivery of a lecture(s);
  - Preparation of a publication;
  - Preparation of a case study;
  - Mentorship of a group of students.

Ph D Advisory Committee Meeting and Report

- Students are required to engage in a 30-60 minute, in-person or remote, Ph D Advisory Committee meeting, composed of a 15-minute presentation by the student to report research progress along with a written summary of courses and milestones completed.
- Students with a MASc degree must complete a Ph D Advisory Committee meeting during the 3rd term after completing their Ph D comprehensive examination.
- Students without a MASc degree must complete a Ph D Advisory Committee Meeting during (i) the 4th term from the start of their program and (ii) the 3rd term after completing their Ph D comprehensive examination.
- All Ph D students will be required to complete a 2nd Ph D Advisory Committee Meeting the 3rd term after completion of a previous Ph D Advisory Committee Meeting in which their overall progress was assessed as "unsatisfactory" unless they have scheduled a Ph D comprehensive examination or defense during that term.

Ph D Comprehensive Examination

- Students are required to meet the University-level Ph D Comprehensive Examination minimum requirements, with certain noted differences that are specific to the Faculty of Engineering Comprehensive Examination minimum requirements:
  - Comprehensive examination purpose: Consistent with University-level minimum requirements.
  - Timing: Students must follow the Faculty of Engineering completion timelines whereby students shall complete their comprehensive examination before the end of their 4th term or 6th term in cases where the student is admitted to the Ph D program without a completed Master's degree.
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  - Format / Content: Consistent with University-level minimum requirements but with additional information provided in the Faculty of Engineering Comprehensive Examination minimum requirements.
  - Academic integrity: Consistent with University-level minimum requirements.

Ph D Thesis

- The primary objective of the program is the accomplishment of independent and original research work and reporting thereon in a research thesis.
- Students are required to meet the University-level Ph D Thesis examination and Thesis defence minimum requirements and the Faculty of Engineering minimum requirements.

Existing

Milestone Requirements

Seminar Attendance

- Over the course of their degree program, all students must attend 24 seminars from departments and research institutions where Chemical Engineering faculty members have a membership. The Chemical Engineering seminars are documented in the Events section of the Chemical Engineering Department website.
- Note: At Chemical Engineering seminars, attendance is documented. At other approved seminars, students complete an attendance form and get it signed by the seminar organizer. Full instructions are available on the Department website.

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- Students are required to present a seminar on their thesis or major paper research proposal and, if appropriate, early stage results to current and past Water students and Water Institute faculty members. Seminars will normally occur following the completion of WATER 601 and WATER 602. Seminars will provide the opportunity for students to discuss how learnings from Water courses were applied in, or influenced, research proposals or research work in the student's home department. Seminars will normally be poster presentations at Water Institute organized events. The seminar is not an oral examination of the thesis or paper; rather, its purpose is to develop the student's ability to communicate their research in an organized and informative manner.

Collaborative Research Seminar II

- Students who have completed the Collaborative Research Seminar 1 as part of their Masters Water degree, must complete the Collaborative Research Seminar 2.
- Students are required to present a seminar on their Ph D thesis proposal to current and past water students and Water Institute faculty members. Seminars will normally occur following the completion of required courses and the comprehensive exam. Seminars should present how learnings from the Collaborative Water Program were applied in, or influenced, thesis proposals. Seminars will normally be poster presentations or talks at Water Institute organized events. The seminar is not an oral examination of the thesis proposal; rather, its purpose is to develop the student's ability to communicate their research in an organized and informative manner.

Collaborative Academic Contribution

- Students who have completed the Collaborative Water Program Research Seminar 1 as part of their Masters Water degree, must complete the Collaborative Academic Contribution milestone.
- Students are required to make an academic contribution to the Collaborative Water Program. The proposed contribution will be documented by the student and approved by the student's Supervisor and the Collaborative Water Program Director. Potential contributions may include, but not be limited to:
  - Development of new or improved curricula or course content;
  - Delivery of a lecture(s);
  - Preparation of a publication;
  - Preparation of a case study;
  - Mentorship of a group of students.

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- Students are required to engage in a 30-60 minute, in-person or remote, Ph D Advisory Committee meeting, composed of a 15-minute presentation by the student to report research progress along with a written summary of courses and milestones completed.
- The Ph D Advisory Committee provides the student with a Ph D Advisory Committee Report describing progress on coursework and milestones completed and an assessment by each committee member of the student's progress (excellent, satisfactory, unsatisfactory) in the following areas:
  - Understanding of material
  - Ability to handle discussion
  - Preparation, presentation, and organization
  - Research progress
  - Coursework progress
  - Overall
- Students with a MASc degree must complete a Ph D Advisory Committee meeting during the 3rd term after completing their Ph D comprehensive examination, with no extensions.
- Students without a MASc degree must complete a Ph D Advisory Committee Meeting during (i) the 4th term from the start of their program and (ii) the 3rd term after completing their Ph D comprehensive examination, with no extensions.
- All Ph D students will be required to complete a 2nd Ph D Advisory Committee Meeting the 3rd term after completion of a previous Ph D Advisory Committee Meeting in which their overall progress was assessed as "unsatisfactory" unless they have scheduled a Ph D comprehensive examination or defense during that term.

Ph D Comprehensive Examination

- Students are required to meet the University-level Ph D Comprehensive Examination minimum requirements, with certain noted differences that are specific to the Faculty of Engineering Comprehensive Examination minimum requirements:
  - Comprehensive examination purpose: Consistent with University-level minimum requirements.
  - Timing: Students must follow the Faculty of Engineering completion timelines whereby students shall complete their comprehensive examination before the end of their 4th term or 6th term in cases where the student is admitted to the Ph D program without a completed Master's degree.
  - Committee: Students must follow the Faculty of Engineering committee composition guidelines which differ from the University-level minimum requirements in both number of committee members and committee makeup.
  - Who Chairs an examination: Consistent with University-level minimum requirements.
  - Format / Content: Consistent with University-level minimum requirements but with additional information provided in the Faculty of Engineering Comprehensive Examination minimum requirements.
  - Academic integrity: Consistent with University-level minimum requirements.

Ph D Thesis

- Students are expected to maintain continuous registration until the thesis is submitted to Graduate Studies and Postdoctoral Affairs. Under exceptional circumstances, students may request Departmental approval for inactive terms.
- The role of a supervisor is to help a student establish a research problem with an appropriate scope, suggest alternative general approaches to the solution of a problem, and provide general advice on the structure and content of a thesis. The professional engineering code of ethics must be strictly observed in the supervisor-student relationship.

Notes

- Department of Chemical Engineering website
- Doctor of Philosophy (Ph D) in Chemical Engineering - Water future graduate students program page

Specializations

Undergraduate Plan Guidelines

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow

Faculty of Engineering

Dependencies

Prerequisites

- CHE 661 - Advances in Biochemical Engineering View Program
- CHE 730 - Special Topics in Chemical Kinetics,Catalysis and Advanced Reactor Engineering View Program
- CHE 720 - Special Topics in Analysis of Chemical Processes View Program
- CHE 710 - Special Topics in Transport Phenomena View Program
- CHE 750 - Special Topics in Electrochemical Engineering, Interfacial Engineering & Materials Science
- CHE 760 - Special Topics in Biochemical Engineering View Program View Program
- CHE 740 - Special Topics in Polymer Science and Engineering View Program
- CHE 770 - Special Topics in Environmental Engineering and Pollution Control View Program
- CHE 612 - Interfacial Phenomena View Program
- WATER 601 - Integrated Water Management View Program
- CHE 620 - Applied Engineering Mathematics View Program
- CHE 600 - Engineering and Research Methods, Ethics, Practice, and Law View Program

MASc in Chemical Engineering - Master of Applied Science (MASc) in Chemical Engineering

Top

Effective Date and Career

Career
Graduate

Effective Term and Year

Proposed

Effective Term and Year
Winter 2027

Existing

Effective Term and Year
Winter 2026

Proposal Details

Proposal Type
Change

Academic Unit Approval
2026-05-11

Quality Assurance Designation
Minor Modification Qad

Is there an impact to existing students?
Yes

Impact on Existing Students

Currently registered students should not be impacted by these changes since they are all cosmetic only.

Is the credential name changing?
No

Graduate Co-operative Requirements
Not Applicable

Change to Learning Outcomes
No

Rationale and Background for Change(s)

Updating the admission and degree requirements to align with current practice and to articulate the requirements of the program more clearly. The intention is to provide greater clarity for students and to remove wording that already appears in the Faculty and University regulations.

The wording in our requirements has grown via incremental additions to become overly verbose. This change is to reduce the

wording to the minimal possible by removing references to policies which are dictated elsewhere, such as the Faculty or University level regulations.

General Program/Plan Information

Faculty

Faculty of Engineering

Academic Unit

Department of Chemical Engineering

Graduate Field of Study

Chemical Engineering

Faculty

Faculty of Engineering

Program/Plan Name

Master of Applied Science (MASc) in Chemical Engineering

Graduate Credential Type

Master's

Accelerated Program

Not applicable

Study Options (New)

Thesis

Admit Term(s)

Fall, Winter, Spring

Delivery Mode

On-campus

Registration Option(s)

Full-time, Part-time

Graduate Research Fields

- Biotechnology and Biomedical Engineering
- Electrochemical Engineering
- Nanotechnology for Advanced Materials
- Process Systems Engineering
- Soft Matter and Polymer Engineering
- Sustainable Reaction Engineering

Admissions

Admission Requirements: Minimum Requirements

Proposed

Admission Requirements: Minimum Requirements

- For applicants whose previous degree was completed in Canada, a 75% overall standing in the last two years, or equivalent, in a four-year Honours Bachelor's degree or equivalent is the minimum requirement for admission.
- For applicants whose previous degree was completed outside of Canada, a 75% overall standing in a four-year Honours Bachelor's degree or equivalent is the minimum requirement for admission.
- English language proficiency (ELP) (if applicable)

Existing

Admission Requirements: Minimum Requirements

- A 75% overall standing in the last two years, or equivalent, in a four-year Honours Bachelor's degree or equivalent.
- English language proficiency (ELP) (if applicable)

Admission Requirements: Application materials

- Résumé
- Statement of interest
- Transcript(s)

Admission Requirements: References

- Number of references: 2
- Type of references: at least 1 academic

Requirements Information

Graduate Degree Requirements

- Students must complete the course and milestone requirements listed below in addition to the Graduate Academic Integrity Module (Graduate AIM).

Thesis Option: Course Requirements

Thesis Option: Course Requirements

Proposed

Thesis Option: Course Requirements

- Students must complete CHE 600 Engineering and Research Methods, Ethics, Practice, and Law (0.25 credit weight) and 4 graduate level courses (0.50 unit weight per course) as follows:
  - 4 elective courses (at least 2 electives must be CHE courses)
  - No more than 1 may be a 500 level course.
  - No more than 1 may be a reading course.
  - No more than 2 may be taught by supervisor(s).
- Students may be required to take more than the number of courses specified above, if requested by the supervisor and approved by the Department of Chemical Engineering.

Existing

Thesis Option: Course Requirements

- Students must complete CHE 600 Engineering and Research Methods, Ethics, Practice, and Law (0.25 credit weight) and 4 graduate level courses (0.50 unit weight per course) as follows:
  - 4 elective courses (at least 2 electives must be CHE courses)
- For students with a non-Chemical Engineering background, 3 electives must be CHE courses.
- No more than 1 may be a 500 level course.
- No more than 1 may be a reading course.
- The courses to be taken will be selected in consultation with the student's research supervisor. The normal full load is at least two 0.50 unit weight courses per term while concurrently maintaining acceptable progress in the research project.
- Graduate courses offered by the Faculty of Engineering are numbered as 600 or 700 series courses and are assigned a unit weight of 0.50, which means that they are one-term courses as defined in the Graduate Studies Academic Calendar.
- The Faculty of Engineering requires that no more than one half of the courses used for credit towards a graduate degree may be taught by a student’s supervisor(s). In the case of co-supervision in small research groups, it may be necessary to relax this rule: in such cases, the student's file must contain a statement of formal approval from the Chemical Engineering Department and endorsement from the Associate Dean for Graduate Studies and Research of Engineering.
- Only courses taken within five years prior to the completion of the MASc degree may be counted for credit towards a degree, unless a request for revalidation is granted.
- Students must achieve a:
  - Minimum cumulative average of 70%.
  - Minimum grade of 65% in each course.
  - Note: Probationary students may have specific grade requirements, which will be specified in their admission letters.
- Each student is responsible for monitoring their own academic records and must immediately notify the Graduate Coordinator of any inadequate grade or average.

Thesis Option: Milestone Requirements

Proposed

Thesis Option: Milestone Requirements

Seminar Attendance

- Over the course of their degree program, students must attend 12 seminars from departments and research institutions where Chemical Engineering faculty members have membership.

Master's Thesis

- Students must submit a thesis accepted by the Department that reports the results of original research and discusses the significance of the work.
- The topic and scope of the thesis are arranged by the student and their supervisor. A MASc thesis should define a substantial research problem, provide a comprehensive review of the literature in the research problem area, describe the theoretical, analytical and/or experimental solution, and provide a comprehensive set of conclusions and recommendations.
- Students are required to meet the University-level Master's degree with thesis minimum requirements and the Faculty of Engineering minimum requirements.

Existing

Thesis Option: Milestone Requirements

Seminar Attendance

- Over the course of their degree program, all students must attend 12 seminars from departments and research institutions where Chemical Engineering faculty members have a membership. The Chemical Engineering seminars are documented in the Events section of the Chemical Engineering Department website.
- Note: At Chemical Engineering seminars, attendance is documented. At other approved seminars, students must complete an attendance form and get it signed by the seminar organizer. Full instructions are available on the Department website.

Master's Thesis

- Each student must submit a thesis that reports the results of original research and discusses the significance of the work. The thesis must be acceptable to the student's supervisor(s) and two additional faculty readers. Any of the readers may request that the student complete an oral examination.
- The topic and scope of a thesis are arranged by the student and their supervisor. A MASc thesis should define a substantial research problem, provide a comprehensive review of the literature in the research problem area, describe the theoretical, analytical and/or experimental solution, and provide a comprehensive set of conclusions and recommendations.
- Each student must prepare a thesis in accordance with the current guidelines issued by Graduate Studies and Postdoctoral Affairs and the Faculty of Engineering.
- Thesis submission: The student must distribute copies of their thesis to the readers designated by the Chemical Engineering Department's Associate Chair for Graduate Studies. The readers will include the supervisor(s) plus at least two other faculty members. They will acknowledge receipt of the thesis from the student by initialing a Department Certification of MASc Thesis Submission and Acceptance form. The student must also submit one copy of their completed MASc thesis, along with their initialed Department Certification of MASc Thesis Submission and Acceptance form, to the Engineering Graduate Studies Office. A representative of the office will confirm acceptance of the thesis by initialing the Department Certification of MASc Thesis Submission and Acceptance form and then email notice of the thesis deposit to the Chemical Engineering department. The thesis will be put on display in the Engineering Graduate Studies Office, and therefore made available to members of the University community, for three weeks. Once the student's Department Certification of MASc Thesis Submission and Acceptance form has been signed by a representative of the Engineering Graduate Studies Office, the student must return the form to the Chemical Engineering Department's Graduate Coordinator.
- Thesis evaluation: Within three weeks of their receipt of the thesis, each reader will return the thesis with their comments to the student and, upon acceptance of the thesis, sign the student's Department Certification of MASc Thesis Submission and Acceptance form. The student will return this form to the Chemical Engineering Department's Graduate Coordinator. Once the student's readers have accepted the thesis and the supervisor is satisfied that the student has completed all of the changes requested by the readers, the supervisor will sign the form to indicate their acceptance. The Chemical Engineering Department's Associate Chair of Graduate Studies will sign the form and forward it to the Engineering Graduate Studies Office. It will prepare a MASc Thesis Acceptance form and forward it to the student, the Chemical Engineering Department's Graduate Studies Office and the University of Waterloo's Graduate Studies and Postdoctoral Affairs.
- Restricted circulation of theses: Occasionally a research program may produce findings that warrant restrictions on the circulation of the thesis. This may result from constraints imposed by research sponsors or a belief that the work may produce patentable processes or devices. If the student and their supervisor(s) judge that some restrictions should be placed on a thesis, they should write to the Associate Chair for Graduate Studies as early as possible in the research program, describing the nature of and reasons for these restrictions. If the Associate Chair for Graduate Studies concurs, then the approval of the Associate Dean for Graduate Studies and Research of Engineering and the Associate Vice-President, Graduate Studies and Postdoctoral Affairs will be sought. The restriction is limited to one year, with a possible extension to a second year if an acceptable case can be made to the Associate Vice-President, Graduate Studies and Postdoctoral Affairs.
- Critical times: If their thesis is accepted on or before the last day of the term, a student is exempt from registering for the following term. Therefore, to avoid paying regular registration fees, the student should submit their thesis at least four weeks before the registration day of the following term. If the thesis requires major revisions that extend completion beyond the registration deadline, the student must register and pay fees for the pending term. Refunds may be made available under certain circumstances.

Notes

- Department of Chemical Engineering website
- Master of Applied Science (MASc) in Chemical Engineering future graduate students program page

Specializations

Undergraduate Plan Guidelines

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Engineering

Dependencies

Prerequisites

- CHE 661 - Advances in Biochemical Engineering View Program
- CHE 730 - Special Topics in Chemical Kinetics,Catalysis and Advanced Reactor Engineering View Program
- CHE 720 - Special Topics in Analysis of Chemical Processes View Program
- CHE 710 - Special Topics in Transport Phenomena View Program
- CHE 750 - Special Topics in Electrochemical Engineering, Interfacial Engineering & Materials Science
- CHE 760 - Special Topics in Biochemical Engineering View Program View Program
- CHE 740 - Special Topics in Polymer Science and Engineering View Program
- CHE 770 - Special Topics in Environmental Engineering and Pollution Control View Program
- CHE 612 - Interfacial Phenomena View Program
- CHE 620 - Applied Engineering Mathematics View Program
- CHE 600 - Engineering and Research Methods, Ethics, Practice, and Law View Program

Top

MASc in Chemical Engineering-Nanotechnology - Master of Applied Science (MASc) in Chemical Engineering -

Nanotechnology

Effective Date and Career

Career
Graduate

Effective Term and Year

Proposed

Effective Term and Year
Winter 2027

Existing

Effective Term and Year
Winter 2026

Proposal Details

Proposal Type
Change

Academic Unit Approval
2026-05-11

Quality Assurance Designation
Minor Modification Qad

Is there an impact to existing students?
Yes

Impact on Existing Students

Currently registered students should not be impacted by these changes since they are all cosmetic only.

Is the credential name changing?
No

Graduate Co-operative Requirements
Not Applicable

Change to Learning Outcomes
No

Rationale and Background for Change(s)

Updating the admission and degree requirements to align with current practice and to articulate the requirements of the

program more clearly. The intention is to provide greater clarity for students and to remove wording that already appears in the Faculty and University regulations.

The wording in our requirements has grown via incremental additions to become overly verbose. This change is to reduce the wording to the minimal possible by removing references to policies which are dictated elsewhere, such as the Faculty or University level regulations.

General Program/Plan Information

Faculty

Faculty of Engineering

Academic Unit

Department of Chemical Engineering

Graduate Field of Study

Chemical Engineering

Faculty

Faculty of Engineering

Program/Plan Name

Master of Applied Science (MASc) in Chemical Engineering - Nanotechnology

Graduate Credential Type

Master's

Accelerated Program

Not applicable

Study Options (New)

Thesis

Program Types

Collaborative

Admit Term(s)

Fall, Winter, Spring

Delivery Mode

On-campus

Registration Option(s)

Full-time

Admissions

Admission Requirements: Minimum Requirements

Proposed

Admission Requirements: Minimum Requirements

- For applicants whose previous degree was completed in Canada, a 75% overall standing in the last two years, or equivalent, in a four-year Honours Bachelor's degree or equivalent is the minimum requirement for admission.
- For applicants whose previous degree was completed outside of Canada, a 75% overall standing in a four-year Honours Bachelor's degree or equivalent is the minimum requirement for admission.
- English language proficiency (ELP) (if applicable)

Existing

Admission Requirements: Minimum Requirements

- A 75% overall standing in the last two years, or equivalent, in a four-year Honours Bachelor's degree or equivalent.
- English language proficiency (ELP) (if applicable)

Admission Requirements: Application materials

- Résumé
- Statement of interest
- Transcript(s)

Admission Requirements: References

- Number of references: 2
- Type of references: at least 1 academic. Note: The Department reserves the right to request an additional reference.

Requirements Information

Graduate Degree Requirements

- Students must complete the course and milestone requirements listed below in addition to the Graduate Academic Integrity Module (Graduate AIM).

Thesis Option: Course Requirements

Thesis Option: Course Requirements

Proposed

Thesis Option: Course Requirements

- Students must complete CHE 600 Engineering and Research Methods, Ethics, Practice, and Law (0.25 credit weight) and 4 graduate level courses (0.50 unit weight per course) as follows:
  - NANO 600 Introduction to Nanotechnology
  - 1 nanotechnology elective course
  - 2 CHE elective courses
  - No more than 1 may be a 500 level course.
  - No more than 1 reading course.
  - No more than 2 may be taught by supervisor(s).
- Note: Students who have a Bachelor of Applied Science (BASc) in Nanotechnology Engineering from the University of Waterloo are not allowed to take NANO 600. Instead, they may choose any 1 course from the list of nanotechnology elective courses.
- Nanotechnology elective courses:
  - BME 611/NANO 608/SYDE 684 Materials Biocompatibility
  - NANO 601 Characterization of Nanomaterials
  - NANO 602 Structure and Spectroscopy of Nanoscale Materials
  - NANO 603 Nanocomposites
  - NANO 604 Nanomechanics and Molecular Dynamics Simulations
  - NANO 605/SYDE 683 Design of MEMS & NEMS
  - NANO 606/SYDE 682 Advanced Micro Electro Mechanical Systems: Physics, Design & Fabrication
  - NANO 707 From Atoms to Crystals, Quantum Wells, Wires and Dots
- Students may be required to take more than the number of courses specified above, if requested by the supervisor and approved by the Department of Chemical Engineering.

Existing

Thesis Option: Course Requirements

- Students must complete CHE 600 Engineering and Research Methods, Ethics, Practice, and Law (0.25 credit weight) and 4 graduate level courses (0.50 unit weight per course) as follows:
  - NANO 600 Introduction to Nanotechnology
  - 1 nanotechnology elective course
  - 2 CHE elective courses
- No more than 1 may be a 500 level course.
- No more than 1 reading course.
- Note: Students who have a Bachelor of Applied Science (BASc) in Nanotechnology Engineering from the University of Waterloo are not allowed to take NANO 600. Instead, they may choose any 1 course from the list of nanotechnology elective courses.
- Nanotechnology elective courses:
  - BME 611/NANO 608/SYDE 684 Materials Biocompatibility
  - NANO 601 Characterization of Nanomaterials
  - NANO 602 Structure and Spectroscopy of Nanoscale Materials
  - NANO 603 Nanocomposites
  - NANO 604 Nanomechanics and Molecular Dynamics Simulations
  - NANO 605/SYDE 683 Design of MEMS & NEMS
  - NANO 606/SYDE 682 Advanced Micro Electro Mechanical Systems: Physics, Design & Fabrication
  - NANO 707 From Atoms to Crystals, Quantum Wells, Wires and Dots
- The courses to be taken will be selected in consultation with the student's research supervisor. The normal full load is at least two 0.50 unit weight courses per term while concurrently maintaining acceptable progress in the research project.
- Graduate courses offered by the Faculty of Engineering are numbered as 600 or 700 series courses and are assigned a unit weight of 0.50, which means that they are one-term courses as defined in the Graduate Studies Academic Calendar.
- The Faculty of Engineering requires that no more than one half of the courses used for credit towards a graduate degree may be taught by a student’s supervisor(s). In the case of co-supervision in small research groups, it may be necessary to relax this rule: in such cases, the student's file must contain a statement of formal approval from the Chemical Engineering Department and endorsement from the Associate Dean for Graduate Studies and Research of

Engineering.
- Only courses taken within five years prior to the completion of the MASc degree may be counted for credit towards a degree, unless a request for revalidation is granted.
- Students must achieve a:
  - Minimum cumulative average of 70%.
  - Minimum grade of 65% in each course.
  - Note: Probationary students may have specific grade requirements, which will be specified in their admission letter.
- Each student is responsible for monitoring their own academic records and must immediately notify the Graduate Studies Manager of any inadequate grade or average.

Thesis Option: Milestone Requirements

Proposed

Thesis Option: Milestone Requirements

Seminar Attendance

- Over the course of their degree program, students must attend 12 seminars:
  - 8 seminars from the Waterloo Institute for Nanotechnology (WIN).
  - 4 seminars from departments and research institutions where Chemical Engineering faculty members have membership.

Master's Thesis

- Students must submit a thesis accepted by the Department that reports the results of original research and discusses the significance of the work.
- The topic and scope of the thesis are arranged by the student and their supervisor. A MASc thesis should define a substantial research problem, provide a comprehensive review of the literature in the research problem area, describe the theoretical, analytical and/or experimental solution, and provide a comprehensive set of conclusions and recommendations.
- Students are required to meet the University-level Master's degree with thesis minimum requirements and the Faculty of Engineering minimum requirements.

Existing

Thesis Option: Milestone Requirements

Seminar Attendance

- Over the course of their degree program, all students must attend 12 seminars:
  - 8 seminars from the Waterloo Institute for Nanotechnology (WIN)
  - 4 seminars from departments and research institutions where Chemical Engineering faculty members have a membership. The Chemical Engineering seminars are documented in the Events section of the Chemical Engineering Department website.
- Note: At Chemical Engineering seminars, attendance is documented. At other approved seminars, students complete an attendance form and get it signed by the seminar organizer. Full instructions are available on the Department website.

Master's Thesis

- Each student must submit a thesis that reports the results of original research and discusses the significance of the work. The thesis must be acceptable to the student's supervisor(s) and two additional faculty readers. Any of the readers may request that the student complete an oral examination.
- The topic and scope of a thesis are arranged by the student and their supervisor. A MASc thesis should define a substantial research problem, provide a comprehensive review of the literature in the research problem area, describe the theoretical, analytical and/or experimental solution, and provide a comprehensive set of conclusions and recommendations.
- Each student must prepare a thesis in accordance with the current guidelines issued by Graduate Studies and Postdoctoral Affairs and the Faculty of Engineering.
- Thesis submission: The student must distribute copies of their thesis to the readers designated by the Chemical Engineering Department's Associate Chair for Graduate Studies. The readers will include the supervisor(s) plus at least two other faculty members. They will acknowledge receipt of the thesis from the student by initialing a Department Certification of MASc Thesis Submission and Acceptance form. The student must also submit one copy of their completed MASc thesis, along with their initialed Department Certification of MASc Thesis Submission and Acceptance form, to the Engineering Graduate Studies Office. A representative of the office will confirm acceptance of the thesis by initialing the Department Certification of MASc Thesis Submission and Acceptance form and then email notice of the thesis deposit to the Chemical Engineering Department. The thesis will be put on display in the Engineering Graduate Studies Office, and therefore made available to members of the University community, for three weeks. Once the student's Department Certification of MASc Thesis Submission and Acceptance form has been signed by a representative of the Engineering Graduate Studies Office, the student must return the form to the Chemical Engineering Department's Graduate Coordinator.
- Thesis evaluation: Within three weeks of their receipt of the thesis, each reader will return the thesis with their comments to the student and, upon acceptance of the thesis, sign the student's Department Certification of MASc Thesis Submission and Acceptance form. The student will return this form to the Chemical Engineering Department's Graduate Coordinator. Once the student's supervisor is satisfied that the student has completed all of the changes requested by the readers, the supervisor will sign the form to indicate his/her acceptance. The Chemical

Engineering Department's Associate Chair of Graduate Studies will sign the form and forward it to the Engineering Graduate Studies Office. It will prepare a MASc Thesis Acceptance form and forward it to the student, the Chemical Engineering Department's Graduate Studies Office and the University of Waterloo's Graduate Studies and Postdoctoral Affairs.
- Restricted circulation of theses: Occasionally a research program may produce findings that warrant restrictions on the circulation of the thesis. This may result from constraints imposed by research sponsors or a belief that the work may produce patentable processes or devices. If the student and their supervisor(s) judge that some restrictions should be placed on a thesis, they should write to the Associate Chair for Graduate Studies as early as possible in the research program, describing the nature of and reasons for the restrictions. If the Associate Chair for Graduate Studies concurs, then the approval of the Associate Dean for Graduate Studies and Research of Engineering and the Associate Vice-President, Graduate Studies and Postdoctoral Affairs will be sought. The restriction is limited to one year, with a possible extension to a second year if an acceptable case can be made to the Associate Vice-President, Graduate Studies and Postdoctoral Affairs.
- Critical times: If their thesis is accepted on or before the last day of the term, a student is not required to register for the following term. Therefore, to avoid paying regular registration fees, the student should submit their thesis at least four weeks before the registration day of the following term. If the thesis requires major revisions that extend completion beyond the registration deadline, the student must register and pay fees for the pending term. Refunds may be made available under certain circumstances.

Notes

- Department of Chemical Engineering website
- Master of Applied Science (MASc) in Chemical Engineering - Nanotechnology future graduate students program page

Specializations

Undergraduate Plan Guidelines

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Engineering

Dependencies

Prerequisites

- CHE 661 - Advances in Biochemical Engineering View Program
- CHE 730 - Special Topics in Chemical Kinetics,Catalysis and Advanced Reactor Engineering View Program
- CHE 720 - Special Topics in Analysis of Chemical Processes View Program
- CHE 710 - Special Topics in Transport Phenomena View Program
- CHE 750 - Special Topics in Electrochemical Engineering, Interfacial Engineering & Materials Science
- CHE 760 - Special Topics in Biochemical Engineering View Program View Program
- CHE 740 - Special Topics in Polymer Science and Engineering View Program
- CHE 770 - Special Topics in Environmental Engineering and Pollution Control View Program
- CHE 612 - Interfacial Phenomena View Program
- CHE 620 - Applied Engineering Mathematics View Program
- CHE 600 - Engineering and Research Methods, Ethics, Practice, and Law View Program

MASc in Chemical Engineering-Water - Master of Applied Science (MASc) in Chemical Engineering - Water

Top

Effective Date and Career

Career
Graduate

Effective Term and Year

Proposed

Effective Term and Year
Winter 2027

Existing

Effective Term and Year
Winter 2026

Proposal Details

Proposal Type
Change

Academic Unit Approval
2026-05-11

Quality Assurance Designation
Minor Modification Qad

Is there an impact to existing students?
Yes

Impact on Existing Students

Currently registered students should not be impacted by these changes since they are all cosmetic only.

Is the credential name changing?
No

Graduate Co-operative Requirements
Not Applicable

Change to Learning Outcomes
No

Rationale and Background for Change(s)

Updating the admission and degree requirements to align with current practice and to articulate the requirements of the program more clearly. The intention is to provide greater clarity for students and to remove wording that already appears in the Faculty and University regulations.

The wording in our requirements has grown via incremental additions to become overly verbose. This change is to reduce the wording to the minimal possible by removing references to policies which are dictated elsewhere, such as the Faculty or University level regulations.

General Program/Plan Information

Faculty
Faculty of Engineering

Academic Unit
Department of Chemical Engineering

Graduate Field of Study
Chemical Engineering

Faculty
Faculty of Engineering

Program/Plan Name
Master of Applied Science (MASc) in Chemical Engineering - Water

Graduate Credential Type
Master's

Accelerated Program
Not applicable

Study Options (New)
Thesis

Program Types
Collaborative

Admit Term(s)
Fall, Winter, Spring

Delivery Mode
On-campus

Registration Option(s)
Full-time, Part-time

Admissions

Admission Requirements: Minimum Requirements

Proposed

Admission Requirements: Minimum Requirements

- For applicants whose previous degree was completed in Canada, a 75% overall standing in the last two years, or equivalent, in a four-year Honours Bachelor's degree or equivalent is the minimum requirement for admission.
- For applicants whose previous degree was completed outside of Canada, a 75% overall standing in a four-year Honours Bachelor's degree or equivalent is the minimum requirement for admission.
- English language proficiency (ELP) (if applicable)

Existing

Admission Requirements: Minimum Requirements

- A 75% overall standing in the last two years, or equivalent, in a four-year Honours Bachelor's degree or equivalent.
- English language proficiency (ELP) (if applicable)

Admission Requirements: Application materials

- Résumé
- Statement of interest
- Transcript(s)

Admission Requirements: References

- Number of references: 2
- Type of references: at least 1 academic

Requirements Information

Graduate Degree Requirements

- Students must complete the course and milestone requirements listed below in addition to the Graduate Academic Integrity Module (Graduate AIM).

Thesis Option: Course Requirements

Thesis Option: Course Requirements

Proposed

Thesis Option: Course Requirements

- Students must complete CHE 600 Engineering and Research Methods, Ethics, Practice, and Law (0.25 credit weight) and 4 graduate level courses (0.50 unit weight per course) as follows:
  - WATER 601 Integrated Water Management
  - WATER 602 Integrated Water Management Project
  - 2 CHE elective courses
  - No more than 1 may be a 500 level course.
  - No more than 1 may be a reading course.
  - No more than 2 may be taught by supervisor(s).
- This degree is offered through the Collaborative Water Program. This program, jointly offered by a range of departments across several academic faculties, promotes the development of interdisciplinary perspectives on water. Collaborative Water Program students complete their specialist training in their respective home departments, while working with colleagues from a variety of other departments in core interdisciplinary courses (WATER 601 and WATER 602).
- Students may be required to take more than the number of courses specified above, if requested by the supervisor and approved by the Department of Chemical Engineering.

Existing

Thesis Option: Course Requirements

- Students must complete CHE 600 Engineering and Research Methods, Ethics, Practice, and Law (0.25 credit weight) and 4 graduate level courses (0.50 unit weight per course) as follows:
  - WATER 601 Integrated Water Management
  - WATER 602 Integrated Water Management Project
  - 2 CHE elective courses
- No more than 1 may be a 500 level course.
- No more than 1 may be a reading course.
- This degree is offered through the Collaborative Water Program. This program, jointly offered by a range of departments across several academic faculties, promotes the development of interdisciplinary perspectives on water.

Collaborative Water Program students complete their specialist training in their respective home departments, while working with colleagues from a variety of other departments in core interdisciplinary courses (WATER 601 and WATER 602).
- The courses to be taken will be selected in consultation with the student's research supervisor. The normal full load is at least two 0.50 unit weight courses per term while concurrently maintaining acceptable progress in the research project.
- Graduate courses offered by the Faculty of Engineering are numbered as 600 or 700 series courses and are assigned a unit weight of 0.50, which means that they are one-term courses as defined in the Graduate Studies Academic Calendar.
- The Faculty of Engineering requires that no more than one half of the courses used for credit towards a graduate degree may be taught by a student's supervisor(s). In the case of co-supervision in small research groups, it may be necessary to relax this rule: in such cases, the student's file must contain a statement of formal approval from the Chemical Engineering Department and endorsement from the Associate Dean for Graduate Studies and Research of Engineering.
- Only courses taken within five years prior to the completion of the MASc degree may be counted for credit towards a degree, unless a request for revalidation is granted.
- Students must achieve a:
  - Minimum cumulative average of 70%.
  - Minimum grade of 65% in each course.
  - Note: Probationary students may have specific grade requirements, which will be specified in their admission letter.
- Each student is responsible for monitoring their own academic records and must immediately notify the Graduate Coordinator of any inadequate grade or average.

Thesis Option: Milestone Requirements

Proposed

Thesis Option: Milestone Requirements

Seminar Attendance

- Over the course of their degree program, students must attend 12 seminars from departments and research institutions where Chemical Engineering faculty members have membership.

Collaborative Research Seminar I

- Students are required to present a seminar on their thesis or major paper research proposal and, if appropriate, early stage results to current and past Water students and Water Institute faculty members. Seminars will normally occur following the completion of WATER 601 and WATER 602. Seminars will provide the opportunity for students to discuss how learnings from Water courses were applied in, or influenced, research proposals or research work in the student's home department. Seminars will normally be poster presentations at Water Institute organized events. The seminar is not an oral examination of the thesis or paper; rather, its purpose is to develop the student's ability to communicate their research in an organized and informative manner.

Master's Thesis

- Students must submit a thesis accepted by the Department that reports the results of original research and discusses the significance of the work.
- The topic and scope of the thesis are arranged by the student and their supervisor. A MASc thesis should define a substantial research problem, provide a comprehensive review of the literature in the research problem area, describe the theoretical, analytical and/or experimental solution, and provide a comprehensive set of conclusions and recommendations.
- Students are required to meet the University-level Master's degree with thesis minimum requirements and the Faculty of Engineering minimum requirements.

Existing

Thesis Option: Milestone Requirements

Seminar Attendance

- Over the course of their degree program, all students must attend 12 seminars from departments and research institutions where Chemical Engineering faculty members have a membership. The Chemical Engineering seminars are documented in the Events section of the Chemical Engineering Department website.
- Note: At Chemical Engineering seminars, attendance is documented. At other approved seminars, students complete an attendance form and get it signed by the seminar organizer. Full instructions are available on the Department website.

Collaborative Research Seminar I

- Students are required to present a seminar on their thesis or major paper research proposal and, if appropriate, early stage results to current and past Water students and Water Institute faculty members. Seminars will normally occur following the completion of WATER 601 and WATER 602. Seminars will provide the opportunity for students to discuss how learnings from Water courses were applied in, or influenced, research proposals or research work in the student's home department. Seminars will normally be poster presentations at Water Institute organized events. The seminar is not an oral examination of the thesis or paper; rather, its purpose is to develop the student's ability to communicate their research in an organized and informative manner.

Master's Thesis

- Each student must submit a thesis that reports the results of original research and discusses the significance of the work. The thesis must be acceptable to the student's supervisor(s) and two additional faculty readers. Any of the readers may request that the student complete an oral examination.
- The topic and scope of a thesis are arranged by the student and their supervisor. A MASc thesis should define a substantial research problem, provide a comprehensive review of the literature in the research problem area, describe the theoretical, analytical and/or experimental solution, and provide a comprehensive set of conclusions and recommendations.
- Each student must prepare a thesis in accordance with the current guidelines issued by Graduate Studies and Postdoctoral Affairs and the Faculty of Engineering.
- Thesis submission: The student must distribute copies of the thesis to the readers designated by the Chemical Engineering Department's Associate Chair for Graduate Studies. The readers will include the supervisor(s) plus at least two other faculty members. They will acknowledge receipt of the thesis from the student by initialing a copy of a Department Certification of MASc Thesis Submission and Acceptance form. The student must also submit one copy of their completed MASc thesis, along with their initialed Department Certification of MASc Thesis Submission and Acceptance form, to the Engineering Graduate Studies Office. A representative of the office will confirm acceptance of the thesis by initialing the Department Certification of MASc Thesis Submission and Acceptance form and then email notice of the thesis deposit to the Chemical Engineering Department. The thesis will be put on display in the Engineering Graduate Studies Office, and therefore made available to members of the University community, for three weeks. Once the student's Department Certification of MASc Thesis Submission and Acceptance form has been signed by a representative of the Engineering Graduate Studies Office, the student must return the form to the Chemical Engineering Department's Graduate Coordinator.
- Thesis evaluation: Within three weeks of their receipt of the thesis, each reader will return the thesis with their comments to the student and, upon acceptance of the thesis, sign the student's Department Certification of MASc Thesis Submission and Acceptance form. The student will return this form to the Chemical Engineering Department's Graduate Coordinator. Once the student's readers have accepted the thesis and the supervisor is satisfied that the student has completed all of the changes requested by the readers, the supervisor will sign the form to indicate their acceptance. The Chemical Engineering Department's Associate Chair of Graduate Studies will sign the form and forward it to the Engineering Graduate Studies Office. It will prepare a MASc Thesis Acceptance form and forward it to the student, the Chemical Engineering Department's Graduate Studies Office, and the University of Waterloo's Graduate Studies and Postdoctoral Affairs.
- Restricted circulation of theses: Occasionally a research program may produce findings that warrant restrictions on the circulation of the thesis. This may result from constraints imposed by research sponsors or a belief that the work may produce patentable processes or devices. If the student and their supervisor(s) judge that some restrictions should be placed on a thesis, they should write to the Associate Chair for Graduate Studies as early as possible in the research program, describing the nature of and reasons for the restrictions. If the Associate Chair for Graduate Studies concurs, then the approval of the Associate Dean for Graduate Studies and Research of Engineering and the Associate Vice-President, Graduate Studies and Postdoctoral Affairs will be sought. The restriction is limited to one year, with a possible extension to a second year if an acceptable case can be made to the Associate Vice-President, Graduate Studies and Postdoctoral Affairs.
- Critical times: If their thesis is accepted on or before the last day of the term, a student is not required to register for the following term. Therefore, to avoid paying regular registration fees, the student should submit their thesis at least four weeks before the registration day of the following term. If the thesis requires major revisions that extend the completion beyond the registration deadline, the student must register and pay fees for the pending term. Refunds may be made available under certain circumstances.

Notes

- Department of Chemical Engineering website
- Master of Applied Science (MASc) in Chemical Engineering - Water future graduate students program page

Specializations

Undergraduate Plan Guidelines

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Engineering

Dependencies

Prerequisites

- CHE 661 - Advances in Biochemical Engineering — View Program
- CHE 730 - Special Topics in Chemical Kinetics,Catalysis and Advanced Reactor Engineering — View Program
- CHE 720 - Special Topics in Analysis of Chemical Processes — View Program
- CHE 710 - Special Topics in Transport Phenomena — View Program
- CHE 750 - Special Topics in Electrochemical Engineering, Interfacial Engineering & Materials Science
- CHE 760 - Special Topics in Biochemical Engineering — View Program View Program
- CHE 740 - Special Topics in Polymer Science and Engineering — View Program
- CHE 770 - Special Topics in Environmental Engineering and Pollution Control — View Program
- CHE 612 - Interfacial Phenomena — View Program
- WATER 601 - Integrated Water Management — View Program
- CHE 620 - Applied Engineering Mathematics — View Program
- CHE 600 - Engineering and Research Methods, Ethics, Practice, and Law — View Program

MEng in Chemical Engineering-Health Technologies-Co-op - Master of Engineering (MEng) in Chemical Engineering - Health Technologies - Co-operative Program

Top

Effective Date and Career

Career
Graduate

Effective Term and Year

Proposed

Effective Term and Year
Winter 2027

Existing

Effective Term and Year
Fall 2026

Proposal Details

Proposal Type
Change

Academic Unit Approval
2026-05-11

Quality Assurance Designation
Minor Modification Qad

Is there an impact to existing students?
No

Is the credential name changing?
No

Graduate Co-operative Requirements
No

Change to Learning Outcomes
No

Rationale and Background for Change(s)

Updating the admission and degree requirements to align with current practice and to articulate the requirements of the program more clearly. The intention is to provide greater clarity for students and to remove wording that already appears in the Faculty and University regulations.

The wording in our requirements has grown via incremental additions to become overly verbose. This change is to reduce the wording to the minimal possible by removing references to policies which are dictated elsewhere, such as the Faculty or University level regulations.

General Program/Plan Information

Faculty
Faculty of Engineering

Academic Unit
Department of Chemical Engineering

Graduate Field of Study

Chemical Engineering

Faculty

Faculty of Engineering

Program/Plan Name

Master of Engineering (MEng) in Chemical Engineering - Health Technologies - Co-operative Program

Graduate Credential Type

Master's

Accelerated Program

Not applicable

Study Options (New)

Coursework

Program Types

Co-operative Collaborative

Admit Term(s)

Fall, Winter, Spring

Delivery Mode

On-campus

Length of Program

- 5-6 terms (20-24 months)

Registration Option(s)

Full-time

Additional Program Information

- Important notice for MEng applicants: applicants to the MEng program are expected to be entirely self funded. No financial assistance will be provided from the Department of Chemical Engineering or the University of Waterloo.

Admissions

Admission Requirements: Minimum Requirements

Proposed

Admission Requirements: Minimum Requirements

- For applicants whose previous degree was completed in Canada, a 75% overall standing in the last two years, or equivalent, in a four-year Honours Bachelor's degree or equivalent is the minimum requirement for admission.
- For applicants whose previous degree was completed outside of Canada, a 75% overall standing in a four-year Honours Bachelor's degree or equivalent is the minimum requirement for admission.
- English language proficiency (ELP) (if applicable)

Existing

Admission Requirements: Minimum Requirements

- A 75% overall standing in the last two years, or equivalent, in a four-year Honours Bachelor's degree or equivalent.
- English language proficiency (ELP) (if applicable)

Admission Requirements: Application materials

- Résumé
- Statement of interest
- Transcript(s)

Admission Requirements: References

- Number of references: 2
- Type of references: at least 1 academic

Requirements Information

Graduate Degree Requirements

- Students must complete the course and milestone requirements listed below in addition to the Graduate Academic Integrity Module (Graduate AIM).
- The MEng in Chemical Engineering - Health Technologies - Co-operative Program will enable students to combine graduate studies with work experience. The program requires successful completion of 1-2 credited standard work terms. The work term(s) typically takes place in term 3 (or terms 3 and 4). The work term(s) must meet Co-operative and Experiential Education (CEE) standard work term requirements and Departmental requirements. Student's should apply to jobs related to their program of study. Note: the program must start and end on an academic term.
- Students are required to complete WIL 601 Career Foundations for Work-Integrated Learning in their first academic term of their co-op program. Students must complete WIL 601 in addition to the program's course requirements.

Coursework Option: Course Requirements

Coursework Option: Course Requirements

Proposed

Coursework Option: Course Requirements

- Students must complete CHE 600 Engineering and Research Methods, Ethics, Practice, and Law (0.25 credit weight) and 9 graduate level courses (0.50 unit weight per course) as follows:
  - 2 of the following Health Technologies core courses:
    - ECON 643 Health Economics
    - MSE 619 Healthcare Analytics
    - PHIL 626 Bioethics and Technology
  - 1 of the following Faculty of Engineering Health Technologies elective courses:
    - BME 602 Foundations in Biomechanical Engineering
    - ECE 608 Quantitative Methods in Biomedical Engineering
    - ENVE 585 Air Quality Engineering and Impacts
    - MSE 630 Human-Computer Interaction
    - SYDE 610 Design of Biomedical Technologies
  - 2 of the following Health Technologies elective courses:
    - HLTH 605B Quantitative Methods and Analysis
    - HLTH 606B Principles of Epidemiology for Public Health
    - HLTH 612 Data Structures and Standards in Health Informatics
    - HLTH 615 Requirements Specifications and Analysis in Health Systems
    - HLTH 633 Digital Health
    - HLTH 657M Application of Artificial Intelligence in Health (0.25) and 658M Machine Learning Techniques in Health (0.25)
  - 4 CHE elective courses
  - No more than 3 may be 500 level courses.
  - No more than 1 may be a reading course.
- The Chemical Engineering Department may require students to take more than the number of courses specified above.

Existing

Coursework Option: Course Requirements

- Students must complete CHE 600 Engineering and Research Methods, Ethics, Practice, and Law (0.25 credit weight) and 9 graduate level courses (0.50 unit weight per course) as follows:
  - 2 of the following Health Technologies core courses:
    - ECON 643 Health Economics
    - MSE 619 Healthcare Analytics
    - PHIL 626 Bioethics and Technology
  - 1 of the following Faculty of Engineering Health Technologies elective courses:
    - BME 602 Foundations in Biomechanical Engineering
    - ECE 608 Quantitative Methods in Biomedical Engineering
    - ENVE 585 Air Quality Engineering and Impacts
    - MSE 630 Human-Computer Interaction
    - SYDE 610 Design of Biomedical Technologies
  - 2 of the following Health Technologies elective courses:
    - HLTH 605B Quantitative Methods and Analysis
    - HLTH 606B Principles of Epidemiology for Public Health
    - HLTH 612 Data Structures and Standards in Health Informatics
    - HLTH 615 Requirements Specifications and Analysis in Health Systems
    - HLTH 633 Digital Health
    - HLTH 657M Application of Artificial Intelligence in Health (0.25) and 658M Machine Learning

Techniques in Health (0.25)
    - 4 CHE elective courses
- No more than 3 may be 500 level courses.
- No more than 1 may be a reading course.
- Graduate courses offered by the Faculty of Engineering are numbered as 600 or 700 series courses and are assigned a unit weight of 0.50, which means that they are one-term courses as defined in the Graduate Studies Academic Calendar.
- Only courses taken within five years prior to the completion of the MEng degree may be counted for credit towards a degree, unless a request for revalidation is granted.
- Students must achieve a:
    - Minimum cumulative average of 70%.
    - Minimum grade of 65% in each individual course.
    - Note: Probationary students may have specific grade requirements, which will be specified in their admission letter.
- Each student is responsible for monitoring their own academic records and must immediately notify the Graduate Coordinator of any inadequate grade or average.

Coursework Option: Milestone Requirements

Proposed

Coursework Option: Milestone Requirements

Seminar Attendance

- Over the course of their degree program, all students must attend 12 seminars from departments and research institutions where Chemical Engineering faculty members have a membership. The Chemical Engineering seminars are documented in the Events section of the Chemical Engineering Department website.
- Note: At Chemical Engineering seminars, attendance is documented. At other approved seminars, students must complete an attendance form and get it signed by the seminar organizer. Full instructions are available on the Department website.

Graduate WIL Reflective Report

- The Graduate WIL Reflective Report requires students to critically reflect on their co-op work term experience, connecting academic knowledge to practical tasks and professional development. Students must complete one reflective report per required work term. The report is administered, evaluated, and graded by the Centre for Work-Integrated Learning.

Existing

Coursework Option: Milestone Requirements

Seminar Attendance

- Over the course of their degree program, all students must attend 12 seminars from departments and research institutions where Chemical Engineering faculty members have a membership. The Chemical Engineering seminars are documented in the Events section of the Chemical Engineering Department website.
- Note: At Chemical Engineering seminars, attendance is documented. At other approved seminars, students must complete an attendance form and get it signed by the seminar organizer. Full instructions are available on the Department website.

Graduate WIL Reflective Report

- The Graduate WIL Reflective Report requires students to critically reflect on their co-op work term experience, connecting academic knowledge to practical tasks and professional development. Students must complete one reflective report per required work term. The report is administered, evaluated, and graded by the Centre for Work-Integrated Learning.
- Students are responsible for following the roles and responsibilities of Co-operative and Experiential Education (CEE).

Notes

- Department of Chemical Engineering website
- Master of Engineering (MEng) in Chemical Engineering - Health Technologies - Co-operative Program future graduate students program page

Specializations

Undergraduate Plan Guidelines

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Engineering

Dependencies

There are no dependencies

MEng in Chemical Engineering - Master of Engineering (MEng) in Chemical Engineering

Top

Effective Date and Career

Career
Graduate

Effective Term and Year

Proposed

Effective Term and Year
Winter 2027

Existing

Effective Term and Year
Spring 2026

Proposal Details

Proposal Type
Change

Academic Unit Approval
2026-05-11

Quality Assurance Designation
Minor Modification Qad

Is there an impact to existing students?
No

Is the credential name changing?
No

Graduate Co-operative Requirements
Not Applicable

Change to Learning Outcomes
No

Rationale and Background for Change(s)

1) Updating the admission and degree requirements to align with current practice and to articulate the requirements of the program more clearly. The intention is to provide greater clarity for students and to remove wording that already appears in the Faculty and University regulations.

The wording in our requirements has grown via incremental additions to become overly verbose. This change is to reduce the wording to the minimal possible by removing references to policies which are dictated elsewhere, such as the Faculty or University level regulations.

2) Adding an elective course to the list of courses associated with the Graduate Specialization in Polymer Science and Engineering and the Graduate Specialization in Process Systems Engineering.

CHE 643 Nanocomposites is being added to the Graduate Specialization in Polymer Science and Engineering elective list, as it aligns with the specialization and offers students an additional elective option.

CHE 524 Process Control Laboratory is being added to the Graduate Specialization in Process Systems Engineering elective list, as it aligns with the specialization and offers students an additional elective option.

General Program/Plan Information

Faculty

Faculty of Engineering

Academic Unit

Department of Chemical Engineering

Graduate Field of Study

Chemical Engineering

Faculty

Faculty of Engineering

Program/Plan Name

Master of Engineering (MEng) in Chemical Engineering

Graduate Credential Type

Master's

Accelerated Program

Not applicable

Study Options (New)

Coursework

Admit Term(s)

Fall, Winter, Spring

Delivery Mode

On-campus

Length of Program

- Full-time: 4 terms (16 months)
- Part-time: 8 terms (32 months)

Registration Option(s)

Full-time, Part-time

Graduate Specializations

- Biological Engineering
- Entrepreneurship
- Machine Learning in Chemical Engineering
- Polymer Science and Engineering
- Process Systems Engineering
- Sustainable Energy and Materials

Additional Program Information

- Important notice for MEng applicants: applicants to the MEng program are expected to be entirely self funded. No financial assistance will be provided from the Department of Chemical Engineering or the University of Waterloo.

Admissions

Admission Requirements: Minimum Requirements

Proposed

Admission Requirements: Minimum Requirements

- For applicants whose previous degree was completed in Canada, a 75% overall standing in the last two years, or equivalent, in a four-year Honours Bachelor's degree or equivalent is the minimum requirement for admission.
- For applicants whose previous degree was completed outside of Canada, a 75% overall standing in a four-year Honours Bachelor's degree or equivalent is the minimum requirement for admission.
- English language proficiency (ELP) (if applicable)

Existing

Admission Requirements: Minimum Requirements

- A 75% overall standing in the last two years, or equivalent, in a four-year Honours Bachelor's degree or equivalent.
- English language proficiency (ELP) (if applicable)

Admission Requirements: Application materials

- Résumé
- Statement of interest
- Transcript(s)

Admission Requirements: References

- Number of references: 2
- Type of references: at least 1 academic

Requirements Information

Graduate Degree Requirements

- Students must complete the course and milestone requirements listed below in addition to the Graduate Academic Integrity Module (Graduate AIM).

Coursework Option: Course Requirements

Coursework Option: Course Requirements

Proposed

Coursework Option: Course Requirements

- Students must complete CHE 600 Engineering and Research Methods, Ethics, Practice, and Law (0.25 credit weight) and 8 courses (0.50 unit weight per course) as follows:
  - 8 elective courses. At least 5 electives must be CHE courses. Any additional courses taken outside the Department must be from the Faculties of Engineering, Mathematics, or Science.
  - No more than 2 may be 500 level courses.
  - No more than 1 may be a reading course.
- The Chemical Engineering Department may require students to take more than the number of courses specified above.
- Students in the MEng in Chemical Engineering program may choose to pursue one of the following Graduate Specializations:
  1. Biological Engineering
  2. Entrepreneurship
  3. Machine Learning in Chemical Engineering
  4. Polymer Science and Engineering
  5. Process Systems Engineering
  6. Sustainable Energy and Materials
- A Graduate Specialization is a University credential that is recognized on the student's transcript but not on the diploma and is intended to reflect that a student has successfully completed a set of courses that together provide an in-depth study in the area of the Graduate Specialization. A student will only obtain the Graduate Specialization on their transcript if they have completed the requirements associated with the MEng degree and the requirements associated with the Graduate Specialization.
- All MEng Graduate Specializations in Chemical Engineering consist of a set of 4 eligible (0.50 weight) courses and this set is comprised of a mix of compulsory and elective courses. Compulsory courses are those that are prescribed as part of the Graduate Specialization. Elective courses are those that are on a list of courses designated as electives for a given Graduate Specialization. The requirements for each of the Graduate Specializations are described below. Note: Students are limited to one Graduate Specialization designation for their MEng in Chemical Engineering degree.
- Note: Not all courses for any given Graduate Specialization are guaranteed to be offered each year. Students are encouraged to take courses when they are offered and should plan accordingly.

1. Graduate Specialization in Biological Engineering

- To receive the Graduate Specialization in Biological Engineering, students must successfully complete 3 compulsory courses, 1 elective course, and 4 additional courses:
  - Compulsory courses:
    - CHE 562 Advanced Bioprocess Engineering
    - CHE 660 Principles of Biochemical Engineering
    - CHE 663 Bioseparations
  - Elective courses (choose 1 from the following list):
    - CHE 561 Biomaterials & Biomedical Design
    - CHE 564 Food Process Engineering

2. Graduate Specialization in Entrepreneurship

- Students must obtain approval from the Chemical Engineering Graduate Officer in order to pursue the Graduate Specialization in Entrepreneurship. Interested students will be reguired to submit a short proposal following matriculation describing their entrepreneurship idea and suitability to pursue it.
- To receive the Graduate Specialization in Entrepreneurship, students must successfully complete the following 4 compulsory courses and 4 additional courses:
  - Compulsory courses:
    - BE 600 Management and Leadership
    - BE 605 Project Management
    - BE 606 Entrepreneurship and Innovation
    - CHE 651 Technology Entrepreneurship Project

3. Graduate Specialization in Machine Learning in Chemical Engineering

- To receive the Graduate Specialization in Machine Learning in Chemical Engineering, students must successfully complete 3 compulsory courses, 1 elective course, and 4 additional courses:
  - Compulsory courses:
    - CHE 523 Introduction to Machine Learning and Data Science in Chemical Engineering
    - CHE 620 Applied Engineering Mathematics
    - CHE 626 Applications of Machine Learning
  - Elective courses (choose 1 from the following list):
    - CHE 520 Process Modeling and Simulation
    - CHE 521 Process Optimization
    - CHE 522 Advanced Process Dynamics and Control
    - CHE 621 Model Building and Response Surface Methodology
  - Of the 4 additional courses, no more than 2 may be from outside CHE

4. Graduate Specialization in Polymer Science and Engineering

- To receive the Graduate Specialization in Polymer Science and Engineering, students must successfully complete 2 compulsory courses, 2 elective courses, and 4 additional courses:
  - Compulsory courses:
    - CHE 541 Introduction to Polymer Science and Properties
    - CHE 621 Model Building and Response Surface Methodology
  - Elective courses (choose 2 from the following list):
    - CHE 543 Polymer Production: Polymer Reaction Engineering
    - CHE 640 Polymer Property Characterization
    - CHE 641 Fundamentals of Polymer Processing Operations
    - CHE 643 Nanocomposites

5. Graduate Specialization in Process Systems Engineering

- To receive the Graduate Specialization in Process Systems Engineering, students must successfully complete 2 compulsory courses, 2 elective courses, and 4 additional courses:
  - Compulsory courses:
    - CHE 620 Applied Engineering Mathematics
    - CHE 621 Model Building and Response Surface Methodology
  - Elective courses (choose 2 from the following list):
    - CHE 520 Process Flowsheet Analysis
    - CHE 521 Process Optimization
    - CHE 522 Advanced Process Dynamics and Control
    - CHE 524 Process Control Laboratory

6. Graduate Specialization in Sustainable Energy and Materials

- To receive the Graduate Specialization in Sustainable Energy and Materials, students must successfully complete 3 compulsory courses, 1 elective course, and 4 additional courses:
  - Compulsory courses:
    - CHE 571 Industrial Ecology
    - SUSM 620 Sustainable Operations
    - SUSM 665 Life Cycle Assessment
  - Elective courses (choose 1 from the following list):
    - CHE 516 Energy Systems Engineering
    - CHE 572 Air Pollution Control
    - CHE 574 Industrial Wastewater Pollution Control
  - Of the 4 additional courses, no more than 2 may be from outside CHE

Existing

Coursework Option: Course Requirements

- Students must complete CHE 600 Engineering and Research Methods, Ethics, Practice, and Law (0.25 credit weight) and 8 courses (0.50 unit weight per course) as follows:
  - 8 elective courses (at least 5 electives must be CHE courses)
- No more than 2 may be 500 level courses, the remainder must be 600 level or higher.
- No more than 1 may be a reading course.
- Graduate courses offered by the Faculty of Engineering are numbered as 600 or 700 series courses and are assigned a unit weight of 0.50, which means that they are one-term courses as defined in the Graduate Studies Academic Calendar.
- Only courses taken within five years prior to the completion of the MEng degree may be counted for credit towards a degree, unless a request for revalidation is granted.
- Students must achieve a:
  - Minimum cumulative average of 70%.

    - Minimum grade of 65% in each individual course.
    - Note: Probationary students may have specific grade requirements, which will be specified in their admission letter.
- Each student is responsible for monitoring their own academic records and must immediately notify the Graduate Coordinator of any inadequate grade or average.
- Students in the MEng in Chemical Engineering program may choose to pursue one of the following Graduate Specializations:
  1. Biological Engineering
  2. Entrepreneurship
  3. Machine Learning in Chemical Engineering
  4. Polymer Science and Engineering
  5. Process Systems Engineering
  6. Sustainable Energy and Materials
- A Graduate Specialization is a University credential that is recognized on the student's transcript but not on the diploma and is intended to reflect that a student has successfully completed a set of courses that together provide an in-depth study in the area of the Graduate Specialization. A student will only obtain the Graduate Specialization on their transcript if they have completed the requirements associated with the MEng degree and the requirements associated with the Graduate Specialization.
- All MEng Graduate Specializations in Chemical Engineering consist of a set of 4 eligible (0.50 weight) courses and this set is comprised of a mix of compulsory and elective courses. Compulsory courses are those that are prescribed as part of the Graduate Specialization. Elective courses are those that are on a list of courses designated as electives for a given Graduate Specialization. The requirements for each of the Graduate Specializations are described below. Note: Students are limited to one Graduate Specialization designation for their MEng in Chemical Engineering degree.
- Note: Not all courses for any given Graduate Specialization are guaranteed to be offered each year. Students are encouraged to take courses when they are offered and should plan accordingly.

1. Graduate Specialization in Biological Engineering

- To receive the Graduate Specialization in Biological Engineering, students must successfully complete 3 compulsory courses, 1 elective course, and 4 additional courses:
    - Compulsory courses:
        - CHE 562 Advanced Bioprocess Engineering
        - CHE 660 Principles of Biochemical Engineering
        - CHE 663 Bioseparations
    - Elective courses (choose 1 from the following list):
        - CHE 561 Biomaterials & Biomedical Design
        - CHE 564 Food Process Engineering

2. Graduate Specialization in Entrepreneurship

- Students must obtain approval from the Chemical Engineering Graduate Officer in order to pursue the Graduate Specialization in Entrepreneurship. Interested students will be reguired to submit a short proposal following matriculation describing their entrepreneurship idea and suitability to pursue it.
- To receive the Graduate Specialization in Entrepreneurship, students must successfully complete the following 4 compulsory courses and 4 additional courses:
    - Compulsory courses:
        - BE 600 Management and Leadership
        - BE 605 Project Management
        - BE 606 Entrepreneurship and Innovation
        - CHE 651 Technology Entrepreneurship Project

3. Graduate Specialization in Machine Learning in Chemical Engineering

- To receive the Graduate Specialization in Machine Learning in Chemical Engineering, students must successfully complete 3 compulsory courses, 1 elective course, and 4 additional courses:
    - Compulsory courses:
        - CHE 523 Introduction to Machine Learning and Data Science in Chemical Engineering
        - CHE 620 Applied Engineering Mathematics
        - CHE 626 Applications of Machine Learning
    - Elective courses (choose 1 from the following list):
        - CHE 520 Process Modeling and Simulation
        - CHE 521 Process Optimization
        - CHE 522 Advanced Process Dynamics and Control
        - CHE 621 Model Building and Response Surface Methodology
    - Of the 4 additional courses, no more than 2 may be from outside CHE

4. Graduate Specialization in Polymer Science and Engineering

- To receive the Graduate Specialization in Polymer Science and Engineering, students must successfully complete 2 compulsory courses, 2 elective courses, and 4 additional courses:
    - Compulsory courses:
        - CHE 541 Introduction to Polymer Science and Properties
        - CHE 621 Model Building and Response Surface Methodology
    - Elective courses (choose 2 from the following list):
        - CHE 543 Polymer Production: Polymer Reaction Engineering
        - CHE 640 Polymer Property Characterization
        - CHE 641 Fundamentals of Polymer Processing Operations

5. Graduate Specialization in Process Systems Engineering

- To receive the Graduate Specialization in Process Systems Engineering, students must successfully complete 2 compulsory courses, 2 elective courses, and 4 additional courses:
    - Compulsory courses:

        - CHE 620 Applied Engineering Mathematics
        - CHE 621 Model Building and Response Surface Methodology
    - Elective courses (choose 2 from the following list):
        - CHE 520 Process Flowsheet Analysis
        - CHE 521 Process Optimization
        - CHE 522 Advanced Process Dynamics and Control

6. Graduate Specialization in Sustainable Energy and Materials

- To receive the Graduate Specialization in Sustainable Energy and Materials, students must successfully complete 3 compulsory courses, 1 elective course, and 4 additional courses:
    - Compulsory courses:
        - CHE 571 Industrial Ecology
        - SUSM 620 Sustainable Operations
        - SUSM 665 Life Cycle Assessment
    - Elective courses (choose 1 from the following list):
        - CHE 516 Energy Systems Engineering
        - CHE 572 Air Pollution Control
        - CHE 574 Industrial Wastewater Pollution Control
    - Of the 4 additional courses, no more than 2 may be from outside CHE

Coursework Option: Milestone Requirements

Proposed

Coursework Option: Milestone Requirements

Seminar Attendance

- Over the course of their degree program, students must attend 12 seminars from departments and research institutions where Chemical Engineering faculty members have membership.

Existing

Coursework Option: Milestone Requirements

Seminar Attendance

- Over the course of their degree program, all students must attend 12 seminars from departments and research institutions where Chemical Engineering faculty members have a membership. The Chemical Engineering seminars are documented in the Events section of the Chemical Engineering Department website.
- Note: At Chemical Engineering seminars, attendance is documented. At other approved seminars, students must complete an attendance form and get it signed by the seminar organizer. Full instructions are available on the Department website.

Notes

- Department of Chemical Engineering website
- Master of Engineering (MEng) in Chemical Engineering future graduate students program page

Specializations

Undergraduate Plan Guidelines

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Engineering

Dependencies

Prerequisites

- CHE 661 - Advances in Biochemical Engineering View Program
- CHE 730 - Special Topics in Chemical Kinetics,Catalysis and Advanced Reactor Engineering View Program
- CHE 720 - Special Topics in Analysis of Chemical Processes View Program
- CHE 710 - Special Topics in Transport Phenomena View Program
- CHE 750 - Special Topics in Electrochemical Engineering, Interfacial Engineering & Materials Science
- CHE 760 - Special Topics in Biochemical Engineering View Program View Program
- CHE 740 - Special Topics in Polymer Science and Engineering View Program
- CHE 770 - Special Topics in Environmental Engineering and Pollution Control View Program
- CHE 612 - Interfacial Phenomena View Program
- BE 606 - Entrepreneurship and Innovation View Program
- BE 610 - Special Topics in Business and Entrepreneurship View Program
- CHE 620 - Applied Engineering Mathematics View Program
- CHE 600 - Engineering and Research Methods, Ethics, Practice, and Law View Program

MEng in Chemical Engineering-Co-op - Master of Engineering (MEng) in Chemical Engineering - Co-operative Program

Top

Effective Date and Career

Career
Graduate

Effective Term and Year

Proposed

Effective Term and Year
Winter 2027

Existing

Effective Term and Year
Fall 2026

Proposal Details

Proposal Type
Change

Academic Unit Approval
2026-05-11

Quality Assurance Designation
Minor Modification Qad

Is there an impact to existing students?
No

Is the credential name changing?
No

Graduate Co-operative Requirements
No

Change to Learning Outcomes
No

Rationale and Background for Change(s)

1) Updating the admission and degree requirements to align with current practice and to articulate the requirements of the program more clearly. The intention is to provide greater clarity for students and to remove wording that already appears in the Faculty and University regulations.

The wording in our requirements has grown via incremental additions to become overly verbose. This change is to reduce the wording to the minimal possible by removing references to policies which are dictated elsewhere, such as the Faculty or University level regulations.

2) Adding an elective course to the list of courses associated with the Graduate Specialization in Polymer Science and Engineering and the Graduate Specialization in Process Systems Engineering.

CHE 643 Nanocomposites is being added to the Graduate Specialization in Polymer Science and Engineering elective list, as it aligns with the specialization and offers students an additional elective option.

CHE 524 Process Control Laboratory is being added to the Graduate Specialization in Process Systems Engineering elective list, as it aligns with the specialization and offers students an additional elective option.

General Program/Plan Information

Faculty **Academic Unit**

Faculty of Engineering

Department of Chemical Engineering

Graduate Field of Study

Chemical Engineering

Faculty

Faculty of Engineering

Program/Plan Name

Master of Engineering (MEng) in Chemical Engineering - Co-operative Program

Graduate Credential Type

Master's

Accelerated Program

Not applicable

Study Options (New)

Coursework

Program Types

Co-operative

Admit Term(s)

Fall, Winter, Spring

Delivery Mode

On-campus

Length of Program

- 5-6 terms (20-24 months)

Registration Option(s)

Full-time

Graduate Specializations

- Biological Engineering
- Entrepreneurship
- Machine Learning in Chemical Engineering
- Polymer Science and Engineering
- Process Systems Engineering
- Sustainable Energy and Materials

Additional Program Information

- Important notice for MEng applicants: applicants to the MEng program are expected to be entirely self funded. No financial assistance will be provided from the Department of Chemical Engineering or the University of Waterloo.

Admissions

Admission Requirements: Minimum Requirements

Proposed

Admission Requirements: Minimum Requirements

- For applicants whose previous degree was completed in Canada, a 75% overall standing in the last two years, or equivalent, in a four-year Honours Bachelor's degree or equivalent is the minimum requirement for admission.
- For applicants whose previous degree was completed outside of Canada, a 75% overall standing in a four-year Honours Bachelor's degree or equivalent is the minimum requirement for admission.
- English language proficiency (ELP) (if applicable)

Existing

Admission Requirements: Minimum Requirements

- A 75% overall standing in the last two years, or equivalent, in a four-year Honours Bachelor's degree or equivalent.
- English language proficiency (ELP) (if applicable)

Admission Requirements: Application materials

- Résumé
- Statement of interest
- Transcript(s)

Admission Requirements: References

- Number of references: 2
- Type of references: at least 1 academic

Requirements Information

Graduate Degree Requirements

- Students must complete the course and milestone requirements listed below in addition to the Graduate Academic Integrity Module (Graduate AIM).
- The MEng in Chemical Engineering - Co-operative Program will enable students to combine graduate studies with work experience. The program requires successful completion of 1-2 credited standard work terms. The work term(s) typically takes place in term 3 (or terms 3 and 4). The work term(s) must meet Co-operative and Experiential Education (CEE)

standard work term requirements and Departmental requirements. Student's should apply to jobs related to their program of study. Note: the program must start and end on an academic term.
- Students are required to complete WIL 601 Career Foundations for Work-Integrated Learning in their first academic term of their co-op program. Students must complete WIL 601 in addition to the program's course requirements.

Coursework Option: Course Requirements

Coursework Option: Course Requirements

Proposed

Coursework Option: Course Requirements

- Students must complete CHE 600 Engineering and Research Methods, Ethics, Practice, and Law (0.25 credit weight) and 8 courses (0.50 unit weight per course) as follows:
  - 8 elective courses. At least 5 electives must be CHE courses. Any additional courses taken outside the Department must be from the Faculties of Engineering, Mathematics, or Science.
  - No more than 2 may be 500 level courses.
  - No more than 1 may be a reading course.
- The Chemical Engineering Department may require students to take more than the number of courses specified above.
- Students in the MEng in Chemical Engineering Co-operative program may choose to pursue one of the following Graduate Specializations:
  1. Biological Engineering
  2. Entrepreneurship
  3. Machine Learning in Chemical Engineering
  4. Polymer Science and Engineering
  5. Process Systems Engineering
  6. Sustainable Energy and Materials
- A Graduate Specialization is a University credential that is recognized on the student's transcript but not on the diploma and is intended to reflect that a student has successfully completed a set of courses that together provide an in-depth study in the area of the Graduate Specialization. A student will only obtain the Graduate Specialization on their transcript if they have completed the requirements associated with the MEng degree and the requirements associated with the Graduate Specialization.
- All MEng Graduate Specializations in Chemical Engineering consist of a set of 4 eligible (0.50 weight) courses and this set is comprised of a mix of compulsory and elective courses. Compulsory courses are those that are prescribed as part of the Graduate Specialization. Elective courses are those that are on a list of courses designated as electives for a given Graduate Specialization. The requirements for each of the Graduate Specializations are described below. Note: Students are limited to one Graduate Specialization designation for their MEng in Chemical Engineering degree.
- Note: Not all courses for any given Graduate Specialization are guaranteed to be offered each year. Students are encouraged to take courses when they are offered and should plan accordingly.

1. Graduate Specialization in Biological Engineering

- To receive the Graduate Specialization in Biological Engineering, students must successfully complete 3 compulsory courses, 1 elective course, and 4 additional courses:
  - Compulsory courses:
    - CHE 562 Advanced Bioprocess Engineering
    - CHE 660 Principles of Biochemical Engineering
    - CHE 663 Bioseparations
  - Elective courses (choose 1 from the following list):
    - CHE 561 Biomaterials & Biomedical Design
    - CHE 564 Food Process Engineering

2. Graduate Specialization in Entrepreneurship

- Students must obtain approval from the Chemical Engineering Graduate Officer in order to pursue the Graduate Specialization in Entrepreneurship. Interested students will be reguired to submit a short proposal following matriculation describing their entrepreneurship idea and suitability to pursue it.

- To receive the Graduate Specialization in Entrepreneurship, students must successfully complete the following 4 compulsory courses and 4 additional courses:
  - Compulsory courses:
    - BE 600 Management and Leadership
    - BE 605 Project Management
    - BE 606 Entrepreneurship and Innovation
    - CHE 651 Technology Entrepreneurship Project

3. Graduate Specialization in Machine Learning in Chemical Engineering

- To receive the Graduate Specialization in Machine Learning in Chemical Engineering, students must successfully complete 3 compulsory courses, 1 elective course, and 4 additional courses:
  - Compulsory courses:
    - CHE 523 Introduction to Machine Learning and Data Science in Chemical Engineering
    - CHE 620 Applied Engineering Mathematics
    - CHE 626 Applications of Machine Learning
  - Elective courses (choose 1 from the following list):
    - CHE 520 Process Modeling and Simulation
    - CHE 521 Process Optimization
    - CHE 522 Advanced Process Dynamics and Control
    - CHE 621 Model Building and Response Surface Methodology
  - Of the 4 additional courses, no more than 2 may be from outside CHE

4. Graduate Specialization in Polymer Science and Engineering

- To receive the Graduate Specialization in Polymer Science and Engineering, students must successfully complete 2 compulsory courses, 2 elective courses, and 4 additional courses:
  - Compulsory courses:
    - CHE 541 Introduction to Polymer Science and Properties
    - CHE 621 Model Building and Response Surface Methodology
  - Elective courses (choose 2 from the following list):
    - CHE 543 Polymer Production: Polymer Reaction Engineering
    - CHE 640 Polymer Property Characterization
    - CHE 641 Fundamentals of Polymer Processing Operations
    - CHE 643 Nanocomposites

5. Graduate Specialization in Process Systems Engineering

- To receive the Graduate Specialization in Process Systems Engineering, students must successfully complete 2 compulsory courses, 2 elective courses, and 4 additional courses:
  - Compulsory courses:
    - CHE 620 Applied Engineering Mathematics
    - CHE 621 Model Building and Response Surface Methodology
  - Elective courses (choose 2 from the following list):
    - CHE 520 Process Flowsheet Analysis
    - CHE 521 Process Optimization
    - CHE 522 Advanced Process Dynamics and Control
    - CHE 524 Process Control Laboratory

6. Graduate Specialization in Sustainable Energy and Materials

- To receive the Graduate Specialization in Sustainable Energy and Materials, students must successfully complete 3 compulsory courses, 1 elective course, and 4 additional courses:
  - Compulsory courses:
    - CHE 571 Industrial Ecology
    - SUSM 620 Sustainable Operations
    - SUSM 665 Life Cycle Assessment
  - Elective courses (choose 1 from the following list):
    - CHE 516 Energy Systems Engineering
    - CHE 572 Air Pollution Control
    - CHE 574 Industrial Wastewater Pollution Control
  - Of the 4 additional courses, no more than 2 may be from outside CHE

Existing

Coursework Option: Course Requirements

- Students must complete CHE 600 Engineering and Research Methods, Ethics, Practice, and Law (0.25 credit weight) and 8 courses (0.50 unit weight per course) as follows:
  - 8 elective courses (at least 5 electives must be CHE courses)
- No more than 2 may be 500 level courses, the remainder must be 600 level or higher.
- No more than 1 may be a reading course.
- Graduate courses offered by the Faculty of Engineering are numbered as 600 or 700 series courses and are assigned a unit weight of 0.50, which means that they are one-term courses as defined in the Graduate Studies Academic Calendar.
- Only courses taken within five years prior to the completion of the MEng degree may be counted for credit towards a degree, unless a request for revalidation is granted.
- Students must achieve a:
  - Minimum cumulative average of 70%.
  - Minimum grade of 65% in each individual course.
  - Note: Probationary students may have specific grade requirements, which will be specified in their admission letter.

- Each student is responsible for monitoring their own academic records and must immediately notify the Graduate Coordinator of any inadequate grade or average.
- Students in the MEng in Chemical Engineering program may choose to pursue one of the following Graduate Specializations:
  1. Biological Engineering
  2. Entrepreneurship
  3. Machine Learning in Chemical Engineering
  4. Polymer Science and Engineering
  5. Process Systems Engineering
  6. Sustainable Energy and Materials
- A Graduate Specialization is a University credential that is recognized on the student's transcript but not on the diploma and is intended to reflect that a student has successfully completed a set of courses that together provide an in-depth study in the area of the Graduate Specialization. A student will only obtain the Graduate Specialization on their transcript if they have completed the requirements associated with the MEng degree and the requirements associated with the Graduate Specialization.
- All MEng Graduate Specializations in Chemical Engineering consist of a set of 4 eligible (0.50 weight) courses and this set is comprised of a mix of compulsory and elective courses. Compulsory courses are those that are prescribed as part of the Graduate Specialization. Elective courses are those that are on a list of courses designated as electives for a given Graduate Specialization. The requirements for each of the Graduate Specializations are described below. Note: Students are limited to one Graduate Specialization designation for their MEng in Chemical Engineering degree.
- Note: Not all courses for any given Graduate Specialization are guaranteed to be offered each year. Students are encouraged to take courses when they are offered and should plan accordingly.

1. Graduate Specialization in Biological Engineering

- To receive the Graduate Specialization in Biological Engineering, students must successfully complete 3 compulsory courses, 1 elective course, and 4 additional courses:
  - Compulsory courses:
    - CHE 562 Advanced Bioprocess Engineering
    - CHE 660 Principles of Biochemical Engineering
    - CHE 663 Bioseparations
  - Elective courses (choose 1 from the following list):
    - CHE 561 Biomaterials & Biomedical Design
    - CHE 564 Food Process Engineering

2. Graduate Specialization in Entrepreneurship

- Students must obtain approval from the Chemical Engineering Graduate Officer in order to pursue the Graduate Specialization in Entrepreneurship. Interested students will be reguired to submit a short proposal following matriculation describing their entrepreneurship idea and suitability to pursue it.
- To receive the Graduate Specialization in Entrepreneurship, students must successfully complete the following 4 compulsory courses and 4 additional courses:
  - Compulsory courses:
    - BE 600 Management and Leadership
    - BE 605 Project Management
    - BE 606 Entrepreneurship and Innovation
    - CHE 651 Technology Entrepreneurship Project

3. Graduate Specialization in Machine Learning in Chemical Engineering

- To receive the Graduate Specialization in Machine Learning in Chemical Engineering, students must successfully complete 3 compulsory courses, 1 elective course, and 4 additional courses:
  - Compulsory courses:
    - CHE 523 Introduction to Machine Learning and Data Science in Chemical Engineering
    - CHE 620 Applied Engineering Mathematics
    - CHE 626 Applications of Machine Learning
  - Elective courses (choose 1 from the following list):
    - CHE 520 Process Modeling and Simulation
    - CHE 521 Process Optimization
    - CHE 522 Advanced Process Dynamics and Control
    - CHE 621 Model Building and Response Surface Methodology
  - Of the 4 additional courses, no more than 2 may be from outside CHE

4. Graduate Specialization in Polymer Science and Engineering

- To receive the Graduate Specialization in Polymer Science and Engineering, students must successfully complete 2 compulsory courses, 2 elective courses, and 4 additional courses:
  - Compulsory courses:
    - CHE 541 Introduction to Polymer Science and Properties
    - CHE 621 Model Building and Response Surface Methodology
  - Elective courses (choose 2 from the following list):
    - CHE 543 Polymer Production: Polymer Reaction Engineering
    - CHE 640 Polymer Property Characterization
    - CHE 641 Fundamentals of Polymer Processing Operations

5. Graduate Specialization in Process Systems Engineering

- To receive the Graduate Specialization in Process Systems Engineering, students must successfully complete 2 compulsory courses, 2 elective courses, and 4 additional courses:
  - Compulsory courses:
    - CHE 620 Applied Engineering Mathematics
    - CHE 621 Model Building and Response Surface Methodology
  - Elective courses (choose 2 from the following list):

        - CHE 520 Process Flowsheet Analysis
        - CHE 521 Process Optimization
        - CHE 522 Advanced Process Dynamics and Control

6. Graduate Specialization in Sustainable Energy and Materials

- To receive the Graduate Specialization in Sustainable Energy and Materials, students must successfully complete 3 compulsory courses, 1 elective course, and 4 additional courses:
    - Compulsory courses:
        - CHE 571 Industrial Ecology
        - SUSM 620 Sustainable Operations
        - SUSM 665 Life Cycle Assessment
    - Elective courses (choose 1 from the following list):
        - CHE 516 Energy Systems Engineering
        - CHE 572 Air Pollution Control
        - CHE 574 Industrial Wastewater Pollution Control
    - Of the 4 additional courses, no more than 2 may be from outside CHE

Coursework Option: Milestone Requirements

Proposed

Coursework Option: Milestone Requirements

Seminar Attendance

- Over the course of their degree program, all students must attend 12 seminars from departments and research institutions where Chemical Engineering faculty members have a membership. The Chemical Engineering seminars are documented in the Events section of the Chemical Engineering Department website.
- Note: At Chemical Engineering seminars, attendance is documented. At other approved seminars, students must complete an attendance form and get it signed by the seminar organizer. Full instructions are available on the Department website.

Graduate WIL Reflective Report

- The Graduate WIL Reflective Report requires students to critically reflect on their co-op work term experience, connecting academic knowledge to practical tasks and professional development. Students must complete one reflective report per required work term. The report is administered, evaluated, and graded by the Centre for Work-Integrated Learning.

Existing

Coursework Option: Milestone Requirements

Seminar Attendance

- Over the course of their degree program, all students must attend 12 seminars from departments and research institutions where Chemical Engineering faculty members have a membership. The Chemical Engineering seminars are documented in the Events section of the Chemical Engineering Department website.
- Note: At Chemical Engineering seminars, attendance is documented. At other approved seminars, students must complete an attendance form and get it signed by the seminar organizer. Full instructions are available on the Department website.

Graduate WIL Reflective Report

- The Graduate WIL Reflective Report requires students to critically reflect on their co-op work term experience, connecting academic knowledge to practical tasks and professional development. Students must complete one reflective report per required work term. The report is administered, evaluated, and graded by the Centre for Work-Integrated Learning.
- Students are responsible for following the roles and responsibilities of Co-operative and Experiential Education (CEE).

Notes

- Department of Chemical Engineering website
- Master of Engineering (MEng) in Chemical Engineering - Co-operative Program future graduate students program page

Specializations

Undergraduate Plan Guidelines

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Engineering

Dependencies

Prerequisites

- CHE 661 - Advances in Biochemical Engineering View Program
- CHE 730 - Special Topics in Chemical Kinetics,Catalysis and Advanced Reactor Engineering View Program
- CHE 720 - Special Topics in Analysis of Chemical Processes View Program
- CHE 710 - Special Topics in Transport Phenomena View Program
- CHE 750 - Special Topics in Electrochemical Engineering, Interfacial Engineering & Materials Science
- CHE 760 - Special Topics in Biochemical Engineering View Program View Program
- CHE 740 - Special Topics in Polymer Science and Engineering View Program
- CHE 770 - Special Topics in Environmental Engineering and Pollution Control View Program
- CHE 612 - Interfacial Phenomena View Program
- BE 606 - Entrepreneurship and Innovation View Program
- BE 610 - Special Topics in Business and Entrepreneurship View Program
- CHE 620 - Applied Engineering Mathematics View Program
- CHE 600 - Engineering and Research Methods, Ethics, Practice, and Law View Program
- CHE 650 - Engineering Work-term Experience Report View Program

MEng in Electrical & Computer Engineering - Master of Engineering (MEng) in Electrical and Computer Engineering

Top

Effective Date and Career

Career
Graduate

Effective Term and Year

Proposed

Effective Term and Year
Winter 2027

Existing

Effective Term and Year
Spring 2026

Proposal Details

Proposal Type
Change

Academic Unit Approval
2026-04-23

Quality Assurance Designation
Minor Modification Qad

Is there an impact to existing students?
Yes

Impact on Existing Students

The revised specialization will be available to students who start the program in Winter 2027 and afterwards.

Is the credential name changing?
No

Graduate Co-operative Requirements
Not Applicable

Change to Learning Outcomes
No

Rationale and Background for Change(s)

Updating the list of courses associated with the Graduate Specialization in Sustainable Energy to allow students to provide a more specific list of courses related to the field of study. Removing the compulsory course and allowing students freedom to select 5 courses of relevance within the list of specific courses.

General Program/Plan Information

Faculty

Faculty of Engineering

Academic Unit

Department of Electrical and Computer Engineering

Graduate Field of Study

Electrical and Computer Engineering

Faculty

Faculty of Engineering

Program/Plan Name

Master of Engineering (MEng) in Electrical and Computer Engineering

Graduate Credential Type

Master's

Accelerated Program

Not applicable

Study Options (New)

Coursework

Admit Term(s)

Fall, Winter, Spring

Delivery Mode

On-campus

Length of Program

- Full-time: 4 terms (16 months)
- Part-time: 8 terms (32 months)

Registration Option(s)

Full-time, Part-time

Graduate Specializations

- Artificial Intelligence and Machine Learning
- Biomedical Engineering
- Business Leadership

- Computer Networking and Security
- Control and Autonomy
- Integrated Devices, Circuits, and Systems
- Nanoelectronic Devices and Materials
- Quantum Engineering
- Software
- Sustainable Energy

Admissions

Admission Requirements: Minimum Requirements

- The Department of Electrical and Computer Engineering requires either (i) a 75% overall standing in the last two years, or equivalent, in a relevant four-year Honours Bachelor's degree or equivalent or (ii) a 75% overall standing or equivalent, in a relevant four-year Honours Bachelor's degree or equivalent, as the minimum requirement for admission to a Master's program for applicants educated at a Canadian institution. A 75% overall standing or equivalent, in a relevant four-year Honours Bachelor's degree or equivalent is the minimum requirement for admission to a Master's program for applicants educated outside of Canada.
- English language proficiency (ELP) (if applicable)

Admission Requirements: Application materials

- Résumé
- Supplementary information form
- Transcript(s)

Admission Requirements: References

- Number of references: 2
- Type of references: at least 1 academic

Requirements Information

Graduate Degree Requirements

- Students must complete the course requirements listed below in addition to the Graduate Academic Integrity Module (Graduate AIM).

Coursework Option: Course Requirements

Coursework Option: Course Requirements

Proposed

Coursework Option: Course Requirements

- Students must complete a minimum of 8 graduate level courses (0.50 unit weight each).
- A minimum of 5 courses must be taken from within the ECE Department. A maximum of 3 courses may be taken from outside the Department but must be from the faculties of Engineering, Mathematics and Science.
- Students pursuing the Graduate Specialization in Business Leadership may take a maximum of 4 courses from outside ECE, selected from the approved BE course list, detailed below.
- A minimum grade of 65% in each course and a minimum cumulative average of 70% are required to remain in the program.
- Courses with grades below 65% cannot be retaken for graduate course credit.
- Students who receive a grade below 65% may be permitted to take a maximum of 2 additional courses to meet the program's course and minimum cumulative average requirements.
- Students in the MEng in Electrical and Computer Engineering program may choose to pursue one of the following Graduate Specializations:
  1. Artificial Intelligence and Machine Learning
  2. Biomedical Engineering
  3. Business Leadership
  4. Computer Networking and Security
  5. Control and Autonomy
  6. Integrated Devices, Circuits, and Systems
  7. Nanoelectronic Devices and Materials
  8. Quantum Engineering
  9. Software
  10. Sustainable Energy
- A Graduate Specialization is a University recognized credential that appears on the student's transcript but not on the diploma. It signifies successful completion of a defined set of courses that provide in-depth study in a specific area. The Graduate Specialization will be noted on the transcript only if the student fulfills both the MEng degree requirements and those of the Graduate Specialization.
- All MEng Graduate Specializations in Electrical and Computer Engineering include a minimum of 4 graduate level (0.50 weight) courses, consisting of a mix of compulsory and elective courses. Compulsory courses are specifically required for the Graduate Specialization, while electives are chosen from an approved list. The specific requirements for each Graduate Specialization are described below.
- Note: Not all elective courses for any given Graduate Specialization are guaranteed to be offered each year. Students are encouraged to take elective courses when available and plan their course selection accordingly.
- Students will be able to complete the Business Leadership Graduate Specialization along with 1 other ECE Graduate Specialization, noting the following:
  - Each course will only be counted towards one Graduate Specialization and the MEng degree.
  - The number of required courses for the MEng degree will increase from 8 to 9 or 10 depending on the combined Graduate Specialization requirements.
- If a Graduate Specialization includes an MEng project course (ECE 699A or 699B), the project topic must be closely related to that Graduate Specialization.
- Students must consult with the ECE Masters Coordinator to finalize their plan of study and to ensure that they are able to meet the degree and Graduate Specialization requirements within the program time limits.

1. Graduate Specialization in Artificial Intelligence and Machine Learning

- To receive the Graduate Specialization in Artificial Intelligence and Machine Learning, students must successfully complete 2 compulsory courses and 3 elective courses:
  - Compulsory courses:
    - ECE 657 Introduction to Machine Learning
    - ECE 657A Introduction to Artificial Intelligence
  - Elective courses (choose 3 from the following list):
    - ECE 602 Introduction to Optimization
    - ECE 603 Statistical Signal Processing
    - ECE 606 Algorithm Design and Analysis
    - ECE 613 Image Processing and Visual Communication
    - ECE 657D Neural Networks and Deep Learning
    - ECE 659 Intelligent Sensors and Sensor Networks
    - ECE 750 Topic-32 Biology and Computation
    - ECE 750 Topic-40 Reinforcement Learning
    - ECE 752 Foundations of Multiagent System
    - ECE 757A Embodied Intelligence
    - ECE 787 Social Robotics

2. Graduate Specialization in Biomedical Engineering

- To receive the Graduate Specialization in Biomedical Engineering, students must successfully complete 2 compulsory courses and 3 elective courses:
  - Compulsory courses (choose 2 from the following list):
    - ECE 601 Foundations of Biology in Engineering
    - ECE 608 Quantitative Methods in Biomedical Engineering
    - ECE 609 Engineering Analysis of Living Cells
  - Elective courses (choose 3 from the following list):
    - Any course from the compulsory list that is not used to fulfill the compulsory course requirement
    - ECE 607 Fundamentals of Ultrasonics
    - ECE 613 Image Processing and Visual Communications
    - ECE 638 Biosensing: Fundamentals and Applications
    - ECE 675 Radiation and Propagation of Electromagnetic Fields
    - ECE 700 Topic-11 Principles of Biomedical Imaging
    - ECE 750 Topic-32 Biology and Computation
    - ECE 757A Embodied Intelligence

3. Graduate Specialization in Business Leadership

- To receive the Graduate Specialization in Business Leadership, students must successfully complete 2 compulsory courses and 2 elective courses:
  - Compulsory courses:
    - BE 600 Management and Leadership
    - BE 601 Introduction to Financial and Managerial Accounting
  - Elective courses (choose 2 from the following list):
    - BE 602 Data Analysis and Management
    - BE 603 Operations and Supply Chain Management
    - BE 604 Marketing Management
    - BE 605 Project Management
    - BE 606 Entrepreneurship and Innovation
    - BE 610 Special Topics in Business and Entrepreneurship
    - BE 660 Negotiations
    - BE 680 Consulting
  - Note: A maximum of 4 courses from outside the ECE Department is permitted to satisfy both the MEng in ECE and Graduate Specialization in Business Leadership requirements.

4. Graduate Specialization in Computer Networking and Security

- To receive the Graduate Specialization in Computer Networking and Security, students must successfully complete 3 compulsory courses and 2 elective courses:
  - Compulsory courses:
    - ECE 610 Broadband Communication Networks
    - ECE 628 Computer Network Security
    - ECE 655 Protocols, Software, and Issues in Mobile Systems
  - Elective courses (choose 2 from the following list):
    - ECE 606 Algorithm Design and Analysis
    - ECE 612 Information Theory
    - ECE 656 Database Systems
    - ECE 657 Introduction to Machine Learning
    - ECE 659 Intelligent Sensors & Wireless Sensor Network
    - ECE 715 Wireless Communication Networks
    - ECE 716 Communication Security

5. Graduate Specialization in Control and Autonomy

- To receive the Graduate Specialization in Control and Autonomy, students must successfully complete 2 compulsory courses and 3 elective courses:
  - Compulsory courses:
    - Choose 1 from the following list:
      - ECE 682 Multivariable Control Systems
      - ECE 686 Stochastic Control of Linear Systems

        - ECE 688 Nonlinear Systems
    - Choose 1 from the following list:
        - ECE 602 Introduction of Optimization
        - ECE 687 Robot Dynamics and Control
  - Elective courses (choose 3 from the following list):
    - Any course from the compulsory lists that is not used to fulfill the compulsory course requirement
    - ECE 604 Stochastic Processes
    - ECE 700 Topic-10 Distributed Optimization
    - ECE 750 Topic-40 Reinforcement Learning
    - ECE 752 Foundations of Multiagent Systems
    - ECE 783 Motion Coordination and Planning
    - ECE 787 Social Robotics
    - ECE 789 Model Predictive Control

6. Graduate Specialization in Integrated Devices, Circuits, and Systems

- To receive the Graduate Specialization in Integrated Devices, Circuits, and Systems, students must successfully complete 2 compulsory courses, and 3 elective courses:
  - Compulsory courses (choose 2 from the following list):
    - ECE 621 Computer Organization
    - ECE 627 Register-transfer-level Digital Systems
    - ECE 630 Physics & Models Semiconductor Devices
    - ECE 631 Microelectronic Processing Technology
    - ECE 636 Advanced Analog Integrated Circuits
    - ECE 637 Digital Integrated Circuits
    - ECE 642 Radio Frequency IC Design
    - ECE 671 Microwave & RF Engineering
  - Elective courses (choose 3 from the following list):
    - Any course from the compulsory list that is not used to fulfill the compulsory course requirement
    - ECE 606 Algorithm Design and Analysis
    - ECE 699A Master of Engineering Project 1
    - ECE 699B Master of Engineering Project 2
    - ECE 732 Advanced VLSI Devices
    - ECE 738 VLSI Circuits for Wireless Communication
    - ECE 774 Radio and Wireless Systems

7. Graduate Specialization in Nanoelectronic Devices and Materials

- To receive the Graduate Specialization in Nanoelectronic Devices and Materials, students must successfully complete 2 compulsory courses and 3 elective courses:
  - Compulsory courses:
    - ECE 630 Physics and Models of Semiconductor Devices
    - ECE 631 Microelectronic Processing Technology
  - Elective courses (choose 3 from the following list):
    - ECE 632 Photovoltaic Energy Conversion
    - ECE 633 Nanoelectronics
    - ECE 634 Organic Electronics
    - ECE 635 Fabrication in the Nanoscale: Technology and Applications
    - ECE 672 Optoelectronic Devices
    - NANO 600 Introduction to Nanotechnology
    - NANO 601 Characterization of Nanomaterials

8. Graduate Specialization in Quantum Engineering

- To receive the Graduate Specialization in Quantum Engineering, students must successfully complete 2 compulsory courses and 3 elective courses:
  - Compulsory courses:
    - ECE 676 Quantum Information Processing Devices
    - ECE 677 Applied Quantum Mechanics
  - Elective courses (choose 3 from the following list):
    - ECE 630 Physics and Models of Semiconductor Devices
    - ECE 633 Nanoelectronics
    - ECE 671 Microwave and RF Engineering
    - ECE 676B Experimental Quantum Engineering
    - ECE 676C Programming of Quantum Computing Algorithms
    - ECE 676D Superconducting Quantum Circuits
    - ECE 676E Lab on Low-Temperature Quantum Engineering
    - QIC 710 Quantum Information Processing
    - QIC 880 Nanoelectronics for Quantum Information Processing

9. Graduate Specialization in Software

- To receive the Graduate Specialization in Software, students must successfully complete 3 compulsory courses and 2 elective courses:
  - Compulsory courses:
    - ECE 650 Methods and Tools for Software Engineering
    - ECE 651 Foundations of Software Engineering
    - ECE 653 Software Testing, Quality Assurance and Maintenance
  - Elective courses (choose 2 from the following list):
    - ECE 606 Algorithm Design and Analysis
    - ECE 652 Methods and Principles of Safety-critical Embedded Software
    - ECE 654 Software Reliability Engineering

        - ECE 655 Protocols, Software, Issues in Mobile Systems
        - ECE 656 Database Systems
        - ECE 657 Introduction to Machine Learning
        - ECE 750 Topic-37 Engineering Self-Adaptive Software Systems
        - ECE 751 Distributed and Network-Centric Computing

10. Graduate Specialization in Sustainable Energy

- To receive the Graduate Specialization in Sustainable Energy, students must successfully complete 5 of the following elective courses:
    - ECE 632 Photovoltaic Energy Conversion
    - ECE 661 Power System Protection and Relaying
    - ECE 662 Power System Analysis and Control
    - ECE 663 Power Electronics
    - ECE 665 High Voltage Engineering Applications
    - ECE 666 Power Systems Operation
    - ECE 668 Active Distributions Systems and DER Integration
    - ECE 669 Dielectric Materials in Power and Transportation Systems

Existing

Coursework Option: Course Requirements

- Students must complete a minimum of 8 graduate level courses (0.50 unit weight each).
- A minimum of 5 courses must be taken from within the ECE Department. A maximum of 3 courses may be taken from outside the Department but must be from the faculties of Engineering, Mathematics and Science.
- Students pursuing the Graduate Specialization in Business Leadership may take a maximum of 4 courses from outside ECE, selected from the approved BE course list, detailed below.
- A minimum grade of 65% in each course and a minimum cumulative average of 70% are required to remain in the program.
- Courses with grades below 65% cannot be retaken for graduate course credit.
- Students who receive a grade below 65% may be permitted to take a maximum of 2 additional courses to meet the program's course and minimum cumulative average requirements.
- Students in the MEng in Electrical and Computer Engineering program may choose to pursue one of the following Graduate Specializations:
  1. Artificial Intelligence and Machine Learning
  2. Biomedical Engineering
  3. Business Leadership
  4. Computer Networking and Security
  5. Control and Autonomy
  6. Integrated Devices, Circuits, and Systems
  7. Nanoelectronic Devices and Materials
  8. Quantum Engineering
  9. Software
  10. Sustainable Energy
- A Graduate Specialization is a University recognized credential that appears on the student's transcript but not on the diploma. It signifies successful completion of a defined set of courses that provide in-depth study in a specific area. The Graduate Specialization will be noted on the transcript only if the student fulfills both the MEng degree requirements and those of the Graduate Specialization.
- All MEng Graduate Specializations in Electrical and Computer Engineering include a minimum of 4 graduate level (0.50 weight) courses, consisting of a mix of compulsory and elective courses. Compulsory courses are specifically required for the Graduate Specialization, while electives are chosen from an approved list. The specific requirements for each Graduate Specialization are described below.
- Note: Not all elective courses for any given Graduate Specialization are guaranteed to be offered each year. Students are encouraged to take elective courses when available and plan their course selection accordingly.
- Students will be able to complete the Business Leadership Graduate Specialization along with 1 other ECE Graduate Specialization, noting the following:
    - Each course will only be counted towards one Graduate Specialization and the MEng degree.
    - The number of required courses for the MEng degree will increase from 8 to 9 or 10 depending on the combined Graduate Specialization requirements.
- If a Graduate Specialization includes an MEng project course (ECE 699A or 699B), the project topic must be closely related to that Graduate Specialization.
- Students must consult with the ECE Masters Coordinator to finalize their plan of study and to ensure that they are able to meet the degree and Graduate Specialization requirements within the program time limits.

1. Graduate Specialization in Artificial Intelligence and Machine Learning

- To receive the Graduate Specialization in Artificial Intelligence and Machine Learning, students must successfully complete 2 compulsory courses and 3 elective courses:
    - Compulsory courses:
        - ECE 657 Introduction to Machine Learning
        - ECE 657A Introduction to Artificial Intelligence
    - Elective courses (choose 3 from the following list):
        - ECE 602 Introduction to Optimization
        - ECE 603 Statistical Signal Processing
        - ECE 606 Algorithm Design and Analysis
        - ECE 613 Image Processing and Visual Communication
        - ECE 657D Neural Networks and Deep Learning
        - ECE 659 Intelligent Sensors and Sensor Networks
        - ECE 750 Topic-32 Biology and Computation
        - ECE 750 Topic-40 Reinforcement Learning
        - ECE 752 Foundations of Multiagent System

        - ECE 757A Embodied Intelligence
        - ECE 787 Social Robotics

2. Graduate Specialization in Biomedical Engineering

- To receive the Graduate Specialization in Biomedical Engineering, students must successfully complete 2 compulsory courses and 3 elective courses:
    - Compulsory courses (choose 2 from the following list):
        - ECE 601 Foundations of Biology in Engineering
        - ECE 608 Quantitative Methods in Biomedical Engineering
        - ECE 609 Engineering Analysis of Living Cells
    - Elective courses (choose 3 from the following list):
        - Any course from the compulsory list that is not used to fulfill the compulsory course requirement
        - ECE 607 Fundamentals of Ultrasonics
        - ECE 613 Image Processing and Visual Communications
        - ECE 638 Biosensing: Fundamentals and Applications
        - ECE 675 Radiation and Propagation of Electromagnetic Fields
        - ECE 700 Topic-11 Principles of Biomedical Imaging
        - ECE 750 Topic-32 Biology and Computation
        - ECE 757A Embodied Intelligence

3. Graduate Specialization in Business Leadership

- To receive the Graduate Specialization in Business Leadership, students must successfully complete 2 compulsory courses and 2 elective courses:
    - Compulsory courses:
        - BE 600 Management and Leadership
        - BE 601 Introduction to Financial and Managerial Accounting
    - Elective courses (choose 2 from the following list):
        - BE 602 Data Analysis and Management
        - BE 603 Operations and Supply Chain Management
        - BE 604 Marketing Management
        - BE 605 Project Management
        - BE 606 Entrepreneurship and Innovation
        - BE 610 Special Topics in Business and Entrepreneurship
        - BE 660 Negotiations
        - BE 680 Consulting
    - Note: A maximum of 4 courses from outside the ECE Department is permitted to satisfy both the MEng in ECE and Graduate Specialization in Business Leadership requirements.

4. Graduate Specialization in Computer Networking and Security

- To receive the Graduate Specialization in Computer Networking and Security, students must successfully complete 3 compulsory courses and 2 elective courses:
    - Compulsory courses:
        - ECE 610 Broadband Communication Networks
        - ECE 628 Computer Network Security
        - ECE 655 Protocols, Software, and Issues in Mobile Systems
    - Elective courses (choose 2 from the following list):
        - ECE 606 Algorithm Design and Analysis
        - ECE 612 Information Theory
        - ECE 656 Database Systems
        - ECE 657 Introduction to Machine Learning
        - ECE 659 Intelligent Sensors & Wireless Sensor Network
        - ECE 715 Wireless Communication Networks
        - ECE 716 Communication Security

5. Graduate Specialization in Control and Autonomy

- To receive the Graduate Specialization in Control and Autonomy, students must successfully complete 2 compulsory courses and 3 elective courses:
    - Compulsory courses:
        - Choose 1 from the following list:
            - ECE 682 Multivariable Control Systems
            - ECE 686 Stochastic Control of Linear Systems
            - ECE 688 Nonlinear Systems
        - Choose 1 from the following list:
            - ECE 602 Introduction of Optimization
            - ECE 687 Robot Dynamics and Control
    - Elective courses (choose 3 from the following list):
        - Any course from the compulsory lists that is not used to fulfill the compulsory course requirement
        - ECE 604 Stochastic Processes
        - ECE 700 Topic-10 Distributed Optimization
        - ECE 750 Topic-40 Reinforcement Learning
        - ECE 752 Foundations of Multiagent Systems
        - ECE 783 Motion Coordination and Planning
        - ECE 787 Social Robotics
        - ECE 789 Model Predictive Control

6. Graduate Specialization in Integrated Devices, Circuits, and Systems

- To receive the Graduate Specialization in Integrated Devices, Circuits, and Systems, students must successfully

complete 2 compulsory courses, and 3 elective courses:
    - Compulsory courses (choose 2 from the following list):
        - ECE 621 Computer Organization
        - ECE 627 Register-transfer-level Digital Systems
        - ECE 630 Physics & Models Semiconductor Devices
        - ECE 631 Microelectronic Processing Technology
        - ECE 636 Advanced Analog Integrated Circuits
        - ECE 637 Digital Integrated Circuits
        - ECE 642 Radio Frequency IC Design
        - ECE 671 Microwave & RF Engineering
    - Elective courses (choose 3 from the following list):
        - Any course from the compulsory list that is not used to fulfill the compulsory course requirement
        - ECE 606 Algorithm Design and Analysis
        - ECE 699A Master of Engineering Project 1
        - ECE 699B Master of Engineering Project 2
        - ECE 732 Advanced VLSI Devices
        - ECE 738 VLSI Circuits for Wireless Communication
        - ECE 774 Radio and Wireless Systems

7. Graduate Specialization in Nanoelectronic Devices and Materials

- To receive the Graduate Specialization in Nanoelectronic Devices and Materials, students must successfully complete 2 compulsory courses and 3 elective courses:
    - Compulsory courses:
        - ECE 630 Physics and Models of Semiconductor Devices
        - ECE 631 Microelectronic Processing Technology
    - Elective courses (choose 3 from the following list):
        - ECE 632 Photovoltaic Energy Conversion
        - ECE 633 Nanoelectronics
        - ECE 634 Organic Electronics
        - ECE 635 Fabrication in the Nanoscale: Technology and Applications
        - ECE 672 Optoelectronic Devices
        - NANO 600 Introduction to Nanotechnology
        - NANO 601 Characterization of Nanomaterials

8. Graduate Specialization in Quantum Engineering

- To receive the Graduate Specialization in Quantum Engineering, students must successfully complete 2 compulsory courses and 3 elective courses:
    - Compulsory courses:
        - ECE 676 Quantum Information Processing Devices
        - ECE 677 Applied Quantum Mechanics
    - Elective courses (choose 3 from the following list):
        - ECE 630 Physics and Models of Semiconductor Devices
        - ECE 633 Nanoelectronics
        - ECE 671 Microwave and RF Engineering
        - ECE 676B Experimental Quantum Engineering
        - ECE 676C Programming of Quantum Computing Algorithms
        - ECE 676D Superconducting Quantum Circuits
        - ECE 676E Lab on Low-Temperature Quantum Engineering
        - QIC 710 Quantum Information Processing
        - QIC 880 Nanoelectronics for Quantum Information Processing

9. Graduate Specialization in Software

- To receive the Graduate Specialization in Software, students must successfully complete 3 compulsory courses and 2 elective courses:
    - Compulsory courses:
        - ECE 650 Methods and Tools for Software Engineering
        - ECE 651 Foundations of Software Engineering
        - ECE 653 Software Testing, Quality Assurance and Maintenance
    - Elective courses (choose 2 from the following list):
        - ECE 606 Algorithm Design and Analysis
        - ECE 652 Methods and Principles of Safety-critical Embedded Software
        - ECE 654 Software Reliability Engineering
        - ECE 655 Protocols, Software, Issues in Mobile Systems
        - ECE 656 Database Systems
        - ECE 657 Introduction to Machine Learning
        - ECE 750 Topic-37 Engineering Self-Adaptive Software Systems
        - ECE 751 Distributed and Network-Centric Computing

10. Graduate Specialization in Sustainable Energy

- To receive the Graduate Specialization in Sustainable Energy, students must successfully complete 1 compulsory course and 4 elective courses:
    - Compulsory course:
        - ECE 660 Operation and Control of Future Integrated Energy Systems
    - Elective courses (choose 4 from the following list):
        - ECE 632 Photovoltaic Energy Conversion
        - ECE 662 Power System Analysis and Control
        - ECE 663 Energy Processing
        - ECE 665 High Voltage Engineering Applications

- ECE 666 Power Systems Operation
- ECE 668 Distribution System Engineering
- ECE 669 Dielectric Materials
- ECE 763 Sustainable Distributed Power Generation
- ECE 765 Power System Protection and Relaying

Notes

- Department of Electrical and Computer Engineering website
- Master of Engineering (MEng) in Electrical and Computer Engineering future students program page

Specializations

Undergraduate Plan Guidelines

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Engineering

Dependencies

Prerequisites

- BE 606 - Entrepreneurship and Innovation — View Program
- BE 610 - Special Topics in Business and Entrepreneurship — View Program

MEng in Electrical & Computer Engineering-Co-op - Master of Engineering (MEng) in Electrical and Computer Engineering - Co-operative Program

Top

Effective Date and Career

Career
Graduate

Effective Term and Year

Proposed

Effective Term and Year
Winter 2027

Existing

Effective Term and Year
Fall 2026

Proposal Details

Proposal Type
Change

Academic Unit Approval
2026-04-23

Quality Assurance Designation
Minor Modification Qad

Is there an impact to existing students?
Yes

Impact on Existing Students

The revised specialization will be available to students who start the program in Winter 2027 and afterwards.

Is the credential name changing?
No

Graduate Co-operative Requirements
No

Change to Learning Outcomes
No

Rationale and Background for Change(s)

Updating the list of courses associated with the Graduate Specialization in Sustainable Energy to allow students to provide a more specific list of courses related to the field of study. Removing the compulsory course and allowing students freedom to select 5 courses of relevance within the list of specific courses.

General Program/Plan Information

Faculty

Faculty of Engineering

Academic Unit

Department of Electrical and Computer Engineering

Graduate Field of Study

Electrical and Computer Engineering

Faculty

Faculty of Engineering

Program/Plan Name

Master of Engineering (MEng) in Electrical and Computer Engineering - Co-operative Program

Graduate Credential Type

Master's

Accelerated Program

Not applicable

Study Options (New)

Coursework

Program Types

Co-operative

Admit Term(s)

Fall, Winter, Spring

Delivery Mode

On-campus

Length of Program

- Full-time: 5-6 terms (20-24 months)

Registration Option(s)

Full-time

Graduate Specializations

- Artificial Intelligence and Machine Learning
- Biomedical Engineering
- Business Leadership

- Computer Networking and Security
- Control and Autonomy
- Integrated Devices, Circuits, and Systems
- Nanoelectronic Devices and Materials
- Quantum Engineering
- Software
- Sustainable Energy

Admissions

Admission Requirements: Minimum Requirements

- The Department of Electrical and Computer Engineering requires either (i) a 75% overall standing in the last two years, or equivalent, in a relevant four-year Honours Bachelor's degree or equivalent or (ii) a 75% overall standing or equivalent, in a relevant four-year Honours Bachelor's degree or equivalent, as the minimum requirement for admission to a Master's program for applicants educated at a Canadian institution. A 75% overall standing or equivalent, in a relevant four-year Honours Bachelor's degree or equivalent is the minimum requirement for admission to a Master's program for applicants educated outside of Canada.
- English language proficiency (ELP) (if applicable)

Admission Requirements: Application materials

- Résumé
- Supplementary information form
- Transcript(s)

Admission Requirements: References

- Number of references: 2
- Type of references: at least 1 academic

Requirements Information

Graduate Degree Requirements

- Students must complete the course and milestone requirements listed below in addition to the Graduate Academic Integrity Module (Graduate AIM).
- The MEng in Electrical and Computer Engineering - Co-operative Program will enable students to combine graduate studies with work experience. The program will foster professional development, networking and new collaborations while enhancing employment opportunities after degree completion.
- The program will include 1 or 2 work terms. The timing of work and academic terms is fairly flexible, but the program must start and end on an academic term.
- Students are required to complete WIL 601 Career Foundations for Work-Integrated Learning in their first academic term of their co-op program. Students must complete WIL 601 in addition to the program's course requirements.

Coursework Option: Course Requirements

Proposed

Coursework Option: Course Requirements

- Students must complete a minimum of 8 one-term graduate level courses (0.50 unit weight each).
- A minimum of 5 courses must be taken from within the ECE Department. A maximum of 3 courses may be taken from outside the Department but must be from the faculties of Engineering, Mathematics and Science.
- Students pursuing the Graduate Specialization in Business Leadership may take a maximum of 4 courses from outside ECE, selected from the approved BE course list, detailed below.
- A minimum grade of 65% in each course and a minimum cumulative average of 70% are required to remain in the program.
- Courses with grades below 65% cannot be retaken for graduate course credit.
- Students who receive a grade below 65% may be permitted to take a maximum of 2 additional courses to meet the program's course and minimum cumulative average requirements.
- Students in the MEng in Electrical and Computer Engineering - Co-operative Program may choose to pursue one of the following Graduate Specializations:
  1. Artificial Intelligence and Machine Learning
  2. Biomedical Engineering
  3. Business Leadership
  4. Computer Networking and Security
  5. Control and Autonomy
  6. Integrated Devices, Circuits, and Systems
  7. Nanoelectronic Devices and Materials
  8. Quantum Engineering
  9. Software
  10. Sustainable Energy
- A Graduate Specialization is a University recognized credential that appears on the student's transcript but not on the diploma. It signifies successful completion of a defined set of courses that provide in-depth study in a specific area. The Graduate Specialization will be noted on the transcript only if the student fulfills both the MEng degree requirements and those of the Graduate Specialization.
- All MEng Graduate Specializations in Electrical and Computer Engineering include a minimum of 4 graduate level (0.50 weight) courses consisting of a mix of compulsory and elective courses. Compulsory courses are specifically required for the Graduate Specialization, while electives are chosen from an approved list. The specific requirements for each Graduate Specialization are described below.
- Note: Not all elective courses for any given Graduate Specialization are guaranteed to be offered each year. Students are encouraged to take elective courses when available and plan the course selection accordingly.
- Students will be able to complete the Business Leadership Graduate Specialization along with 1 other ECE Graduate Specialization, noting the following:

    - Each course will only be counted towards one Graduate Specialization and the MEng degree.
    - The number of required courses for the MEng degree will increase from 8 to 9 or 10 depending on the combined Graduate Specialization requirements.
- If a Graduate Specialization includes an MEng project course (ECE 699A or 699B), the project topic must be closely related to that Graduate Specialization.
- Students must consult with the ECE Masters Coordinator to finalize their plan of study and to ensure that they are able to meet the degree and Graduate Specialization requirements within the program time limits.

1. Graduate Specialization in Artificial Intelligence and Machine Learning

- To receive the Graduate Specialization in Artificial Intelligence and Machine Learning, students must successfully complete 2 compulsory courses and 3 elective courses:
    - Compulsory courses:
        - ECE 657 Introduction to Machine Learning
        - ECE 657A Introduction to Artificial Intelligence
    - Elective courses (choose 3 from the following list):
        - ECE 602 Introduction to Optimization
        - ECE 603 Statistical Signal Processing
        - ECE 606 Algorithm Design and Analysis
        - ECE 613 Image Processing and Visual Communication
        - ECE 657D Neural Networks and Deep Learning
        - ECE 659 Intelligent Sensors and Sensor Networks
        - ECE 750 Topic-32 Biology and Computation
        - ECE 750 Topic-40 Reinforcement Learning
        - ECE 752 Foundations of Multiagent System
        - ECE 757A Embodied Intelligence
        - ECE 787 Social Robotics

2. Graduate Specialization in Biomedical Engineering

- To receive the Graduate Specialization in Biomedical Engineering, students must successfully complete 2 compulsory courses and 3 elective courses:
    - Compulsory courses (choose 2 from the following list):
        - ECE 601 Foundations of Biology in Engineering
        - ECE 608 Quantitative Methods in Biomedical Engineering
        - ECE 609 Engineering Analysis of Living Cells
    - Elective courses (choose 3 from the following list):
        - Any course from the compulsory list that is not used to fulfill the compulsory course requirement
        - ECE 607 Fundamentals of Ultrasonics
        - ECE 613 Image Processing and Visual Communications
        - ECE 638 Biosensing: Fundamentals and Applications
        - ECE 675 Radiation and Propagation of Electromagnetic Fields
        - ECE 700 Topic-11 Principles of Biomedical Imaging
        - ECE 750 Topic-32 Biology and Computation
        - ECE 757A Embodied Intelligence

3. Graduate Specialization in Business Leadership

- To receive the Graduate Specialization in Business Leadership, students must successfully complete 2 compulsory courses and 2 elective courses:
    - Compulsory courses:
        - BE 600 Management and Leadership
        - BE 601 Introduction to Financial and Managerial Accounting
    - Elective courses (choose 2 from the following list):
        - BE 602 Data Analysis and Management
        - BE 603 Operations and Supply Chain Management
        - BE 604 Marketing Management
        - BE 605 Project Management
        - BE 606 Entrepreneurship and Innovation
        - BE 610 Special Topics in Business and Entrepreneurship
        - BE 660 Negotiations
        - BE 680 Consulting
    - Note: A maximum of 4 courses from outside the ECE Department is permitted to satisfy both the MEng in ECE and Graduate Specialization in Business Leadership requirements.

4. Graduate Specialization in Computer Networking and Security

- To receive the Graduate Specialization in Computer Networking and Security, students must successfully complete 3 compulsory courses and 2 elective courses:
    - Compulsory courses:
        - ECE 610 Broadband Communication Networks
        - ECE 628 Computer Network Security
        - ECE 655 Protocols, Software, and Issues in Mobile Systems
    - Elective courses (choose 2 from the following list):
        - ECE 606 Algorithm Design and Analysis
        - ECE 612 Information Theory
        - ECE 656 Database Systems
        - ECE 657 Introduction to Machine Learning
        - ECE 659 Intelligent Sensors & Wireless Sensor Network
        - ECE 715 Wireless Communication Networks
        - ECE 716 Communication Security

5. Graduate Specialization in Control and Autonomy

- To receive the Graduate Specialization in Control and Autonomy, students must successfully complete 2 compulsory courses and 3 elective courses:
  - Compulsory courses:
    - Choose 1 from the following list:
      - ECE 682 Multivariable Control Systems
      - ECE 686 Stochastic Control of Linear Systems
      - ECE 688 Nonlinear Systems
    - Choose 1 from the following list:
      - ECE 602 Introduction of Optimization
      - ECE 687 Robot Dynamics and Control
  - Elective courses (choose 3 from the following list):
    - Any course from the compulsory lists that is not used to fulfill the compulsory course requirement.
    - ECE 604 Stochastic Processes
    - ECE 700 Topic-10 Distributed Optimization
    - ECE 750 Topic-40 Reinforcement Learning
    - ECE 752 Foundations of Multiagent Systems
    - ECE 783 Motion Coordination & Planning
    - ECE 787 Social Robotics
    - ECE 789 Model Predictive Control

6. Graduate Specialization in Integrated Devices, Circuits, and Systems

- To receive the Graduate Specialization in Integrated Devices, Circuits, and Systems, students must successfully complete 2 compulsory courses, and 3 elective courses:
  - Compulsory courses (choose 2 from the following list):
    - ECE 621 Computer Organization
    - ECE 627 Register-transfer-level Digital Systems
    - ECE 630 Physics & Models Semiconductor Devices
    - ECE 631 Microelectronic Processing Technology
    - ECE 636 Advanced Analog Integrated Circuits
    - ECE 637 Digital Integrated Circuits
    - ECE 642 Radio Frequency IC Design
    - ECE 671 Microwave and RF Engineering
  - Elective courses (choose 3 from the following list):
    - Any course from the compulsory list that is not used to fulfill the compulsory course requirement
    - ECE 606 Algorithm Design and Analysis
    - ECE 699A Master of Engineering Project 1
    - ECE 699B Master of Engineering Project 2
    - ECE 732 Advanced VLSI Devices
    - ECE 738 VLSI Circuits for Wireless Communication
    - ECE 774 Radio and Wireless Systems

7. Graduate Specialization in Nanoelectronic Devices and Materials

- To receive the Graduate Specialization in Nanoelectronic Devices and Materials, students must successfully complete 2 compulsory courses and 3 elective courses:
  - Compulsory courses:
    - ECE 630 Physics and Models of Semiconductor Devices
    - ECE 631 Microelectronic Processing Technology
  - Elective courses (choose 3 from the following list):
    - ECE 632 Photovoltaic Energy Conversion
    - ECE 633 Nanoelectronics
    - ECE 634 Organic Electronics
    - ECE 635 Fabrication in the Nanoscale: Technology and Applications
    - ECE 672 Optoelectronic Devices
    - NANO 600 Introduction to Nanotechnology
    - NANO 601 Characterization of Nanomaterials

8. Graduate Specialization in Quantum Engineering

- To receive the Graduate Specialization in Quantum Engineering, students must successfully complete 2 compulsory courses and 3 elective courses:
  - Compulsory courses:
    - ECE 676 Quantum Information Processing Devices
    - ECE 677 Applied Quantum Mechanics
  - Elective courses (choose 3 from the following list):
    - ECE 630 Physics and Models of Semiconductor Devices
    - ECE 633 Nanoelectronics
    - ECE 671 Microwave and RF Engineering
    - ECE 676B Experimental Quantum Engineering
    - ECE 676C Programming of Quantum Computing Algorithms
    - ECE 676D Superconducting Quantum Circuits
    - ECE 676E Lab on Low-Temperature Quantum Engineering
    - QIC 710 Quantum Information Processing
    - QIC 880 Nanoelectronics for Quantum Information Processing

9. Graduate Specialization in Software

- To receive the Graduate Specialization in Software, students must successfully complete 3 compulsory courses and 2 elective courses:

- Compulsory courses:
  - ECE 650 Methods and Tools for Software Engineering
  - ECE 651 Foundations of Software Engineering
  - ECE 653 Software Testing, Quality Assurance and Maintenance
- Elective courses (choose 2 from the following list):
  - ECE 606 Algorithm Design and Analysis
  - ECE 652 Methods and Principles of Safety-critical Embedded Software
  - ECE 654 Software Reliability Engineering
  - ECE 655 Protocols, Software, Issues in Mobile Systems
  - ECE 656 Database Systems
  - ECE 657 Introduction to Machine Learning
  - ECE 750 Topic-37 Engineering Self-Adaptive Software Systems
  - ECE 751 Distributed and Network-Centric Computing

10. Graduate Specialization in Sustainable Energy

- To receive the Graduate Specialization in Sustainable Energy, students must successfully complete 5 of the following elective courses:
  - ECE 632 Photovoltaic Energy Conversion
  - ECE 661 Power System Protection and Relaying
  - ECE 662 Power System Analysis and Control
  - ECE 663 Power Electronics
  - ECE 665 High Voltage Engineering Applications
  - ECE 666 Power Systems Operation
  - ECE 668 Active Distributions Systems and DER Integration
  - ECE 669 Dielectric Materials in Power and Transportation Systems

Existing

Coursework Option: Course Requirements

- Students must complete a minimum of 8 one-term graduate level courses (0.50 unit weight each).
- A minimum of 5 courses must be taken from within the ECE Department. A maximum of 3 courses may be taken from outside the Department but must be from the faculties of Engineering, Mathematics and Science.
- Students pursuing the Graduate Specialization in Business Leadership may take a maximum of 4 courses from outside ECE, selected from the approved BE course list, detailed below.
- A minimum grade of 65% in each course and a minimum cumulative average of 70% are required to remain in the program.
- Courses with grades below 65% cannot be retaken for graduate course credit.
- Students who receive a grade below 65% may be permitted to take a maximum of 2 additional courses to meet the program's course and minimum cumulative average requirements.
- Students in the MEng in Electrical and Computer Engineering - Co-operative Program may choose to pursue one of the following Graduate Specializations:
  1. Artificial Intelligence and Machine Learning
  2. Biomedical Engineering
  3. Business Leadership
  4. Computer Networking and Security
  5. Control and Autonomy
  6. Integrated Devices, Circuits, and Systems
  7. Nanoelectronic Devices and Materials
  8. Quantum Engineering
  9. Software
  10. Sustainable Energy
- A Graduate Specialization is a University recognized credential that appears on the student's transcript but not on the diploma. It signifies successful completion of a defined set of courses that provide in-depth study in a specific area. The Graduate Specialization will be noted on the transcript only if the student fulfills both the MEng degree requirements and those of the Graduate Specialization.
- All MEng Graduate Specializations in Electrical and Computer Engineering include a minimum of 4 graduate level (0.50 weight) courses consisting of a mix of compulsory and elective courses. Compulsory courses are specifically required for the Graduate Specialization, while electives are chosen from an approved list. The specific requirements for each Graduate Specialization are described below.
- Note: Not all elective courses for any given Graduate Specialization are guaranteed to be offered each year. Students are encouraged to take elective courses when available and plan the course selection accordingly.
- Students will be able to complete the Business Leadership Graduate Specialization along with 1 other ECE Graduate Specialization, noting the following:
  - Each course will only be counted towards one Graduate Specialization and the MEng degree.
  - The number of required courses for the MEng degree will increase from 8 to 9 or 10 depending on the combined Graduate Specialization requirements.
- If a Graduate Specialization includes an MEng project course (ECE 699A or 699B), the project topic must be closely related to that Graduate Specialization.
- Students must consult with the ECE Masters Coordinator to finalize their plan of study and to ensure that they are able to meet the degree and Graduate Specialization requirements within the program time limits.

1. Graduate Specialization in Artificial Intelligence and Machine Learning

- To receive the Graduate Specialization in Artificial Intelligence and Machine Learning, students must successfully complete 2 compulsory courses and 3 elective courses:
  - Compulsory courses:
    - ECE 657 Introduction to Machine Learning
    - ECE 657A Introduction to Artificial Intelligence
  - Elective courses (choose 3 from the following list):
    - ECE 602 Introduction to Optimization

        - ECE 603 Statistical Signal Processing
        - ECE 606 Algorithm Design and Analysis
        - ECE 613 Image Processing and Visual Communication
        - ECE 657D Neural Networks and Deep Learning
        - ECE 659 Intelligent Sensors and Sensor Networks
        - ECE 750 Topic-32 Biology and Computation
        - ECE 750 Topic-40 Reinforcement Learning
        - ECE 752 Foundations of Multiagent System
        - ECE 757A Embodied Intelligence
        - ECE 787 Social Robotics

2. Graduate Specialization in Biomedical Engineering

- To receive the Graduate Specialization in Biomedical Engineering, students must successfully complete 2 compulsory courses and 3 elective courses:
    - Compulsory courses (choose 2 from the following list):
        - ECE 601 Foundations of Biology in Engineering
        - ECE 608 Quantitative Methods in Biomedical Engineering
        - ECE 609 Engineering Analysis of Living Cells
    - Elective courses (choose 3 from the following list):
        - Any course from the compulsory list that is not used to fulfill the compulsory course requirement
        - ECE 607 Fundamentals of Ultrasonics
        - ECE 613 Image Processing and Visual Communications
        - ECE 638 Biosensing: Fundamentals and Applications
        - ECE 675 Radiation and Propagation of Electromagnetic Fields
        - ECE 700 Topic-11 Principles of Biomedical Imaging
        - ECE 750 Topic-32 Biology and Computation
        - ECE 757A Embodied Intelligence

3. Graduate Specialization in Business Leadership

- To receive the Graduate Specialization in Business Leadership, students must successfully complete 2 compulsory courses and 2 elective courses:
    - Compulsory courses:
        - BE 600 Management and Leadership
        - BE 601 Introduction to Financial and Managerial Accounting
    - Elective courses (choose 2 from the following list):
        - BE 602 Data Analysis and Management
        - BE 603 Operations and Supply Chain Management
        - BE 604 Marketing Management
        - BE 605 Project Management
        - BE 606 Entrepreneurship and Innovation
        - BE 610 Special Topics in Business and Entrepreneurship
        - BE 660 Negotiations
        - BE 680 Consulting
    - Note: A maximum of 4 courses from outside the ECE Department is permitted to satisfy both the MEng in ECE and Graduate Specialization in Business Leadership requirements.

4. Graduate Specialization in Computer Networking and Security

- To receive the Graduate Specialization in Computer Networking and Security, students must successfully complete 3 compulsory courses and 2 elective courses:
    - Compulsory courses:
        - ECE 610 Broadband Communication Networks
        - ECE 628 Computer Network Security
        - ECE 655 Protocols, Software, and Issues in Mobile Systems
    - Elective courses (choose 2 from the following list):
        - ECE 606 Algorithm Design and Analysis
        - ECE 612 Information Theory
        - ECE 656 Database Systems
        - ECE 657 Introduction to Machine Learning
        - ECE 659 Intelligent Sensors & Wireless Sensor Network
        - ECE 715 Wireless Communication Networks
        - ECE 716 Communication Security

5. Graduate Specialization in Control and Autonomy

- To receive the Graduate Specialization in Control and Autonomy, students must successfully complete 2 compulsory courses and 3 elective courses:
    - Compulsory courses:
        - Choose 1 from the following list:
            - ECE 682 Multivariable Control Systems
            - ECE 686 Stochastic Control of Linear Systems
            - ECE 688 Nonlinear Systems
        - Choose 1 from the following list:
            - ECE 602 Introduction of Optimization
            - ECE 687 Robot Dynamics and Control
    - Elective courses (choose 3 from the following list):
        - Any course from the compulsory lists that is not used to fulfill the compulsory course requirement.
        - ECE 604 Stochastic Processes
        - ECE 700 Topic-10 Distributed Optimization
        - ECE 750 Topic-40 Reinforcement Learning

        - ECE 752 Foundations of Multiagent Systems
        - ECE 783 Motion Coordination & Planning
        - ECE 787 Social Robotics
        - ECE 789 Model Predictive Control

6. Graduate Specialization in Integrated Devices, Circuits, and Systems

- To receive the Graduate Specialization in Integrated Devices, Circuits, and Systems, students must successfully complete 2 compulsory courses, and 3 elective courses:
    - Compulsory courses (choose 2 from the following list):
        - ECE 621 Computer Organization
        - ECE 627 Register-transfer-level Digital Systems
        - ECE 630 Physics & Models Semiconductor Devices
        - ECE 631 Microelectronic Processing Technology
        - ECE 636 Advanced Analog Integrated Circuits
        - ECE 637 Digital Integrated Circuits
        - ECE 642 Radio Frequency IC Design
        - ECE 671 Microwave and RF Engineering
    - Elective courses (choose 3 from the following list):
        - Any course from the compulsory list that is not used to fulfill the compulsory course requirement
        - ECE 606 Algorithm Design and Analysis
        - ECE 699A Master of Engineering Project 1
        - ECE 699B Master of Engineering Project 2
        - ECE 732 Advanced VLSI Devices
        - ECE 738 VLSI Circuits for Wireless Communication
        - ECE 774 Radio and Wireless Systems

7. Graduate Specialization in Nanoelectronic Devices and Materials

- To receive the Graduate Specialization in Nanoelectronic Devices and Materials, students must successfully complete 2 compulsory courses and 3 elective courses:
    - Compulsory courses:
        - ECE 630 Physics and Models of Semiconductor Devices
        - ECE 631 Microelectronic Processing Technology
    - Elective courses (choose 3 from the following list):
        - ECE 632 Photovoltaic Energy Conversion
        - ECE 633 Nanoelectronics
        - ECE 634 Organic Electronics
        - ECE 635 Fabrication in the Nanoscale: Technology and Applications
        - ECE 672 Optoelectronic Devices
        - NANO 600 Introduction to Nanotechnology
        - NANO 601 Characterization of Nanomaterials

8. Graduate Specialization in Quantum Engineering

- To receive the Graduate Specialization in Quantum Engineering, students must successfully complete 2 compulsory courses and 3 elective courses:
    - Compulsory courses:
        - ECE 676 Quantum Information Processing Devices
        - ECE 677 Applied Quantum Mechanics
    - Elective courses (choose 3 from the following list):
        - ECE 630 Physics and Models of Semiconductor Devices
        - ECE 633 Nanoelectronics
        - ECE 671 Microwave and RF Engineering
        - ECE 676B Experimental Quantum Engineering
        - ECE 676C Programming of Quantum Computing Algorithms
        - ECE 676D Superconducting Quantum Circuits
        - ECE 676E Lab on Low-Temperature Quantum Engineering
        - QIC 710 Quantum Information Processing
        - QIC 880 Nanoelectronics for Quantum Information Processing

9. Graduate Specialization in Software

- To receive the Graduate Specialization in Software, students must successfully complete 3 compulsory courses and 2 elective courses:
    - Compulsory courses:
        - ECE 650 Methods and Tools for Software Engineering
        - ECE 651 Foundations of Software Engineering
        - ECE 653 Software Testing, Quality Assurance and Maintenance
    - Elective courses (choose 2 from the following list):
        - ECE 606 Algorithm Design and Analysis
        - ECE 652 Methods and Principles of Safety-critical Embedded Software
        - ECE 654 Software Reliability Engineering
        - ECE 655 Protocols, Software, Issues in Mobile Systems
        - ECE 656 Database Systems
        - ECE 657 Introduction to Machine Learning
        - ECE 750 Topic-37 Engineering Self-Adaptive Software Systems
        - ECE 751 Distributed and Network-Centric Computing

10. Graduate Specialization in Sustainable Energy

- To receive the Graduate Specialization in Sustainable Energy, students must successfully complete 1 compulsory

course and 4 elective courses:
    - Compulsory course:
        - ECE 660 Operation and Control of Future Integrated Energy Systems
    - Elective courses (choose 4 from the following list):
        - ECE 632 Photovoltaic Energy Conversion
        - ECE 662 Power System Analysis and Control
        - ECE 663 Energy Processing
        - ECE 665 High Voltage Engineering Applications
        - ECE 666 Power Systems Operation
        - ECE 668 Distribution System Engineering
        - ECE 669 Dielectric Materials
        - ECE 763 Sustainable Distributed Power Generation
        - ECE 765 Power System Protection and Relaying

Coursework Option: Milestone Requirements

Proposed

Coursework Option: Milestone Requirements

Graduate WIL Reflective Report

- The Graduate WIL Reflective Report requires students to critically reflect on their co-op work term experience, connecting academic knowledge to practical tasks and professional development. Students must complete one reflective report per required work term. The report is administered, evaluated, and graded by the Centre for Work-Integrated Learning.

Existing

Coursework Option: Milestone Requirements

Graduate WIL Reflective Report

- The Graduate WIL Reflective Report requires students to critically reflect on their co-op work term experience, connecting academic knowledge to practical tasks and professional development. Students must complete one reflective report per required work term. The report is administered, evaluated, and graded by the Centre for Work-Integrated Learning.
- Students are responsible for following the roles and responsibilities of Co-operative and Experiential Education (CEE).

Notes

- Department of Electrical and Computer Engineering website
- Master of Engineering (MEng) in Electrical and Computer Engineering - Co-operative Program future students program page

Specializations

Undergraduate Plan Guidelines

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Engineering

Dependencies

Prerequisites

- BE 606 - Entrepreneurship and Innovation — View Program
- BE 610 - Special Topics in Business and Entrepreneurship — View Program

MASc in Systems Design Engineering - Master of Applied Science (MASc) in Systems Design Engineering

Top

Effective Date and Career

Career
Graduate

Effective Term and Year

Proposed

Effective Term and Year
Winter 2027

Existing

Effective Term and Year
Fall 2025

Proposal Details

Proposal Type
Change

Academic Unit Approval
2026-04-20

Quality Assurance Designation
Minor Modification Qad

Is there an impact to existing students?
No

Is the credential name changing?

No

Graduate Co-operative Requirements
Not Applicable

Change to Learning Outcomes
No

Rationale and Background for Change(s)

Adding a Master's Thesis Proposal milestone to the degree requirements. The introduction of a formal thesis proposal ensures early alignment and engagement between students and their supervisory committees, promotes timely progress toward thesis completion, and provides a clear checkpoint for scope, feasibility and research direction.

General Program/Plan Information

Faculty
Faculty of Engineering

Academic Unit
Department of Systems Design Engineering

Graduate Field of Study
Systems Design Engineering

Faculty
Faculty of Engineering

Program/Plan Name
Master of Applied Science (MASc) in Systems Design Engineering

Graduate Credential Type
Master's

Accelerated Program
Not applicable

Study Options (New)
Thesis

Admit Term(s)
Fall, Winter, Spring

Delivery Mode
On-campus

Length of Program

- Students are required to complete the program in accordance with the University program time limits.

Registration Option(s)

Full-time, Part-time

Graduate Research Fields

- Biomedical Engineering
- Human Factors and Ergonomics
- Machine Learning and Intelligence
- Mechatronic and Physical Systems
- Modelling, Simulation and Systems Theory
- Optimization and Decision Making
- Societal and Environmental Systems
- Vision, Image and Signal Processing

Admissions

Admission Requirements: Minimum Requirements

- A 4-year Honours Bachelor's degree in engineering or a Honours Bachelor of Applied Science (or equivalent) that includes the following courses or equivalent:
  - Calculus II (SYDE 112)
  - Matrices and Linear Systems (SYDE 114)
- And one of the following two courses or equivalent:
  - Probability and Statistics (SYDE 212)
  - Calculus 3 (SYDE 211)
- At least an overall 75% (or equivalent) standing from a recognized university.
- For applicants whose previous degree was completed in Canada, a 75% overall standing in the last two years, or equivalent (at the sole discretion of the University of Waterloo, in all cases), in a four-year Honours Bachelor's degree or Honours Bachelor of Applied Science is the minimum requirement for admission to a Master's program.
- Due to the variable nature of international credentials, for applicants whose previous degree was completed outside of Canada, a 75% overall standing in a four-year Honours Bachelor's degree or Honour's Bachelor of Applied Science is the minimum requirement for admission.
- English language proficiency (ELP) (if applicable)

Admission Requirements: Application materials

- Program-specific questions (PSQ)
- Résumé
- Statement of interest
- Transcript(s)

Admission Requirements: References

- Number of references: 2
- Type of references: academic. Applicants who completed their degree five or more years before the application date may submit 1 academic and 1 professional reference.

Requirements Information

Graduate Degree Requirements

- Students must complete the course and milestone requirements listed below in addition to the Graduate Academic Integrity Module (Graduate AIM).

Thesis Option: Course Requirements

Thesis Option: Course Requirements

- Students must successfully complete 4 graduate courses (0.50 unit weight per course) counting towards degree credit from the University of Waterloo satisfying the following criteria:
  - At least 2 courses from Systems Design Engineering at the 500, 600 or 700 level.
  - At least 1 course from the Systems Design Engineering core methods courses list.
  - A maximum of 2 courses may be taken from outside the Faculty of Engineering but must be from the Faculties of Mathematics, Health, Environment and/or Science.
  - At most 1 course at the 500 level.
- Systems Design Engineering core methods courses:
  - SYDE 600 Systems Theory, Models, Research & Design
  - SYDE 620 Fundamentals of Continuous System Models
  - SYDE 631 Time Series Modelling
  - SYDE 640 Experimental Design
  - SYDE 675 Pattern Recognition
- All course selections are arranged by the supervisor(s) in consultation with the student and are subject to the approval of the Associate Chair for Graduate Studies. Students pursuing one the program's Graduate Research Fields, should inform their supervisor(s) of their chosen field(s) to ensure appropriate course selection.
- Note: these requirements are in addition to satisfactory completion of any transitional courses that may be specified at the time of admission.
- Note: the Faculty of Engineering requires that no more than one-half of the courses used for credit toward a graduate degree may be taught by a candidate's supervisor(s). In the case of co-supervision in small research groups, it may be necessary to relax this rule; however, the student's file must contain a statement of formal approval from the

Department and endorsement from the Associate Dean for Graduate Studies and Research in the Faculty of Engineering.

Thesis Option: Milestone Requirements

Proposed

Thesis Option: Milestone Requirements

Master's Thesis Proposal

- Students must prepare and present a thesis proposal that will be examined and approved by their supervisor and committee. The thesis proposal must be completed by the end of term 3. The composition of the committee is outlined in the Master's Thesis milestone description below.

Master's Seminar

- Students are required to present a research seminar based on their thesis at the Systems Design Engineering Graduate Colloquium or at a publicly attended seminar administered by their supervisor and advertised by the Department. The thesis readers should be invited to attend the seminar.

Seminar Attendance

- Students are required to attend an average of four University of Waterloo research seminars per full-time term and two per part-time term. It is the student's responsibility to attach a list of seminars attended to their activity report.
- To earn the seminar attendance milestone, the Department records should show that the number of seminars a student has attended is, at least, four times the number of terms the student has been registered as a full-time student in the Department.

Master's Thesis

- Students must submit a thesis embodying the results of independent research work to the satisfaction of an Examining Committee. The topic of the thesis is arranged by the supervisor(s) and the student. The composition of the Examining Committee must be as follows:
  - The student's supervisor(s).
  - At least one faculty member from within the Department of Systems Design Engineering.
  - At least one faculty member from outside the Department of Systems Design Engineering.
  - No more than one adjunct faculty member (including Professors Emeriti) may serve on the Examining Committee. Adjunct appointments require the approval of the Associate Dean, Graduate from the student's home Faculty.
  - At least two of the faculty members on the committee must be tenure or tenure-track.
- Before submitting their thesis for display, students must submit a graphical abstract for their thesis to the Department. Guidelines for the graphical abstract are available from the Department.
- Students may choose to pursue up to 2 of the following Graduate Research Fields:
  - Biomedical Engineering
  - Human Factors and Ergonomics
  - Machine Learning and Intelligence
  - Mechatronic and Physical Systems
  - Modelling, Simulation and Systems Theory
  - Optimization and Decision Making
  - Societal and Environmental Systems
  - Vision, Image and Signal Processing
- A Graduate Research Field is a University credential that is recognized on the student's transcript and is intended to reflect that a student has successfully completed research concentrated in the area of the Graduate Research Field. The Department, represented by the student's supervisor and thesis readers, must assess whether a student's completed research warrants the field designation at the time of degree completion. To obtain the Graduate Research Field designation, a student must also complete the requirements associated with the MASc degree. Students can choose to pursue a maximum of 2 Graduate Research Field designations (1 methodology field and 1 application field) for their degree.

Existing

Thesis Option: Milestone Requirements

Master's Seminar

- Students are required to present a research seminar based on their thesis at the Systems Design Engineering Graduate Colloquium or at a publicly attended seminar administered by their supervisor and advertised by the Department. The thesis readers should be invited to attend the seminar.

Seminar Attendance

- Students are required to attend an average of four University of Waterloo research seminars per full-time term and two per part-time term. It is the student's responsibility to attach a list of seminars attended to their activity report.
- To earn the seminar attendance milestone, the Department records should show that the number of seminars a student has attended is, at least, four times the number of terms the student has been registered as a full-time student in the Department.

Master's Thesis

- Students must submit a thesis embodying the results of independent research work to the satisfaction of an Examining Committee. The topic of the thesis is arranged by the supervisor(s) and the student. The composition of the Examining Committee must be as follows:
  - The student's supervisor(s).
  - At least one faculty member from within the Department of Systems Design Engineering.
  - At least one faculty member from outside the Department of Systems Design Engineering.
  - No more than one adjunct faculty member (including Professors Emeriti) may serve on the Examining Committee. Adjunct appointments require the approval of the Associate Dean, Graduate from the student's home Faculty.
  - At least two of the faculty members on the committee must be tenure or tenure-track.
- Before submitting their thesis for display, students must submit a graphical abstract for their thesis to the Department. Guidelines for the graphical abstract are available from the Department.
- Students may choose to pursue up to 2 of the following Graduate Research Fields:
  - Biomedical Engineering
  - Human Factors and Ergonomics
  - Machine Learning and Intelligence
  - Mechatronic and Physical Systems
  - Modelling, Simulation and Systems Theory
  - Optimization and Decision Making
  - Societal and Environmental Systems
  - Vision, Image and Signal Processing
- A Graduate Research Field is a University credential that is recognized on the student's transcript and is intended to reflect that a student has successfully completed research concentrated in the area of the Graduate Research Field. The Department, represented by the student's supervisor and thesis readers, must assess whether a student's completed research warrants the field designation at the time of degree completion. To obtain the Graduate Research Field designation, a student must also complete the requirements associated with the MASc degree. Students can choose to pursue a maximum of 2 Graduate Research Field designations (1 methodology field and 1 application field) for their degree.

Notes

- Systems Design Engineering website
- Master of Applied Science (MASc) in Systems Design Engineering future graduate students program page

Specializations

Undergraduate Plan Guidelines

Workflow Information

Workflow Path	Faculty/AFIW Path(s) for Workflow

Committee approvals

Faculty of Engineering

Dependencies

There are no dependencies

MASc in Systems Design Engineering-Aeronautics - Master of Applied Science (MASc) in Systems Design Engineering - Aeronautics

Top

Effective Date and Career

Career
Graduate

Effective Term and Year

Proposed

Effective Term and Year
Winter 2027

Existing

Effective Term and Year
Fall 2025

Proposal Details

Proposal Type
Change

Academic Unit Approval
2026-04-20

Quality Assurance Designation
Minor Modification Qad

Is there an impact to existing students?
No

Is the credential name changing?
No

Graduate Co-operative Requirements

Not Applicable

Change to Learning Outcomes
No

Rationale and Background for Change(s)

Adding a Master's Thesis Proposal milestone to the degree requirements. The introduction of a formal thesis proposal ensures early alignment and engagement between students and their supervisory committees, promotes timely progress toward thesis completion, and provides a clear checkpoint for scope, feasibility and research direction.

General Program/Plan Information

Faculty

Faculty of Engineering

Academic Unit

Department of Systems Design Engineering

Graduate Field of Study

Systems Design Engineering

Faculty
Faculty of Engineering

Program/Plan Name
Master of Applied Science (MASc) in Systems Design Engineering - Aeronautics

Graduate Credential Type
Master's

Accelerated Program
Not applicable

Study Options (New)
Thesis

Program Types

Collaborative

Admit Term(s)
Fall, Winter, Spring

Delivery Mode
On-campus

Length of Program

- Students are required to complete the program in accordance with the University program time limits.

Registration Option(s)
Full-time, Part-time

Admissions

Admission Requirements: Minimum Requirements

- A 4-year Honours Bachelor’s degree in engineering or a Honours Bachelor of Applied Science (or equivalent) that includes the following courses or equivalent:
  - Calculus II (SYDE 112)
  - Matrices and Linear Systems (SYDE 114)
- And one of the following two courses or equivalent:
  - Probability and Statistics (SYDE 212)
  - Calculus 3 (SYDE 211)
- At least an overall 75% (or equivalent) standing from a recognized university.
- For applicants whose previous degree was completed in Canada, a 75% overall standing in the last two years, or equivalent (at the sole discretion of the University of Waterloo, in all cases), in a four-year Honours Bachelor's degree or Honours Bachelor of Applied Science is the minimum requirement for admission to a Master's program.
- Due to the variable nature of international credentials, for applicants whose previous degree was completed outside of Canada, a 75% overall standing in a four-year Honours Bachelor's degree or Honour’s Bachelor of Applied Science is the minimum requirement for admission.
- English language proficiency (ELP) (if applicable)

Admission Requirements: Application materials

- Program-specific questions (PSQ)
- Résumé
- Transcript(s)

Admission Requirements: References

- Number of references: 2
- Type of references: academic. Applicants who completed their degree five or more years before the application date may submit 1 academic and 1 professional reference.

Requirements Information

Graduate Degree Requirements

- Students must complete the course and milestone requirements listed below in addition to the Graduate Academic Integrity Module (Graduate AIM).

Thesis Option: Course Requirements

Thesis Option: Course Requirements

- Students must successfully complete AVIA 601 Interdisciplinary Aeronautics, AVIA 602 Interdisciplinary Aeronautics Project, and 3 graduate courses (0.50 unit weight per course) counting towards degree credit from the University of Waterloo satisfying the following criteria:
  - At least 2 courses from Systems Design Engineering at the 500, 600 or 700 level.
  - At least 1 course from the Systems Design Engineering core methods courses list.
  - A maximum of 1 course may be taken from outside the Faculty of Engineering but must be from the Faculties of Mathematics, Health, Environment or Science.
  - At most 1 course at the 500 level.
- Systems Design Engineering core methods courses:
  - SYDE 600 Systems Theory, Models, Research & Design
  - SYDE 620 Fundamentals of Continuous System Models
  - SYDE 631 Time Series Modelling
  - SYDE 640 Experimental Design
  - SYDE 675 Pattern Recognition
- This degree is offered through the Collaborative Aeronautics Program. This program, jointly offered by a range of departments/schools across several academic faculties, promotes the development of interdisciplinary perspectives on aeronautics. Collaborative Aeronautics Program students complete their specialist training in their respective home departments/schools, while working with colleagues from a variety of other departments/schools in core interdisciplinary courses (AVIA 601 and AVIA 602).
- All course selections are arranged by the supervisor(s) in consultation with the student and are subject to the approval of the Associate Chair for Graduate Studies.
- Note: these requirements are in addition to satisfactory completion of any transitional courses that may be specified at the time of admission.
- Note: the Faculty of Engineering requires that no more than one-half of the courses used for credit toward a graduate degree may be taught by a candidate's supervisor(s). In the case of co-supervision in small research groups, it may be necessary to relax this rule; however, the student's file must contain a statement of formal approval from the Department and endorsement from the Associate Dean for Graduate Studies and Research in the Faculty of Engineering.

Thesis Option: Milestone Requirements

Proposed

Thesis Option: Milestone Requirements

Master's Thesis Proposal

- Students must prepare and present a thesis proposal that will be examined and approved by their supervisor and committee. The thesis proposal must be completed by the end of term 3. The composition of the committee is

outlined in the Master's Thesis milestone description below.

Master's Seminar

- Students are required to present a research seminar based on their thesis at the Systems Design Engineering Graduate Colloquium or at a publicly attended seminar administered by their supervisor and advertised by the Department. The thesis readers should be invited to attend the seminar.

Seminar Attendance

- Students are required to attend an average of four University of Waterloo research seminars per full-time term and two per part-time term. It is the student's responsibility to attach a list of seminars attended to their activity report.
- To earn the seminar attendance milestone, the Department records should show that the number of seminars a student has attended is, at least, four times the number of terms the student has been registered as a full-time student in the Department.

Master's Thesis

- Students must submit a thesis embodying the results of independent research work to the satisfaction of an Examining Committee. The topic of the thesis must be applicable to Systems Design Engineering and Aeronautics and is arranged by the supervisor(s) and the student. The composition of the Examining Committee must be as follows:
  - The student's supervisor(s).
  - At least one faculty member from within the Department of Systems Design Engineering.
  - At least one faculty member from outside the Department of Systems Design Engineering.
  - No more than one adjunct faculty member (including Professors Emeriti) may serve on the Examining Committee. Adjunct appointments require the approval of the Associate Dean, Graduate from the student's home Faculty.
  - At least two of the faculty members on the committee must be tenure or tenure-track.
- Before submitting their thesis for display, students must submit a graphical abstract for their thesis to the Department. Guidelines for the graphical abstract are available from the Department.

Existing

Thesis Option: Milestone Requirements

Master's Seminar

- Students are required to present a research seminar based on their thesis at the Systems Design Engineering Graduate Colloquium or at a publicly attended seminar administered by their supervisor and advertised by the Department. The thesis readers should be invited to attend the seminar.

Seminar Attendance

- Students are required to attend an average of four University of Waterloo research seminars per full-time term and two per part-time term. It is the student's responsibility to attach a list of seminars attended to their activity report.
- To earn the seminar attendance milestone, the Department records should show that the number of seminars a student has attended is, at least, four times the number of terms the student has been registered as a full-time student in the Department.

Master's Thesis

- Students must submit a thesis embodying the results of independent research work to the satisfaction of an Examining Committee. The topic of the thesis must be applicable to Systems Design Engineering and Aeronautics and is arranged by the supervisor(s) and the student. The composition of the Examining Committee must be as follows:
  - The student's supervisor(s).
  - At least one faculty member from within the Department of Systems Design Engineering.
  - At least one faculty member from outside the Department of Systems Design Engineering.
  - No more than one adjunct faculty member (including Professors Emeriti) may serve on the Examining Committee. Adjunct appointments require the approval of the Associate Dean, Graduate from the student's home Faculty.
  - At least two of the faculty members on the committee must be tenure or tenure-track.
- Before submitting their thesis for display, students must submit a graphical abstract for their thesis to the Department. Guidelines for the graphical abstract are available from the Department.

Notes

- Systems Design Engineering website
- Master of Applied Science (MASc) in Systems Design Engineering - Aeronautics future graduate students program page

Specializations

Undergraduate Plan Guidelines

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Engineering

Dependencies

There are no dependencies

MASc in Systems Design Engineering-Nanotechnology - Master of Applied Science (MASc) in Systems Design Engineering - Nanotechnology

Top

Effective Date and Career

Career
Graduate

Effective Term and Year

Proposed

Effective Term and Year
Winter 2027

Existing

Effective Term and Year
Winter 2026

Proposal Details

Proposal Type
Change

Academic Unit Approval
2026-04-20

Quality Assurance Designation
Minor Modification Qad

Is there an impact to existing students?
No

Is the credential name changing?
No

Graduate Co-operative Requirements
Not Applicable

Change to Learning Outcomes
No

Rationale and Background for Change(s)

Adding a Master's Thesis Proposal milestone to the degree requirements. The introduction of a formal thesis proposal ensures early alignment and engagement between students and their supervisory committees, promotes timely progress toward thesis completion, and provides a clear checkpoint for scope, feasibility and research direction.

General Program/Plan Information

Faculty
Faculty of Engineering

Academic Unit
Department of Systems Design Engineering

Graduate Field of Study
Systems Design Engineering

Faculty
Faculty of Engineering

Program/Plan Name
Master of Applied Science (MASc) in Systems Design Engineering - Nanotechnology

Graduate Credential Type
Master's

Accelerated Program
Not applicable

Study Options (New)
Thesis

Program Types
Collaborative

Admit Term(s)
Fall, Winter, Spring

Delivery Mode
On-campus

Length of Program

- Students are required to complete the program in accordance with the University program time limits.

Registration Option(s)
Full-time

Admissions

Admission Requirements: Minimum Requirements

- A 4-year Honours Bachelor's degree in engineering or a Honours Bachelor of Applied Science (or equivalent) that includes the following courses or equivalent:
  - Calculus II (SYDE 112)
  - Matrices and Linear Systems (SYDE 114)
- And one of the following two courses or equivalent:
  - Probability and Statistics (SYDE 212)
  - Calculus 3 (SYDE 211)
- At least an overall 75% (or equivalent) standing from a recognized university.
- For applicants whose previous degree was completed in Canada, a 75% overall standing in the last two years, or equivalent (at the sole discretion of the University of Waterloo, in all cases), in a four-year Honours Bachelor's degree or Honours Bachelor of Applied Science is the minimum requirement for admission to a Master's program.
- Due to the variable nature of international credentials, for applicants whose previous degree was completed outside of Canada, a 75% overall standing in a four-year Honours Bachelor's degree or Honour's Bachelor of Applied Science is the minimum requirement for admission.
- English language proficiency (ELP) (if applicable)

Admission Requirements: Application materials

- Program-specific questions (PSQ)
- Résumé
- Statement of interest
- Transcript(s)

Admission Requirements: References

- Number of references: 2
- Type of references: academic. Applicants who completed their degree five or more years before the application date may submit 1 academic and 1 professional reference.

Requirements Information

Graduate Degree Requirements

- Students must complete the course and milestone requirements listed below in addition to the Graduate Academic Integrity Module (Graduate AIM).

Thesis Option: Course Requirements

Thesis Option: Course Requirements

- Students must successfully complete NANO 600 Introduction to Nanotechnology, and 3 graduate courses (0.50 unit weight per course) counting towards degree credit from the University of Waterloo satisfying the following criteria:
  - At least 2 courses from Systems Design Engineering at the 500, 600 or 700 level.
  - At least 1 course from the Nanotechnology elective course list.
  - At least 1 course from the Systems Design Engineering core methods courses list.

    - A maximum of 2 courses may be taken from outside the Faculty of Engineering but must be from the Faculties of Mathematics, Health, Environment and/or Science.
    - At most 1 course at the 500 level.
- Note: it is possible that some students may need to take additional courses to meet the specific course requirements of the collaborative program.
- Nanotechnology elective courses:
    - BME 611/NANO 608/SYDE 684 Materials Biocompatibility
    - NANO 601 Characterization of Nanomaterials
    - NANO 602 Structure and Spectroscopy of Nanoscale Materials
    - NANO 603 Nanocomposites
    - NANO 604 Nanomechanics and Molecular Dynamics Simulations
    - NANO 605/SYDE 683 Design of MEMS & NEMS
    - NANO 606/SYDE 682 Advanced Micro Electro Mechanical Systems: Physics, Design & Fabrication
    - NANO 707 From Atoms to Crystals, Quantum Wells, Wires and Dots
- Systems Design Engineering core methods courses:
    - SYDE 600 Systems Theory, Models, Research & Design
    - SYDE 620 Fundamentals of Continuous System Models
    - SYDE 631 Time Series Modelling
    - SYDE 640 Experimental Design
    - SYDE 675 Pattern Recognition
- Core courses are designed to provide the base knowledge and skill set required to prepare students for more specialized courses and to conduct interdisciplinary nanoscale research.
- Students holding a Bachelor of Applied Science (BASc) degree in Nanotechnology Engineering or Master's degree in Nanotechnology at the University of Waterloo can not take NANO 600. Instead, they can choose 1 course from the list of nanotechnology elective courses.
- All course selections are arranged by the supervisor(s) in consultation with the student and are subject to the approval of the Associate Chair for Graduate Studies.
- Note: these requirements are in addition to satisfactory completion of any transitional courses that may be specified at the time of admission.
- Note: the Faculty of Engineering requires that no more than one-half of the courses used for credit toward a graduate degree may be taught by a candidate's supervisor(s). In the case of co-supervision in small research groups, it may be necessary to relax this rule; however, the student's file must contain a statement of formal approval from the Department and endorsement from the Associate Dean for Graduate Studies and Research in the Faculty of Engineering.

Thesis Option: Milestone Requirements

Proposed

Thesis Option: Milestone Requirements

Master's Thesis Proposal

- Students must develop and defend a thesis proposal that will be examined and approved by their supervisor and committee. The thesis proposal must be completed by the end of term 3. The composition of the committee is outlined in the Master's Thesis milestone description below.

Nanotechnology Seminar

- This seminar is a forum for student presentation of research results or proposals. Invited speakers from academia and industry will also present results of research from time to time. The range of topics that will be addressed in the seminar crosses all areas of research in the collaborative program. Each student is required to present at least one research seminar. To receive credit, students are required to attend seminars according to the Department's Seminar Policy posted on the Department of Systems Design Engineering website.

Master's Seminar

- Students are required to present a research seminar based on their thesis at the Systems Design Engineering Graduate Colloquium or at a publicly attended seminar administered by their supervisor and advertised by the Department. The thesis readers should be invited to attend the seminar.
- Note: The MASc Seminar may simultaneously count towards the Nanotechnology Seminar requirement of the Systems Design Engineering Department.

Seminar Attendance

- Students are required to attend an average of four University of Waterloo research seminars per full-time term and two per part-time term. It is the student's responsibility to attach a list of seminars attended to their activity report.
- To earn the seminar attendance milestone, the Department records should show that the number of seminars a student has attended is, at least, four times the number of terms the student has been registered as a full-time student in the Department.

Master's Thesis

- Students must submit a thesis embodying the results of independent research work to the satisfaction of an Examining Committee. The topic of the thesis is arranged by the supervisor(s) and the student. The composition of the Examining Committee must be as follows:
    - The student's supervisor(s).
    - At least one faculty member from within the Department of Systems Design Engineering.
    - At least one faculty member from outside the Department of Systems Design Engineering.

    - No more than one adjunct faculty member (including Professors Emeriti) may serve on the Examining Committee. Adjunct appointments require the approval of the Associate Dean, Graduate from the student's home Faculty.
    - At least two of the faculty members on the committee must be tenure or tenure-track.
- Before submitting their thesis for display, students must submit a graphical abstract for their thesis to the Department. Guidelines for the graphical abstract are available from the Department.

Existing

Thesis Option: Milestone Requirements

Nanotechnology Seminar

- This seminar is a forum for student presentation of research results or proposals. Invited speakers from academia and industry will also present results of research from time to time. The range of topics that will be addressed in the seminar crosses all areas of research in the collaborative program. Each student is required to present at least one research seminar. To receive credit, students are required to attend seminars according to the Department's Seminar Policy posted on the Department of Systems Design Engineering website.

Master's Seminar

- Students are required to present a research seminar based on their thesis at the Systems Design Engineering Graduate Colloquium or at a publicly attended seminar administered by their supervisor and advertised by the Department. The thesis readers should be invited to attend the seminar.
- Note: The MASc Seminar may simultaneously count towards the Nanotechnology Seminar requirement of the Systems Design Engineering Department.

Seminar Attendance

- Students are required to attend an average of four University of Waterloo research seminars per full-time term and two per part-time term. It is the student's responsibility to attach a list of seminars attended to their activity report.
- To earn the seminar attendance milestone, the Department records should show that the number of seminars a student has attended is, at least, four times the number of terms the student has been registered as a full-time student in the Department.

Master's Thesis

- Students must submit a thesis embodying the results of independent research work to the satisfaction of an Examining Committee. The topic of the thesis is arranged by the supervisor(s) and the student. The composition of the Examining Committee must be as follows:
    - The student's supervisor(s).
    - At least one faculty member from within the Department of Systems Design Engineering.
    - At least one faculty member from outside the Department of Systems Design Engineering.
    - No more than one adjunct faculty member (including Professors Emeriti) may serve on the Examining Committee. Adjunct appointments require the approval of the Associate Dean, Graduate from the student's home Faculty.
    - At least two of the faculty members on the committee must be tenure or tenure-track.
- Before submitting their thesis for display, students must submit a graphical abstract for their thesis to the Department. Guidelines for the graphical abstract are available from the Department.

Notes

- Systems Design Engineering website
- Master of Applied Science (MASc) in Systems Design Engineering - Nanotechnology future graduate students program page

Specializations

Undergraduate Plan Guidelines

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Engineering

Dependencies

There are no dependencies

MEng in Systems Design Engineering - Master of Engineering (MEng) in Systems Design Engineering

Top

Effective Date and Career

Career
Graduate

Effective Term and Year

Proposed

Effective Term and Year
Winter 2027

Existing

Effective Term and Year
Spring 2026

Proposal Details

Proposal Type
Change

Academic Unit Approval
2026-06-18

Quality Assurance Designation
Minor Modification Qad

Is there an impact to existing students?

Yes

Impact on Existing Students

No impact on current students registered in the program as these courses are not offered. If students have already taken courses that are being removed from the requirements, the courses will count toward the Graduate Specialization requirements.

Is the credential name changing?

No

Graduate Co-operative Requirements

Not Applicable

Change to Learning Outcomes

No

Rationale and Background for Change(s)

Replacing SYDE 544 Biomed Measure & SIP with BME 544 Biomedical Measurement and Signal Processing in the list of courses associated with the Graduate Specializations in "Biomedical Systems" and "Vision, Image and Signal Processing". Removing courses from the Graduate Specialization course lists that are no longer offered.

SYDE 544 has changed to BME 544, so the course lists are being updated accordingly. Several courses are no longer offered and need to be removed from the course requirements to avoid confusion.

General Program/Plan Information

Faculty

Faculty of Engineering

Academic Unit

Department of Systems Design Engineering

Graduate Field of Study

Systems Design Engineering

Faculty

Faculty of Engineering

Program/Plan Name

Master of Engineering (MEng) in Systems Design Engineering

Graduate Credential Type
Master's

Accelerated Program
Not applicable

Study Options (New)
Coursework

Admit Term(s)
Fall, Winter, Spring

Delivery Mode
On-campus

Length of Program

- Full-time: 4 terms (16 months)
- Part-time: 8 terms (32 months)

Registration Option(s)
Full-time, Part-time

Graduate Specializations

- Artificial Intelligence and Machine Learning
- Biomedical Systems
- Human Factors
- Mechatronics and Physical Systems
- Vision, Image and Signal Processing

Admissions

Admission Requirements: Minimum Requirements

- A 4-year Honours Bachelor’s degree in engineering. For applicants whose previous degree was completed in Canada, a 75% overall standing in the last two years, or equivalent (at the sole discretion of the University of Waterloo, in all cases), in a four-year Honour’s Bachelor's degree in engineering is the minimum requirement for admission to a Master's program.
- Due to the variable nature of international credentials, for applicants whose previous degree was completed outside of Canada, a 75% overall standing in a four-year Honours Bachelor's degree in engineering or equivalent is the minimum requirement for admission.
- Applicants who do not hold a Honours Bachelor’s degree in engineering must justify their suitability by demonstrating formal or informal training in engineering through the supplementary information form (SIF), their resume/CV, or other supporting material.
- English language proficiency (ELP) (if applicable)

Admission Requirements: Application materials

- Program-specific questions (PSQ)
- Résumé

- Transcript(s)

Admission Requirements: References

- Number of references: 2
- Type of references: a minimum of 1 academic reference. Applicants who complete their degree five or more years before the application date may submit 2 professional references.

Requirements Information

Graduate Degree Requirements

- Students must complete the course requirements listed below in addition to the Graduate Academic Integrity Module (Graduate AIM).

Coursework Option: Course Requirements

Coursework Option: Course Requirements

Proposed

Coursework Option: Course Requirements

- Students must complete the following 2 core Systems Design Engineering graduate courses:
  - SYDE 600 Systems Theory, Models, Research & Design
  - 1 of:
    - SYDE 660A Systems Design Graduate Workshop 1 - AI and Machine Learning,
    - SYDE 660B Systems Design Graduate Workshop 1 - Biomedical Systems,
    - SYDE 660C Systems Design Graduate Workshop 1 - Human Factors,
    - SYDE 660D Systems Design Graduate Workshop 1 - Mechatronic & Physical Systems,
    - SYDE 660E Systems Design Graduate Workshop 1 - Vision, Image & Signal Processing, or
    - SYDE 660 Systems Design Graduate Workshop 1
- In addition to the 2 core courses, students must complete 6 Engineering graduate courses (0.50 unit weight per course) counting towards degree credit from the University of Waterloo satisfying the following criteria:
  - At least 2 Systems Design Engineering courses at the 500, 600 or 700 level.
  - At most 2 courses at the 500 level.
  - At most 2 graduate courses may be taken from the Faculty of Mathematics.
- Students in the MEng in Systems Design Engineering program may also choose to pursue one of the following five Graduate Specializations:
  1. Artificial Intelligence and Machine Learning
  2. Biomedical Systems
  3. Human Factors
  4. Mechatronics and Physical Systems
  5. Vision, Image and Signal Processing
- A Graduate Specialization is a University credential that is recognized on the student's transcript but not on the diploma and is intended to reflect that a student has successfully completed a set of courses that together provide an in-depth study in the area of the Graduate Specialization. A student will only obtain the Graduate Specialization on their transcript if they have completed the requirements associated with the MEng degree and the requirements associated with the Graduate Specialization.
- All MEng Graduate Specializations in Systems Design Engineering consist of a set of 4 graduate (0.50 weight) level courses and this set is comprised of a mix of specified and elective courses. Specified courses are those that are prescribed as part of the Graduate Specialization. Elective courses are those that are on a list of courses designated as electives for a given Graduate Specialization. The requirements for each of the five Graduate Specializations are described below.

1. Graduate Specialization in Artificial Intelligence and Machine Learning

- Students must satisfy the following:
- 3 Specified courses:
  - SYDE 522 Machine Intelligence or SYDE 552 Computational Neurosciences
  - SYDE 660A Systems Design Graduate Workshop 1 – AI and Machine Learning
  - SYDE 675 Pattern Recognition
- Elective courses (at least 1 course from the following list):
  - SYDE 670 Deployment of Deep Learning Models
  - SYDE 671 Advanced Image Processing
  - SYDE 672 Statistical Image Processing
  - SYDE 673 Video Processing & Analytics

2. Graduate Specialization in Biomedical Systems

- Students must satisfy the following:
- 3 Specified courses:
  - BME 544 Biomedical Measurement and Signal Processing
  - SYDE 660B Systems Design Graduate Workshop 1 – Biomedical Systems3 Specified courses:
  - SYDE 684 Materials Biocompatability
- Elective courses (at least 1 course from the following list)
  - SYDE 552 Computational Neurosciences
  - SYDE 652 Dynamics of Multibody Systems
  - SYDE 677 Medical Imaging
- Note that only one 500 level course may be used to satisfy the requirements of a Graduate Specialization. Therefore, if BME 544 is taken as a Specified course, then SYDE 552 cannot be taken to satisfy the Elective course requirement.

3. Graduate Specialization in Human Factors

- Students must satisfy the following:
- 3 Specified courses:
  - SYDE 660C Systems Design Graduate Workshop 1 – Human Factors
  - At least 2 from the following list:
    - SYDE 542 Interface Design or SYDE 543 Cognitive Ergonomics
    - SYDE 642 Cognitive Engineering Methods
    - SYDE 644 Human Factors Testing
- Elective course (or an additional course from the Specified course list):
  - SYDE 533 Conflict Resolution
- Note that only one 500 level course may be used to satisfy the requirements of a Graduate Specialization. Therefore, if SYDE 542 or SYDE 543 is taken as a Specified course, then SYDE 533 cannot be taken to satisfy the Elective course requirement.

4. Graduate Specialization in Mechatronic and Physical Systems

- Students must satisfy the following:
- 3 Specified courses:
  - SYDE 660D Systems Design Graduate Workshop 1 - Mechatronic & Physical Systems
  - At least 2 from the following list:
    - SYDE 553 Advanced Dynamics
    - SYDE 652 Dynamics of Multibody Systems
    - SYDE 655 Optimal Control

        - SYDE 682 Advanced MEMS, Physics, Design & Fabrication
        - SYDE 683 Modelling, Simulation & Design of MEMS
    - Elective courses (at least 1 from the following list or an additional course from the Specified course list):
        - SYDE 531 Design Opt. under Probabilistic Uncertainty
        - SYDE 631 Time Series Modelling
    - Note that only one 500 level course may be used to satisfy the requirements of a Graduate Specialization. Therefore, if SYDE 553 is taken as a Specified course, then SYDE 531 cannot be taken to satisfy the Elective course requirement.

5. Graduate Specialization in Vision, Image and Signal Processing

- Students must satisfy the following:
- 3 Specified courses:
    - SYDE 660E Systems Design Graduate Workshop 1 - Vision, Image & Signal Processing
    - At least 2 from the following list:
        - SYDE 575 Image Processing
        - SYDE 671 Advanced Image Processing
        - SYDE 677 Medical Imaging
- Elective courses (at least 1 from the following list or an additional course from the Specified course list):
    - BME 544 Biomedical Measurement and Signal Processing
    - SYDE 633 Remote Sensing Systems
    - SYDE 672 Statistical Image Processing
    - SYDE 673 Video Processing & Analytics
    - SYDE 675 Pattern Recognition
- Note that only one 500 level course may be used to satisfy the requirements of a Graduate Specialization. Therefore, if SYDE 575 is taken as a specified course, then BME 544 cannot be taken to satisfy the Elective course requirement.
- All course selections are arranged by the student.
- Note: these requirements are in addition to satisfactory completion of any transitional courses that may be specified at the time of admission.
- For any Graduate Specialization, an equivalent course related to the Graduate Specialization may replace an elective course with the approval of the Department Graduate Officer. Additional 700-level courses relevant to the various Graduate Specializations may be offered periodically throughout the academic year. Students should contact the Graduate Coordinator to inquire about courses that align with their Graduate Specialization elective.

Existing

Coursework Option: Course Requirements

- Students must complete the following 2 core Systems Design Engineering graduate courses:
    - SYDE 600 Systems Theory, Models, Research & Design
    - 1 of:
        - SYDE 660A Systems Design Graduate Workshop 1 - AI and Machine Learning,
        - SYDE 660B Systems Design Graduate Workshop 1 - Biomedical Systems,
        - SYDE 660C Systems Design Graduate Workshop 1 - Human Factors,
        - SYDE 660D Systems Design Graduate Workshop 1 - Mechatronic & Physical Systems,
        - SYDE 660E Systems Design Graduate Workshop 1 - Vision, Image & Signal Processing, or
        - SYDE 660 Systems Design Graduate Workshop 1
- In addition to the 2 core courses, students must complete 6 Engineering graduate courses (0.50 unit weight per course) counting towards degree credit from the University of Waterloo satisfying the following criteria:
    - At least 2 Systems Design Engineering courses at the 500, 600 or 700 level.
    - At most 2 courses at the 500 level.
    - At most 2 graduate courses may be taken from the Faculty of Mathematics.
- Students in the MEng in Systems Design Engineering program may also choose to pursue one of the following five Graduate Specializations:
  1. Artificial Intelligence and Machine Learning
  2. Biomedical Systems
  3. Human Factors
  4. Mechatronics and Physical Systems
  5. Vision, Image and Signal Processing
- A Graduate Specialization is a University credential that is recognized on the student's transcript but not on the diploma and is intended to reflect that a student has successfully completed a set of courses that together provide an in-depth study in the area of the Graduate Specialization. A student will only obtain the Graduate Specialization on their transcript if they have completed the requirements associated with the MEng degree and the requirements associated with the Graduate Specialization.
- All MEng Graduate Specializations in Systems Design Engineering consist of a set of 4 graduate (0.50 weight) level courses and this set is comprised of a mix of specified and elective courses. Specified courses are those that are prescribed as part of the Graduate Specialization. Elective courses are those that are on a list of courses designated as electives for a given Graduate Specialization. The requirements for each of the five Graduate Specializations are described below.

1. Graduate Specialization in Artificial Intelligence and Machine Learning

- Students must satisfy the following:
- 3 Specified courses:
    - SYDE 522 Machine Intelligence or SYDE 552 Computational Neurosciences
    - SYDE 660A Systems Design Graduate Workshop 1 – AI and Machine Learning
    - SYDE 675 Pattern Recognition
- Elective courses (at least 1 course from the following list):
    - SYDE 662 Systems Design Graduate Workshop 2
    - SYDE 670 Deployment of Deep Learning Models
    - SYDE 671 Advanced Image Processing
    - SYDE 672 Statistical Image Processing
    - SYDE 673 Video Processing & Analytics

    - SYDE 674 3D Computer Vision & Imaging

2. Graduate Specialization in Biomedical Systems

- Students must satisfy the following:
- 3 Specified courses:
    - SYDE 660B Systems Design Graduate Workshop 1 – Biomedical Systems
    - At least 2 from the following list:
        - SYDE 544 Biomed Measure & SIP
        - SYDE 684 Materials Biocompatability
        - SYDE 750 Topic 20 Topics in Systems Modelling: Modeling of Biomechanical Systems
        - SYDE 750 Topic 36 Topics in Systems Modelling: Assistive Tech and Rehab Eng
- Elective courses (at least 1 from the following list or an additional course from the Specified course list)
    - SYDE 552 Computational Neurosciences
    - SYDE 556 Simulating Neurobiological Systems
    - SYDE 652 Dynamics of Multibody Systems
    - SYDE 662 Systems Design Graduate Workshop 2
    - SYDE 677 Medical Imaging
- Note that only one 500 level course may be used to satisfy the requirements of a Graduate Specialization. Therefore, if SYDE 544 is taken as a Specified course, then SYDE 552 and SYDE 556 cannot be taken to satisfy the Elective course requirement.

3. Graduate Specialization in Human Factors

- Students must satisfy the following:
- 3 Specified courses:
    - SYDE 660C Systems Design Graduate Workshop 1 – Human Factors
    - At least 2 from the following list:
        - SYDE 542 Interface Design or SYDE 543 Cognitive Ergonomics
        - SYDE 642 Cognitive Engineering Methods
        - SYDE 644 Human Factors Testing
- Elective courses (at least 1 from the following list or an additional course from the Specified course list):
    - SYDE 533 Conflict Resolution
    - SYDE 662 Systems Design Graduate Workshop 2
    - SYDE 740 Advanced Cognitive Ergonomics
- Note that only one 500 level course may be used to satisfy the requirements of a Graduate Specialization. Therefore, if SYDE 542 or SYDE 543 is taken as a Specified course, then SYDE 533 cannot be taken to satisfy the Elective course requirement.

4. Graduate Specialization in Mechatronic and Physical Systems

- Students must satisfy the following:
- 3 Specified courses:
    - SYDE 660D Systems Design Graduate Workshop 1 - Mechatronic & Physical Systems
    - At least 2 from the following list:
        - SYDE 553 Advanced Dynamics
        - SYDE 652 Dynamics of Multibody Systems
        - SYDE 655 Optimal Control
        - SYDE 682 Advanced MEMS, Physics, Design & Fabrication
        - SYDE 683 Modelling, Simulation & Design of MEMS
        - SYDE 750 Modelling Continuum Systems
- Elective courses (at least 1 from the following list or an additional course from the Specified course list):
    - SYDE 531 Design Opt. under Probabilistic Uncertainty
    - SYDE 631 Time Series Modelling
    - SYDE 661 Model-based robust design
    - SYDE 662 Systems Design Graduate Workshop 2
- Note that only one 500 level course may be used to satisfy the requirements of a Graduate Specialization. Therefore, if SYDE 553 is taken as a Specified course, then SYDE 531 cannot be taken to satisfy the Elective course requirement.

5. Graduate Specialization in Vision, Image and Signal Processing

- Students must satisfy the following:
- 3 Specified courses:
    - SYDE 660E Systems Design Graduate Workshop 1 - Vision, Image & Signal Processing
    - At least 2 from the following list:
        - SYDE 575 Image Processing
        - SYDE 671 Advanced Image Processing
        - SYDE 677 Medical Imaging
- Elective courses (at least 1 from the following list or an additional course from the Specified course list):
    - SYDE 544 Biomed Measure & SIP
    - SYDE 633 Remote Sensing Systems
    - SYDE 662 Systems Design Graduate Workshop 2
    - SYDE 672 Statistical Image Processing
    - SYDE 673 Video Processing & Analytics
    - SYDE 674 3D Computer Vision & Imaging
    - SYDE 675 Pattern Recognition
- Note that only one 500 level course may be used to satisfy the requirements of a Graduate Specialization. Therefore, if SYDE 575 is taken as a specified course, then SYDE 544 cannot be taken to satisfy the Elective course requirement.
- All course selections are arranged by the student.
- Note: these requirements are in addition to satisfactory completion of any transitional courses that may be specified at the time of admission.

Notes

- Systems Design Engineering website
- Master of Engineering (MEng) in Systems Design Engineering future graduate students program page

Specializations

Undergraduate Plan Guidelines

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Engineering

Dependencies

Prerequisites

- BE 606 - Entrepreneurship and Innovation — View Program
- BE 610 - Special Topics in Business and Entrepreneurship — View Program
- SYDE 600 - Systems Theory, Models, Research & Design — View Program

Graduate Studies
Program Revision Template

Prior to form submission, review the content revision instructions and information regarding major/minor modifications. For questions about the form submission, contact Trevor Clews, Graduate Studies and Postdoctoral Affairs (GSPA).

Faculty: Engineering

Program: Master of Architecture (MArch) - Water - Co-operative Program

Program contact name(s): Adrian Blackwell, Andri Efstathiou, Mark Anderton

Form completed by:

Description of proposed changes:
Note: changes to courses and milestones also require the completion/submission of the SGRC Graduate Studies Course/Milestone Form.

Adding a direct entry Co-operative option to the MArch - Water program.

Is this a major modification to the program? No

Rationale for change(s):

The School of Architecture is adding a direct entry co-operative option to the MArch - Water program to be consistent with the options of the regular MArch/MArch Co-op program. When the MArch - Water program went into effect years ago, the co-operative option was not implemented but over the years students have expressed interest in both the regular MArch - Water program and a MArch - Water co-operative option. The MArch programs distinguish requirements based on student's academic backgrounds and the proposed requirements will create a clear differentiation in coding between students entering into A) the two-year MArch stream (International students and Canadian students not coming from an accredited pre-professional program) and B) the one-year MArch stream (UW architecture undergrads and other Canadian CACB accredited pre-professional undergraduate programs). The proposed MArch - Water - Co-operative option will align with the current practice of the regular MArch/MArch Co-op program/option. There are no changes to the programs learning outcomes. The degree requirements of the proposed MArch - Water - Co-operative option are consistent with the regular MArch - Water program except for the co-op requirements.

The co-op program/option will be supported by Co-operative and Experiential Education (CEE). Attached is the Review that was completed by CEE.

Proposed effective date: Term: Spring Year: 2027

Current Graduate Studies Academic Calendar (GSAC) page (include the link to the web page where the changes are to be made):

https://uwaterloo.ca/academic-calendar/graduate-studies/catalog#/programs?group=Architecture

Current MArch - Water Graduate Studies Academic Calendar content:	**Proposed MArch - Water - Co-operative Program Graduate Studies Academic Calendar content**:
Master of Architecture (MArch) - Water **Admit term(s)**	**Master of Architecture (MArch) - Water - Co-operative Program (direct entry)**

Current MArch - Water Graduate Studies Academic Calendar content:	Proposed MArch - Water - Co-operative Program Graduate Studies Academic Calendar content:
• Fall **Delivery mode** • On-campus **Delivery mode information** • Cambridge campus **Registration option(s)** • Full-time **Program type(s)** • Collaborative **Study option(s)** • Thesis **Length of program** • Students can complete the program within a minimum of three terms and up to a maximum of six terms. Note that students need to submit a Request for extension beyond program time limits after term six. **Additional program information** • In Canada, all provincial/territorial associations/institutes/orders recommend a degree from an accredited professional degree program as a prerequisite for licensure. The Canadian Architectural Certification Board (CACB) is the sole agency authorized to accredit Canadian professional degree programs in architecture for the purposes of architectural licensure. • The professional Master of Architecture in conjunction with the pre-professional Bachelor of Architectural Studies degree from the University of Waterloo or other equivalent accredited architecture programs, together constitute an accredited professional education. • A program may be granted a six-year, three-year, or two-year term of accreditation, depending on its degree of conformance with established educational standards. The professional Master of Architecture in conjunction with the pre-professional Bachelor of Architectural Studies degree from the University of Waterloo is accredited by the Canadian Architectural Certification Board. • Note: The Master of Architecture curriculum covers the following key areas: Design; History and Theory; Building Technology; Professional Practice.	**Admit term(s)** • Fall **Delivery mode** • On-campus **Delivery mode information** • Cambridge campus **Registration option(s)** • Full-time **Program type(s)** • Co-operative • Collaborative **Study option(s)** • Thesis **Length of program** • Students can complete the program within a minimum of four terms and up to a maximum of nine terms. Note that students need to submit a Request for extension beyond program time limits after term six. **Additional program information** • In Canada, all provincial/territorial associations/institutes/orders recommend a degree from an accredited professional degree program as a prerequisite for licensure. The Canadian Architectural Certification Board (CACB) is the sole agency authorized to accredit Canadian professional degree programs in architecture for the purposes of architectural licensure. • The professional Master of Architecture in conjunction with the pre-professional Bachelor of Architectural Studies degree from the University of Waterloo or other equivalent accredited architecture programs, together constitute an accredited professional education. • A program may be granted a six-year, three-year, or two-year term of accreditation, depending on its degree of conformance with established educational standards. The professional Master of Architecture in conjunction with the pre-professional Bachelor of Architectural Studies degree from the University of Waterloo is accredited by the Canadian Architectural Certification Board. • Note: The Master of Architecture curriculum covers the following key areas: Design; History

Current MArch - Water Graduate Studies Academic Calendar content:	Proposed MArch - Water - Co-operative Program Graduate Studies Academic Calendar content:

Admission requirements: Minimum requirements
• ***Advanced stream:***
• Successful completion of any of the following pre-professional four-year Honours Bachelor of Architectural Studies (BAS) undergraduate degrees with a minimum overall average of 75%: expedited
  ○ University of Waterloo Honours Bachelor of Architectural Studies.
  ○ Canadian Architectural Certification Board (CACB) accredited pre-professional program (which must include the Comprehensive Building Design Studio and related technical Student Performance Criteria (SPCs) noted in the Canadian Architectural Certification Board).
  ○ National Architectural Accrediting Board (NAAB) accredited Bachelor of Architecture (BArch) from a US architecture program.
• Note: University of Waterloo Honours Bachelor of Architectural Studies program graduates who maintained a 75% average are automatically accepted to the MArch program. These students must apply but do not need to submit a Portfolio (as part of their application materials) and are required to submit only one letter of reference.
 	
• ***Standard stream:***
• Successful completion of any of the following:
  ○ An approved accredited, professional Bachelor of Architecture degree from a school outside of Canada with a minimum overall average of 75% or equivalent.
  ○ An approved four-year, honours pre-professional undergraduate Architecture degree in Canada with a minimum overall average of 75%.
  ○ An approved pre-professional undergraduate architecture degree from a US architecture program with a minimum overall average of 75%.
• Applicants must have completed an undergraduate architecture degree that included either a co-op or internship experience within Canada, or they must have been employed by an architecture firm in Canda or have equivalent industry experience.
• Applicants to the Standard stream that do not meet the above conditions must apply to the Master of Architecture (MArch) - Water - Co-operative Program (Standard stream).
	and Theory; Building Technology; Professional Practice.
	
	Admission requirements: Minimum requirements
	• ***Advanced stream:***
	• Successful completion of any of the following pre-professional four-year Honours Bachelor of Architectural Studies (BAS) undergraduate degrees with a minimum overall average of 75%:
	  ○ University of Waterloo Honours Bachelor of Architectural Studies.
	  ○ Canadian Architectural Certification Board (CACB) accredited pre-professional program (which must include the Comprehensive Building Design Studio and related technical Student Performance Criteria (SPCs) noted in the Canadian Architectural Certification Board).
	  ○ National Architectural Accrediting Board (NAAB) accredited Bachelor of Architecture (BArch) from a US architecture program.
	• Note: University of Waterloo Honours Bachelor of Architectural Studies program graduates who maintained a 75% average are automatically accepted to the MArch program. These students must apply but do not need to submit a Portfolio (as part of their application materials) and are required to submit only one letter of reference.
	
	• ***Standard stream:***
	• Successful completion of any of the following:
	  ○ An approved accredited, professional Bachelor of Architecture degree from a school outside of Canada with a minimum overall average of 75% or equivalent.
	  ○ An approved four-year, honours pre-professional undergraduate Architecture degree in Canada with a minimum overall average of 75%.
	  ○ An approved pre-professional undergraduate architecture degree from a US architecture program with a minimum overall average of 75%.
	• Applicants who have not completed three or more years of post-secondary study at an institution at which English was the language of instruction may be required to verify English Proficiency which may include a written exercise or interview as instructed by the School of Architecture. Details will be

Current MArch - Water Graduate Studies Academic Calendar content:	Proposed MArch - Water - Co-operative Program Graduate Studies Academic Calendar content:

• Applicants who have not completed three or more years of post-secondary study at an institution at which English was the language of instruction may be required to verify English Proficiency which may include a written exercise or interview as instructed by the School of Architecture. Details will be communicated when required after initial assessment of applications is complete. This is an additional departmental requirement and not a substitute for the English Language Proficiency Certification.
• English language proficiency (ELP) (if applicable)
 	
Admission requirements: Application materials
• Portfolio
  ○ Portfolio of design work – uploaded directly to the program application.
• Résumé/Curriculum vitae
• Statement of interest
  ○ Including a statement of the students proposed research interest.
• Transcript(s)
  ○ From each post-secondary institution attended (past or current) showing all courses and marks, along with the transcript legends/keys/grading scales uploaded to the program application. Degree certificates (if obtained) must be uploaded with the transcripts.
 	
Admission requirements: References
• Number of references: 2
• Type of references: academic
 	
Degree requirements
• Students must complete the course and milestone requirements listed below in addition to the Graduate Academic Integrity Module (Graduate AIM).
 	
Course requirements
• **Advanced stream**
• Students must complete the following courses in addition to 2 Water core courses:
• Year 1: Fall
  ○ ARCH 610 Architectural Research and Analysis
  ○ ARCH 692 Thesis Research and Design Studio I
  ○ ARCH 6XX or 7XX elective
• Year 1: Winter
	communicated when required after initial assessment of applications is complete. This is an additional departmental requirement and not a substitute for the English Language Proficiency Certification.
	• English language proficiency (ELP) (if applicable)
	• Applicants to the Standard stream, who meet the above admission conditions and who have completed an undergraduate architecture degree that included either a co-op or internship experience within Canada, who have been employed by an architecture firm in Canada, or have equivalent industry experience, can apply to the Master of Architecture (MArch) - Water Program (Standard stream).
	
	Admission requirements: Application materials
	• Portfolio
	  ○ Portfolio of design work – uploaded directly to the program application.
	• Résumé/Curriculum vitae
	• Statement of interest
	  ○ Including a statement of the students proposed research interest.
	• Transcript(s)
	  ○ From each post-secondary institution attended (past or current) showing all courses and marks, along with the transcript legends/keys/grading scales uploaded to the program application. Degree certificates (if obtained) must be uploaded with the transcripts.
	
	Admission requirements: References
	• Number of references: 2
	• Type of references: academic
	
	Degree requirements
	• Students must complete the course and milestone requirements listed below in addition to the Graduate Academic Integrity Module (Graduate AIM).
	• Students are required to complete WIL 601 Career Foundations for Work-Integrated Learning in their first academic term. Students must complete WIL 601 in addition to the program's course requirements.
	• The program requires successful completion of one credited standard work term. The work term takes place in term 3 (the Spring term in year 1). Note: the program must start and end on an academic term.

Current MArch - Water Graduate Studies Academic Calendar content:	Proposed MArch - Water - Co-operative Program Graduate Studies Academic Calendar content:
○ ARCH 655 Architectural Professional Practice: Ethics, Business, Legal Issues, and Contract Administration ○ ARCH 693 Thesis Research and Design Studio II ○ ARCH 6XX or 7XX elective • Year 1: Spring ○ ARCH 6XX or 7XX elective • Students are encouraged to use elective courses to explore areas of specialization in support of their thesis research. Students can substitute at most 1 ARCH 6XX or 7XX graduate elective with 1 WATER core course. 1 course (0.50 unit weight) may be an independent Architecture Reading Course. • Water core courses (delivered at main campus in Waterloo): ○ WATER 601 Integrated Water Management (typically offered in Year 1: Winter) ○ WATER 602 Integrated Water Management Project (typically offered in Year 2: Fall) • ***Standard stream:*** • Students must complete the following courses in addition to 2 Water core courses: • Year 1: Fall ○ ARCH 640 Contemporary Theory, Culture and Criticism ○ ARCH 662 Steel & Concrete: Design, Structure and Construction ○ ARCH 690 Design Studio • Year 1: Winter ○ ARCH 642 Modernism To The 21st Century ○ ARCH 671 Technical Report ○ ARCH 673 The Science of the Building Envelope ○ ARCH 691 Design Studio - Comprehensive Building Design • Year 2: Fall ○ ARCH 610 Architectural Research and Analysis ○ ARCH 640 Contemporary Theory, Culture and Criticism ○ ARCH 692 Thesis Research and Design Studio I ○ ARCH 6XX or 7XX elective • Year 2: Winter ○ ARCH 655 Architectural Professional Practice: Ethics, Business, Legal Issues, and Contract Administration ○ ARCH 693 Thesis Research and Design Studio II	**Course requirements** • **Advanced stream** • Students must complete the following courses in addition to 2 Water core courses: • Year 1: Fall ○ ARCH 610 Architectural Research and Analysis ○ ARCH 692 Thesis Research and Design Studio I ○ ARCH 6XX or 7XX elective • Year 1: Winter ○ ARCH 655 Architectural Professional Practice: Ethics, Business, Legal Issues, and Contract Administration ○ ARCH 693 Thesis Research and Design Studio II ○ ARCH 6XX or 7XX elective • Year 1: Spring: Co-op Work Term • Year 2: Fall ○ ARCH 6XX or 7XX elective • Students are encouraged to use elective courses to explore areas of specialization in support of their thesis research. Students can substitute at most 1 ARCH 6XX or 7XX graduate elective with 1 WATER core course. 1 course (0.50 unit weight) may be an independent Architecture Reading Course. • Water core courses (delivered at main campus in Waterloo): ○ WATER 601 Integrated Water Management (typically offered in Year 1: Winter) ○ WATER 602 Integrated Water Management Project (typically offered in Year 2: Fall) • ***Standard stream:*** • Students must complete the following courses in addition to 2 Water core courses: • Year 1: Fall ○ ARCH 640 Contemporary Theory, Culture and Criticism ○ ARCH 662 Steel & Concrete: Design, Structure and Construction ○ ARCH 690 Design Studio • Year 1: Winter ○ ARCH 642 Modernism To The 21st Century ○ ARCH 671 Technical Report ○ ARCH 673 The Science of the Building Envelope ○ ARCH 691 Design Studio - Comprehensive Building Design • Year 1: Spring: Co-op Work Term • Year 2: Fall

Current MArch - Water Graduate Studies Academic Calendar content:	Proposed MArch - Water - Co-operative Program Graduate Studies Academic Calendar content:
○ ARCH 6XX or 7XX elective • Year 2: Spring ○ ARCH 6XX or 7XX elective • Students are encouraged to use elective courses to explore areas of specialization in support of their thesis research. Students can substitute at most 1 ARCH 6XX or 7XX graduate elective with 1 WATER core course. 1 course (0.50 unit weight) may be an independent Architecture Reading Course. • Water core courses (delivered at main campus in Waterloo): ○ WATER 601 Integrated Water Management (typically offered in Year 1: Winter) ○ WATER 602 Integrated Water Management Project (typically offered in Year 2: Fall) • This degree is offered through the Collaborative Water Program. This program, jointly offered by a range of departments across several academic faculties, promotes the development of interdisciplinary perspectives on water. Collaborative Water Program students complete their specialist training in their respective home departments, while working with colleagues from a variety of other departments in core interdisciplinary courses (WATER 601 and WATER 602). **Milestone requirements** **Collaborative Research Seminar I** • Students are required to present a seminar on their thesis or major paper research proposal and, if appropriate, early stage results to current and past Water students and Water Institute faculty members. Seminars will normally occur following the completion of WATER 601 and WATER 602. Seminars will provide the opportunity for students to discuss how learnings from Water courses were applied in, or influenced, research proposals or research work in the student's home department. Seminars will normally be poster presentations at Water Institute organized events. The seminar is not an oral examination of the thesis or paper; rather, its purpose is to develop the student's ability to communicate their research in an organized and informative manner. **Master's Thesis in Design**	○ ARCH 610 Architectural Research and Analysis ○ ARCH 692 Thesis Research and Design Studio I ○ ARCH 6XX or 7XX elective • Year 2: Winter ○ ARCH 655 Architectural Professional Practice: Ethics, Business, Legal Issues, and Contract Administration ○ ARCH 693 Thesis Research and Design Studio II ○ ARCH 6XX or 7XX elective • Year 2: Spring ○ ARCH 6XX or 7XX elective • Students are encouraged to use elective courses to explore areas of specialization in support of their thesis research. Students can substitute at most 1 ARCH 6XX or 7XX graduate elective with 1 WATER core course. 1 course (0.50 unit weight) may be an independent Architecture Reading Course. • Water core courses (delivered at main campus in Waterloo): ○ WATER 601 Integrated Water Management (typically offered in Year 1: Winter) ○ WATER 602 Integrated Water Management Project (typically offered in Year 2: Fall) • This degree is offered through the Collaborative Water Program. This program, jointly offered by a range of departments across several academic faculties, promotes the development of interdisciplinary perspectives on water. Collaborative Water Program students complete their specialist training in their respective home departments, while working with colleagues from a variety of other departments in core interdisciplinary courses (WATER 601 and WATER 602). **Milestone requirements** **Graduate WIL Reflective Report** • The Graduate WIL Reflective Report requires students to critically reflect on their co-op work term experience, connecting academic knowledge to practical tasks and professional development. Students must complete one reflective report per required work term. The report is administered, evaluated, and graded by the Centre for Work-Integrated Learning.

Current MArch - Water Graduate Studies Academic Calendar content:	**Proposed MArch - Water - Co-operative Program Graduate Studies Academic Calendar content**:
• Students must undertake and complete a research and design thesis. The thesis is developed within ARCH 692 and ARCH 693 and must be completed within terms 3 to 6 from the start of ARCH 692. The thesis is supervised by a faculty advisor, and supported by a committee of one additional faculty member. The thesis must be presented and defended successfully before an Examining Committee composed of: ○ the student's supervisor or co-supervisors; and ○ an additional tenured or tenure track faculty member from the University of Waterloo; and ○ at least one additional examiner whose expertise can support the evaluation of the Master's thesis	• Students are responsible for following the roles and responsibilities of Cooperative and Experiential Education (CEE). **Collaborative Research Seminar I** • Students are required to present a seminar on their thesis or major paper research proposal and, if appropriate, early stage results to current and past Water students and Water Institute faculty members. Seminars will normally occur following the completion of WATER 601 and WATER 602. Seminars will provide the opportunity for students to discuss how learnings from Water courses were applied in, or influenced, research proposals or research work in the student's home department. Seminars will normally be poster presentations at Water Institute organized events. The seminar is not an oral examination of the thesis or paper; rather, its purpose is to develop the student's ability to communicate their research in an organized and informative manner. **Master's Thesis in Design** • Students must undertake and complete a research and design thesis (in Year 2). The thesis is developed within ARCH 692 and ARCH 693 and must be completed within 3 to 6 terms from the start of ARCH 692. The thesis is supervised by a faculty advisor, and supported by a committee of one additional faculty member. The thesis must be presented and defended successfully before an Examining Committee composed of a minimum of: ○ the student's supervisor or co-supervisors; and ○ an additional tenured or tenure track faculty member from the University of Waterloo; and ○ at least one additional examiner whose expertise can support the evaluation of the Master's thesis.

How will students currently registered in the program be impacted by these changes?

No students currently enrolled in the program will be affected. The changes only apply to incoming students.

Department/School approval date (mm/dd/yy): 07/22/26
Reviewed by GSPA (for GSPA use only) ☒ date (mm/dd/yy): 09/23/26
Faculty approval date (mm/dd/yy):

Senate Graduate & Research Council (SGRC) approval date (mm/dd/yy):
Senate approval date (mm/dd/yy) (if applicable):

CO-OPERATIVE AND EXPERIENTIAL EDUCATION
Co-operative Education
519-888-4026 | ceehub@uwaterloo.ca

Co-operative & Experiential Education (CEE) Review

Proposed Program: Master of Architecture Water, Co-op

Program Effective Date: Spring 2026

Requested by: School of Architecture

Prepared by: Brent Thornhill

Executive Summary

The School of Architecture has expressed intent to add a co-op component to the Master of Architecture, Water program, with its optional co-op milestone to be fully administered by Co-operative & Experiential Education (CEE). The proposed launch of the co-op option is currently targeting a first admission of fall 2027. Based on our review, CEE can support the WIL component of this program, with the expectation that the program operates in alignment with existing graduate co-op program requirements.

Architecture – Water students already have the option to pursue co-op, but currently have to choose between the Water or Co-op designation on their degree. Formalizing the co-op option of the program allows students to be recognized for taking co-op as part of the Water program. CEE will work with the School of Architecture ahead of the program launch to address system and records processing needs, WIL programming and job development opportunities. An industry and job analysis has been completed by CEE and is included as part of this review. Partnership with Architecture will be critical to successfully identifying and actioning an opportunity development strategy.

CEE will collaborate with the academic unit and utilize existing staff, resources, and processes across the portfolio, to support this new co-op program, with the understanding of approximately **5** students in this program for fall 2026.

CEE recommends the School of Architecture consider the following:

- Ensure admission requirements include direct admission to the co-op program so that potential barriers for international students who are required to obtain a co-op work permit to work in Canada are reduced.
- Ensure co-op degree requirements in the graduate calendar are up to date, specifically the one required co-op work term, typical academic/co-op sequence, the completion of WIL 601 (two terms ahead of the work term), and a work

report assessed by the faculty or a reflective report provided and assessed by CEE.

- Review the implications of involvement in WIL as related to items such as, but not limited to, student statuses, milestone completion requirements (work term and work report), fee schedule, funding packages and scholarships.
- Share existing employer contacts with CEE to manage the ongoing co-op hiring relationship.

CEE, with leadership from the designated Faculty Relations Manager, will:

- Complete an industry and job analysis for the Master of Architecture, Water program as a basis for an Industry Relations opportunity development strategy.
- Collaborate with the Associate Director, Graduate Studies in the School of Architecture to work through the Co-op program plan, as well as processes to support students who may not successfully complete co-op requirements.
- Support programs with content for recruitment materials and recommended student communication (e.g., information on resources and supports) ahead of the start of studies and during orientation programming.

Work-Integrated Learning at UW

Work integrated learning (WIL) allows students to apply classroom learning to the workplace and, likewise, connect workplace learning to their degree and areas of specialization. For those students who are seeking a stronger connection between their studies and industry, the University of Waterloo's co-op and WIL programs distinguish it amongst Canadian institutions. Furthermore, CEE provides a robust system of support for students (domestic and international visa) seeking work experiences in Canada or internationally.

Benefits go beyond the students. Industry partners benefit by gaining access to a wider range of undergraduate and graduate students who bring varied experiences personally, professionally, and academically. All stakeholders will benefit from opportunities for idea exchange and strengthened connection between academic research and innovations in industry.

Moving a CEE administered work-integrated learning plan to an existing graduate program aligns with the strategic focus on GradWIL at an institutional level and will continue to reinforce UW as a WIL leader for both undergraduate and graduate programs.

The key components of a quality WIL experience are pedagogy, experience, assessment and reflection, or P.E.A.R. Making sure all four elements are included in the development of program-level WIL are critical for creating a qualify WIL experience.

- Pedagogy – includes the academic course content and the WIL curriculum
- Experience – meaningful and aligned appropriately with the WIL model
- Assessment – including the learning outcomes for the program + Future Ready Talent Framework
- Reflection – on the WIL experience and in alignment with the idea of "purposeful work"

Co-op Program Structure

The Master of Architecture, Water program will follow proposed changes to the existing WIL models based on outcomes of the GradWIL project. All students are responsible for following the procedures, roles and responsibilities of co-op students.

Co-op students will be required to complete WIL 601 prior to their co-op recruitment term (for full-time students, typically completed in their first study term). In WIL 601 students will identify, evaluate and articulate current skillsets and the competencies they are developing in graduate school, as well as critically reflect on their career values and goals.

The Centre for Career Development (CCD) provides career and work term preparation resources and services (e.g.: resume, cover letter, interview preparation, job search, etc.) for all graduate students. These services are accessed more readily when promoted by the academic program or incorporated into existing courses. Additional collaboration between the School of Architecture, Student and Faculty Relations and CCD may be required prior to Spring 2026 to establish how existing services and staff will be utilized.

Work terms must meet standard work term requirements for all Master of Architecture, Water students. Architecture students will have access to the co-op job boards through WaterlooWorks or may arrange their own employment externally, which must be approved by CEE. During the experience, graduate students will be supported by Co-op Advisors through site visits, e-check-ins, and work term ratings. Employers will evaluate the work performance of students via the Student Performance Evaluation (SPE); a rating of 'marginal' or above will grant the milestone for the course.

The program will facilitate a work report or reflection assignment post-experience, which will also be a requirement for the work term completion. CEE is currently developing a graduate-level work term reflection – more information to follow.

To evaluate program effectiveness and WIL outcomes, the CEE Faculty Relations Manager, Architecture, will monitor and share key metrics annually to ensure program quality.

Sequence

All incoming students will be admitted to the co-op program, with a non-co-op option available as a transfer-in option.

Students in the Master of Architecture - Water program will be scheduled for one work term, typically after two academic terms.

Master of Architecture, Water co-op sequence:

Fall	Winter	Spring	Fall
Study WIL 601	Study Co-op Recruiting Term	Work term Work Report/Reflection	Study

Admissions

Programs seeking to add a co-op component must create a direct-entry program (plan code). There are a range of benefits to this structure, including CEE's ability to forecast earlier the number of students expected to be scheduled for a work term from the program and adjust employer and student-facing resources as necessary. Most notably, CEE can assist visa students in their work permit applications upon program admission, ensuring work terms are not negatively impacted by processing times.

As the industry and job analysis is completed, CEE will have a clearer picture of where students may find work (employers as well as geographic locations). When marketing the program to prospective students, this information will be key to ensuring students are making an informed choice in choosing the program.

Program Plan Codes

Specific plan codes must exist to differentiate between co-op and non-co-op plans and students. In some instances, plan codes may already exist, while in others, new plan codes will need to be created/approved.

Plan Code	Plan Description	Plan exists
TBD	Master of Architecture, Water Co-op	N
ARCHWM	Master of Architecture, Water	Y

ARCHMC	Master of Architecture, Co-op	Y

Degree Requirements

Co-op Graduate students requirements include successful completion of:

- WIL 601: Career Foundations for Work-Integrated Learning
- Completion of the work term milestone with a Student Performance Evaluation of 'marginal' or better
- Completion of a work/reflective report

Students unsuccessful in successfully completing these requirements will be able to transfer to the non-co-op program. It is the responsibility of the program to ensure students understand deadlines for transferring to the non-co-op option to avoid additional fees.

Graduate Student Support

The Centre for Career Development (CCD) is in the Tatham Centre at the Waterloo campus and provides support to all undergrad and grad students alumni and staff with co-op, WIL and career planning and preparation. Existing services include 1:1 appointments for resumes, cover letters, interview skills, work search, career planning and others, 1:1 drop-ins, workshops, both on and offline resources and supports all offered through a dedicated team of existing co-op and career staff.

Master of Architecture, Water students will be assigned to a dedicated CEE Advisor for the entirety of their program. The CEE Advisor can provide answers to co-op related questions as well as support throughout the job recruitment process.

Job Scoping

The School of Architecture's expectation is that students in the Mater of Architecture, Water program will participate in the same employment opportunities in other Master of Architecture co-op programs.

Should the labour market evolve differently for the Master of Architecture, Water program, a labour market analysis will be completed by the Faculty Relations Manager (Architecture). The analysis will include a review of the labour market, job demands, and areas for business development. Input and engagement from the School of Architecture will ensure this analysis aligns with the goals of the program and create key partnerships and facilitate potential co-op work term opportunities already identified by the program.

Best efforts will be made to support graduate students in their job search. For example, CEE has proactively been engaged with Mitacs and the funding they have access to for WIL at the graduate level. Existing services and expertise in CCD will be leveraged to support students in their job search, noting that the new program plan will examine the resources required to provide these supports.

Student Status and Fees

The proposed cost for one work term will be based on the co-op fee and paid by the program (as opposed to the student) as co-op students do continue paying tuition during their work term. The program will be assessed two co-op fees, based on the approved fee structure for graduate co-op programs. The fee is paid during the work term (typically spring). The current co-op fee can be found on the co-op website and the program will be assessed the equivalent of two fees student participating in a scheduled work term.

International Students and Work Experiences

The CEE international team will support work terms held outside of Canada, adhering to UW and Global Affairs Canada (GAC) travel polices and advisories.

Students studying on a visa must obtain a co-op work permit to find employment for a work term. Applying for a Co-op/WIL work permit in Canada can take several months, with recent processing times taking at least six months. Requiring direct admissions to the co-op program allows students to apply earlier and avoid delaying co-op employment.

Co-op Program Plan

Following all levels of academic program approval for these programs and before the first term of admission, a Co-op Program Plan will be required. The Program Plan is a checklist of information, records, system, communications, etc., that ensures CEE administered plans are set-up appropriately and necessary decisions are made. This is a collaborative activity led by a designated Faculty Relations Manager and the academic unit.

Richard Wikkerink

May 25, 2026
Date

Director, Student & Faculty Relations
Co-operative and Experiential Education

Maya Przbylski

July 9, 2026
Date

O'Donovan Director/Associate Professor
School of Architecture

Adrian Blackwell

June 18, 2026
Date

Associate Director, Graduate Studies
School of Architecture

UNIVERSITY OF WATERLOO | Senate

For Approval **Open Session - Consent**

To:	Senate Graduate Council
From:	Ian Rowlands Associate Dean, Graduate Studies
Date of Meeting:	November 2, 2026
Agenda Item:	**3.2.2. Faculty of Environment**

Recommendation/Motion

To recommend that Senate Graduate Council approve, through its consent agenda, the submitted course changes for the Faculty of Environment, effective January 1, 2027, as presented.

Jurisdictional Information

As outlined in the council's Terms and Reference, Senate Graduate Council is empowered to make recommendation and approvals on behalf of Senate for a variety of matters:

- On behalf of Senate, consider and approve all new graduate courses, the deletion of graduate courses, and proposed minor modifications to existing graduate courses and programs, and provide Senate with a brief summary of Council's deliberations in this regard.

Governance Path

Senate Graduate Council: November 2, 2026

Date 2026/10/23

Show Empty Fields

Meeting Information

Agenda Page Title
SGC - Faculty of Environment - Consent Agenda - November 2, 2026

Career Level
Graduate,

Faculty/Unit
Environment

Date
2026-11-02

Summary

Course Proposals:

1) Environment, Enterprise and Development

a. *1 course revision*

2) Environment, Resources and Sustainability

a. *1 course revision*

3) Geography and Environmental Management

a. *1 course revision*

Other Business

Attachment(s)

Course Proposals

Courses: Retire
No proposals have been added.

Courses: New
No proposals have been added.

Courses: Changes

Code	Title	Type	Workflow Step
DEVP 606	Energy Sustainability	Courses	SGC, Senate Graduate Council (SGC)
ERS 619	Energy Sustainability	Courses	SGC, Senate Graduate Council (SGC)

GEOG 669	Energy Sustainability	Courses	SGC, Senate Graduate Council (SGC)

Programs & Plans Proposals

Programs & Plans: Retire
No proposals have been added.

Programs & Plans: Major Modifications
No proposals have been added.

Programs & Plans: Minor Modifications
No proposals have been added.

Regulations Proposals

Regulations: Retire
No proposals have been added.

Regulations: New
No proposals have been added.

Regulations: Changes
No proposals have been added.

DEVP 606 - Energy Sustainability

Top

Effective Date & Career

Career
Graduate

Effective Term and Year

Proposed

Effective Term and Year
Winter 2027

Existing

Effective Term and Year
Spring 2025

Quest Course ID
12666

Offering Number
3

Proposal Details

Proposal Type
Change

Academic Unit Approval
2026-05-29

Unit Weight/Number Changes
No

Rationale and Background for Change

SYDE 639 is being added to the existing DEVP 606/ERS 619/GEOG 669 cross-listing. The course will be particularly valuable for SYDE graduate students conducting research in energy systems. The material directly supports their degree requirements by providing foundational and applied knowledge relevant to contemporary energy research, systems modeling, and engineering decision-making. All units involved in the cross-listing have been consulted and are supportive of the proposed change.

Course Information

Faculty

Faculty of Environment

Academic Unit

School of Environment, Enterprise and Development

Subject Code

DEVP

Number

606

Is this course cross-listed?

Yes

Cross-Listed Courses

Proposed

Cross-Listed Courses

SYDE 639 - Energy Sustainability

Existing

Cross-Listed Courses

Title

Energy Sustainability

Abbreviated Title

Energy Sustainability

Description

Renewable and non-renewable energy supply systems are compared using economic and environmental measures. Consumption trends, conservation options and choices are considered at the household, community and global scales. Projects are used to demonstrate the economic and environmental challenges in the design of sustainable energy systems. *eligible for MES.

Units

0.50

Exceptions to Fees or Academic Progress Units

No

Components

Lecture Reading Seminar

Primary Component

Lecture

Grading Information

Grading Basis
Numerical Grading Basis

Repeatable Courses

Can this course be repeated for credit?
No

Enrolment Rules

Consent to Add
No consent required

Consent to Drop
No consent required

Prerequisites

Corequisites

Antirequisites

Course Notes

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Environment

Dependencies

There are no dependencies

ERS 619 - Energy Sustainability

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Effective Date & Career

Career	Effective Term and Year	Quest Course ID	Offering Number

Graduate	Proposed **Effective Term and Year** Winter 2027 Existing **Effective Term and Year** Spring 2025	12666	2

Proposal Details

Proposal Type
Change

Academic Unit Approval
2026-03-30

Unit Weight/Number Changes
No

Rationale and Background for Change

SYDE 639 is being added to the existing DEVP 606/ERS 619/GEOG 669 cross-listing. The course will be particularly valuable for SYDE graduate students conducting research in energy systems. The material directly supports their degree requirements by providing foundational and applied knowledge relevant to contemporary energy research, systems modeling, and engineering decision-making. All units involved in the cross-listing have been consulted and are supportive of the proposed change.

Course Information

Faculty
Faculty of Environment

Academic Unit
School of Environment, Resources and Sustainability

Subject Code
ERS

Number
619

Is this course cross-listed?
Yes

Cross-Listed Courses

Proposed

Cross-Listed Courses
SYDE 639 - Energy Sustainability

Existing

Cross-Listed Courses

Title

Energy Sustainability

Abbreviated Title
Energy Sustainability

Description
Renewable and non-renewable energy supply systems are compared using economic and environmental measures. Consumption trends, conservation options and choices are considered at the household, community and global scales. Projects are used to demonstrate the economic and environmental challenges in the design of sustainable energy systems. *eligible for MES.

Units
0.50

Exceptions to Fees or Academic Progress Units
No

Components
Lecture Reading Seminar

Primary Component
Lecture

Grading Information

Grading Basis
Numerical Grading Basis

Repeatable Courses

Can this course be repeated for credit?
No

Enrolment Rules

Consent to Add
No consent required

Consent to Drop
No consent required

Prerequisites

Corequisites

Antirequisites

Course Notes

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Environment

Dependencies

There are no dependencies

GEOG 669 - Energy Sustainability

Top

Effective Date & Career

Career
Graduate

Effective Term and Year

Proposed

Effective Term and Year
Winter 2027

Existing

Effective Term and Year
Spring 2025

Quest Course ID
12666

Offering Number
1

Proposal Details

Proposal Type
Change

Academic Unit Approval
2026-04-19

Unit Weight/Number Changes
No

Rationale and Background for Change

SYDE 639 is being added to the existing DEVP 606/ERS 619/GEOG 669 cross-listing. The course will be particularly valuable for SYDE graduate students conducting research in energy systems. The material directly supports their degree requirements by providing foundational and applied knowledge relevant to contemporary energy research, systems modeling, and engineering decision-making. All units involved in the cross-listing have been consulted and are supportive of the proposed change.

Course Information

Faculty

Faculty of Environment

Academic Unit

Department of Geography and Environmental Management

Subject Code

GEOG

Number

669

Is this course cross-listed?

Yes

Cross-Listed Courses

Proposed

Cross-Listed Courses

SYDE 639 - Energy Sustainability

Existing

Cross-Listed Courses

Title

Energy Sustainability

Abbreviated Title

Energy Sustainability

Description

Renewable and non-renewable energy supply systems are compared using economic and environmental measures. Consumption trends, conservation options and choices are considered at the household, community and global scales. Projects are used to demonstrate the economic and environmental challenges in the design of sustainable energy systems. *eligible for MES.

Units

0.50

Exceptions to Fees or Academic Progress Units

No

Components

Lecture Reading Seminar

Primary Component

Lecture

Grading Information

Grading Basis

Numerical Grading Basis

Repeatable Courses

Can this course be repeated for credit?
No

Enrolment Rules

Consent to Add
No consent required

Consent to Drop
No consent required

Prerequisites

Corequisites

Antirequisites

Course Notes

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Environment

Dependencies

There are no dependencies

[redacted]

UNIVERSITY OF WATERLOO | Senate

For Approval **Open Session - Consent**

To:	Senate Graduate Council
From:	Barbara Csima Associate Dean, Graduate Studies
Date of Meeting:	November 2, 2026
Agenda Item:	**3.2.3. Faculty of Mathematics**

Recommendation/Motion

To recommend that Senate Graduate Council approve, through its consent agenda, the submitted new graduate courses, the deletion of graduate courses, and proposed minor modifications to existing graduate courses and programs for the Faculty of Mathematics, effective January 1, 2027, as presented.

Jurisdictional Information

As outlined in the council's Terms and Reference, Senate Graduate Council is empowered to make recommendation and approvals on behalf of Senate for a variety of matters:

- On behalf of Senate, consider and approve all new graduate courses, the deletion of graduate courses, and proposed minor modifications to existing graduate courses and programs, and provide Senate with a brief summary of Council's deliberations in this regard.

Governance Path

Senate Graduate Council: November 2, 2026

Date 2026/10/22

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Meeting Information

Agenda Page Title
SGC - Faculty of Mathematics - Consent Agenda - November 2, 2026

Career Level
Graduate,

Faculty/Unit
Mathematics

Date
2026-11-02

Summary

Course Proposals:

1) Applied Mathematics:

a. *4 courses being inactivated*
b. *5 new courses*
c. *1 course revision*

2) Combinatorics and Optimization:

a. *1 new course*

3) Computer Science:

a. *1 course revision*

4) Pure Mathematics:

a. *1 new course*

5) Mathematics for Teachers:

a. *1 course being inactivated*
b. *15 course revisions (attached)*

Program Proposals:

1) Applied Mathematics (attached):
1.1) PhD in Applied Mathematics
1.2) PhD in Applied Mathematics - Aeronautics
1.3) PhD in Applied Mathematics - Quantum Information
1.4) PhD in Applied Mathematics - Water
1.5) MMath in Applied Mathematics
1.6) MMath in Applied Mathematics - Aeronautics
1.7) MMath in Applied Mathematics - Co-operative Program
1.8) MMath in Applied Mathematics - Quantum Information
1.9) MMath in Applied Mathematics - Water

a. *Adding a "Colloquium Attendance" milestone to the degree requirements.*

2) Combinatorics and Optimization:
2.1) MMath in Combinatorics and Optimization
2.2) MMath in Combinatorics and Optimization - Co-operative Program

a. *Revising the GSAC to reflect that the Master's Research Paper study option is transfer-in entry only.*

3) Mathematics for Teachers:

3.1) Mathematics for Teacher (MMT)

a. *Articulating and lowering the minimum length of program.*

Attachment(s)

- MATH 600 & 692 Prerequisites - graduate_studies_course_milestone_form - Reviewed by GSPA.pdf
- AMATH - New Milestone - graduate_studies_program_revision_template - Reviewed by GSPA - Updated.pdf

Course Proposals

Courses: Retire

Code	Title	Type	Workflow Step
AMATH 851	Stability Theory and Applications	Courses	SGC, Senate Graduate Council (SGC)
AMATH 855	Advanced Systems Analysis and Control	Courses	SGC, Senate Graduate Council (SGC)
AMATH 863	Hydrodynamic Stability and Turbulence	Courses	SGC, Senate Graduate Council (SGC)
AMATH 867	Dispersive and Nonlinear Waves	Courses	SGC, Senate Graduate Council (SGC)
MATH 680	History of Mathematics	Courses	SGC, Senate Graduate Council (SGC)

Courses: New

Code	Title	Type	Workflow Step
AMATH 813	Advanced Fluid Mechanics	Courses	SGC, Senate Graduate Council (SGC)
AMATH 823	Advanced Mathematical Physics	Courses	SGC, Senate Graduate Council (SGC)
AMATH 833	Advanced Mathematical Biology and Medicine	Courses	SGC, Senate Graduate Council (SGC)
AMATH 843	Advanced Scientific Computing Methods	Courses	SGC, Senate Graduate Council (SGC)
AMATH 853	Advanced Dynamical Systems and Control Theory	Courses	SGC, Senate Graduate Council (SGC)
CO 636	Combinatorial Algebraic Geometry	Courses	SGC, Senate Graduate Council (SGC)
PMATH 663	Combinatorial Algebraic Geometry	Courses	SGC, Senate Graduate Council (SGC)

Courses: Changes

Code	Title	Type	Workflow Step
AMATH 905	Reading Course	Courses	SGC, Senate Graduate Council (SGC)
CS 738	Data Engineering for Data Science	Courses	SGC, Senate Graduate Council (SGC)

Programs & Plans Proposals

Programs & Plans: Retire
No proposals have been added.

Programs & Plans: Major Modifications
No proposals have been added.

Programs & Plans: Minor Modifications

Code	Title	Type	Workflow Step

MMath in Combinatorics & Optimization	Master of Mathematics (MMath) in Combinatorics and Optimization	Programs	SGC, Senate Graduate Council (SGC)
MMath in Combinatorics & Optimization-Co-op	Master of Mathematics (MMath) in Combinatorics and Optimization - Co-operative Program	Programs	SGC, Senate Graduate Council (SGC)
Master of Mathematics for Teachers (MMT)	Master of Mathematics for Teachers (MMT)	Programs	SGC, Senate Graduate Council (SGC)

Regulations Proposals

Regulations: Retire
No proposals have been added.

Regulations: New
No proposals have been added.

Regulations: Changes
No proposals have been added.

AMATH 851 - Stability Theory and Applications

Top

Effective Date & Career

Career
Graduate

Effective Term and Year
Proposed

Effective Term and Year
Winter 2027

Existing

Effective Term and Year
Fall 2023

Quest Course ID
11285

Offering Number
1

Proposal Details

Proposal Type
Retire

Academic Unit Approval
2026-06-22

Last Offering of Course
-

Retired Impact
No

Rationale and Background for Change

This course has not been taught for some time; we are cleaning up the Calendar since we are creating new graduate courses.

Course Information

Faculty

Faculty of Mathematics

Academic Unit

Department of Applied Mathematics

Subject Code
AMATH

Number
851

Is this course cross-listed?
No

Title
Stability Theory and Applications

Abbreviated Title
Stability Theory & Application

Description
Concepts of stability and boundedness, basic stability criteria, comparison methods, large scale systems, method of decomposition and aggregation, method of several Lyapunov functions, method of vector Lyapunov functions, method of higher derivatives. Stability problems in ecology, mechanics, neural networks and control systems. Students should have completed AM751 or equivalent.

Units
0.50

Exceptions to Fees or Academic Progress Units
No

Components

Lecture

Primary Component
Lecture

Grading Information

Grading Basis
Numerical Grading Basis

Repeatable Courses

Can this course be repeated for credit?
No

Enrolment Rules

Consent to Add

Consent to Drop

No consent required

No consent required

Prerequisites

Corequisites

Antirequisites

Course Notes

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Mathematics

Dependencies

There are no dependencies

AMATH 855 - Advanced Systems Analysis and Control

Top

Effective Date & Career

Career
Graduate

Effective Term and Year

Proposed

Effective Term and Year
Winter 2027

Existing

Effective Term and Year
Fall 2023

Quest Course ID
132

Offering Number
1

Proposal Details

Proposal Type
Retire

Academic Unit Approval
2026-06-22

Last Offering of Course
-

Retired Impact
No

Rationale and Background for Change

This course has not been taught for some time; we are cleaning up the Calendar since we are creating new graduate courses.

Course Information

Faculty
Faculty of Mathematics

Academic Unit
Department of Applied Mathematics

Subject Code
AMATH

Number
855

Is this course cross-listed?
No

Title
Advanced Systems Analysis and Control

Abbreviated Title
Adv Systems Analysis & Control

Description
The main theme is the extension of control theory beyond systems modelled by linear ordinary differential equations. Topics include: advanced systems theory, control of nonlinear systems, control of partial differential equations and delay equations. Students should have completed an introductory undergraduate course in control theory.

Units
0.50

Exceptions to Fees or Academic Progress Units
No

Components
Lecture

Primary Component
Lecture

Grading Information

Grading Basis
Numerical Grading Basis

Repeatable Courses

Can this course be repeated for credit?
No

Enrolment Rules

Consent to Add
No consent required

Consent to Drop
No consent required

Prerequisites

Corequisites

Antirequisites

Course Notes

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Mathematics

Dependencies

There are no dependencies

AMATH 863 - Hydrodynamic Stability and Turbulence

Top

Effective Date & Career

Career
Graduate

Effective Term and Year
Proposed

Effective Term and Year
Winter 2027

Existing

Quest Course ID
133

Offering Number
1

Effective Term and Year
Fall 2023

Proposal Details

Proposal Type
Retire

Academic Unit Approval
2026-06-22

Last Offering of Course
-

Retired Impact
No

Rationale and Background for Change

This course has not been taught for some time; we are cleaning up the Calendar since we are creating new graduate courses.

Course Information

Faculty
Faculty of Mathematics

Academic Unit
Department of Applied Mathematics

Subject Code
AMATH

Number
863

Is this course cross-listed?
No

Title
Hydrodynamic Stability and Turbulence

Abbreviated Title
Hydrodyn Stability/Turbulence

Description
Mathematical methods, stability of parellel flows for unstratified and stratified fluids, Rayleigh-Taylor instability, centrifugal instability, barotropic and baroclinic instabilities, the effects of viscosity and the Orr-Sommerfeld equation, transition to turbulence, averaged equations, closure problem, homogeneous isotropic turbulence, turbulent boundary layers, effects of stratification. Students should have completed an introductory undergraduate course in fluid mechanics.

Units
0.50

Exceptions to Fees or Academic Progress Units
No

Components

Lecture

Primary Component
Lecture

Grading Information

Grading Basis
Numerical Grading Basis

Repeatable Courses

Can this course be repeated for credit?
No

Enrolment Rules

Consent to Add
No consent required

Consent to Drop
No consent required

Prerequisites

Corequisites

Antirequisites

Course Notes

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow

Faculty of Mathematics

Dependencies

There are no dependencies

AMATH 867 - Dispersive and Nonlinear Waves

Top

Effective Date & Career

Career
Graduate

Effective Term and Year

Proposed

Effective Term and Year
Winter 2027

Existing

Effective Term and Year
Fall 2023

Quest Course ID
134

Offering Number
1

Proposal Details

Proposal Type
Retire

Academic Unit Approval
2026-06-22

Last Offering of Course
-

Retired Impact
No

Rationale and Background for Change

This course has not been taught for some time; we are cleaning up the Calendar since we are creating new graduate courses.

Course Information

Faculty
Faculty of Mathematics

Academic Unit
Department of Applied Mathematics

Subject Code
AMATH

Number
867

Is this course cross-listed?
No

Title
Dispersive and Nonlinear Waves

Abbreviated Title
Dispersive and Nonlinear Waves

Description
Dispersive waves, propagation of dispersive waves in an inhomogeneous medium (WKB theory). Nonlinear resonant interactions. Solitons: completely integrable nonlinear wave equations (e.g., the Kd V equation, nonlinear Schrodinger equations) and the inverse Scattering Transform. Applications to water waves and nonlinear optics. Introduction to weakly nonlocal solitary waves and beyond-all-orders asymptotics. Completion of an upper year course in partial differential equations is strongly recommended.

Units
0.50

Exceptions to Fees or Academic Progress Units
No

Components
Lecture

Primary Component
Lecture

Grading Information

Grading Basis
Numerical Grading Basis

Repeatable Courses

Can this course be repeated for credit?
No

Enrolment Rules

Consent to Add
No consent required

Consent to Drop
No consent required

Prerequisites

Corequisites

Antirequisites

Course Notes

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Mathematics

Dependencies

There are no dependencies

MATH 680 - History of Mathematics

Top

Effective Date & Career

Career
Graduate

Effective Term and Year

Proposed

Effective Term and Year
Winter 2027

Existing

Effective Term and Year
Fall 2023

Quest Course ID
13842

Offering Number
1

Proposal Details

Proposal Type
Retire

Academic Unit Approval
2026-09-16

Last Offering of Course
-

Retired Impact
No

Rationale and Background for Change

MATH 680 is being removed from the course catalog as it is no longer offered. The course was replaced by MATH 682 and MATH 683 in Winter 2020.

Course Information

Faculty
Faculty of Mathematics

Academic Unit
Dean of Mathematics Office

Subject Code
MATH

Number
680

Is this course cross-listed?
No

Title
History of Mathematics

Abbreviated Title
History of Mathematics

Description
We explore the who, where, when and why of some of the most important ideas in mathematics. Topics include: William T. Tutte and Decryption, Euclid and the Delian Problem, Archimedes and his estimate of Pi, Al Khwarizmi and Islamic mathematics, Durer and the Renaissance, Descartes and Analytic Geometry, and Kepler and Planetary Motion.

Units
0.50

Exceptions to Fees or Academic Progress Units
No

Components
Lecture

Primary Component
Lecture

Grading Information

Grading Basis
Numerical Grading Basis

Repeatable Courses

Can this course be repeated for credit?
No

Enrolment Rules

Consent to Add
No consent required

Consent to Drop
No consent required

Prerequisites

Corequisites

- **Completed or concurrently enrolled in:**
  - MATH600 - Introduction to Mathematical Software for Teachers (0.25)
  - MATH692 - Reading, Writing and Discovering Proofs (0.25)

Antirequisites

Course Notes

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Mathematics

Dependencies

There are no dependencies

AMATH 813 - Advanced Fluid Mechanics

Top

Effective Date & Career

Career
Graduate

Effective Term and Year
Winter 2027

Proposal Details

Proposal Type
New

Academic Unit Approval
2026-06-22

Rationale and Background for New Course

This new course is designed to better align with the core topics and evolving needs of graduate students across the Department's various research areas. In particular, it provides a flexible framework for offering advanced and contemporary material that reflects ongoing developments in fluid mechanics, while allowing students to engage with modern interdisciplinary methods and current research directions. The course will also help broaden the range of graduate-level

offerings available to students and facilitate stronger connections between coursework and active research programs within the Department. The Department will reduce the offering of highly specialized courses with fixed topics in favor of this new more flexible course format.

Course Information

Faculty

Faculty of Mathematics

Academic Unit

Department of Applied Mathematics

Subject Code

AMATH

Number

813

Is this course cross-listed?

No

Title

Advanced Fluid Mechanics

Abbreviated Title

Advanced Fluid Mechanics

Description

This course explores a range of topics related to recent research developments in advanced fluid mechanics. Emphasis will be placed on modern mathematical methods and modeling techniques arising in areas such as nonlinear waves, hydrodynamic instabilities, internal waves and mixing, rotating stratified turbulence, biological fluid dynamics, computational fluid dynamics, and physical oceanography and limnology. Topics are motivated by the richness of fluid flow as governed by nonlinear systems of partial differential equations, and draw on tools from asymptotics and perturbation theory, numerical methods, instability theory, and stochastic processes. Specific topics may vary depending on the instructor and recent developments in the field.

Units

0.50

Exceptions to Fees or Academic Progress Units

No

Components

Lecture

Primary Component

Lecture

Grading Information

Grading Basis

Numerical Grading Basis

Repeatable Courses

Can this course be repeated for credit?
Yes

Total Completions Allowed
02

Allow Multiple Enrol in a Term
No

Enrolment Rules

Consent to Add
No consent required

Consent to Drop
No consent required

Prerequisites

Corequisites

Antirequisites

Course Notes

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Mathematics

Dependencies

There are no dependencies

AMATH 823 - Advanced Mathematical Physics

Top

Effective Date & Career

Career
Graduate

Effective Term and Year
Winter 2027

Proposal Details

Proposal Type
New

Academic Unit Approval
2026-06-22

Rationale and Background for New Course

This new course is designed to better align with the core topics and evolving needs of graduate students across the Department's various research areas. In particular, it provides a flexible framework for offering advanced and contemporary material that reflects ongoing developments in mathematical physics, while allowing students to engage with modern interdisciplinary methods and current research directions. The course will also help broaden the range of graduate-level offerings available to students and facilitate stronger connections between coursework and active research programs within the Department. The Department will reduce the offering of highly specialized courses with fixed topics in favor of this new more flexible course format.

Course Information

Faculty
Faculty of Mathematics

Academic Unit
Department of Applied Mathematics

Subject Code
AMATH

Number
823

Is this course cross-listed?
No

Title
Advanced Mathematical Physics

Abbreviated Title
Advanced Mathematical Physics

Description
This course explores a range of topics related to recent research developments in advanced mathematical physics. Emphasis will be placed on modern mathematical methods and modeling techniques arising in areas such as quantum information theory, quantum computing and the foundations of quantum theory, quantum gravity, noncommutative geometry, relativistic quantum information, many body-physics, cosmology and the physics of the early universe. Topics draw on tools from quantum mechanics, general relativity, information theory and scientific machine learning.

Units
0.50

Exceptions to Fees or Academic Progress Units
No

Components
Lecture

Primary Component
Lecture

Grading Information

Grading Basis
Numerical Grading Basis

Repeatable Courses

Can this course be repeated for credit?
Yes

Total Completions Allowed
02

Allow Multiple Enrol in a Term
No

Enrolment Rules

Consent to Add
No consent required

Consent to Drop
No consent required

Prerequisites

Corequisites

Antirequisites

Course Notes

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Mathematics

Dependencies

There are no dependencies

AMATH 833 - Advanced Mathematical Biology and Medicine

Top

Effective Date & Career

Career
Graduate

Effective Term and Year
Winter 2027

Proposal Details

Proposal Type
New

Academic Unit Approval
2026-06-22

Rationale and Background for New Course

This new course is designed to better align with the core topics and evolving needs of graduate students across the Department's various research areas. In particular, it provides a flexible framework for offering advanced and contemporary material that reflects ongoing developments in mathematical biology and medicine, while allowing students to engage with modern interdisciplinary methods and current research directions. The course will also help broaden the range of graduate-level offerings available to students and facilitate stronger connections between coursework and active research programs within the Department. The Department will reduce the offering of highly specialized courses with fixed topics in favor of this new more flexible course format.

Course Information

Faculty
Faculty of Mathematics

Academic Unit
Department of Applied Mathematics

Subject Code
AMATH

Number
833

Is this course cross-listed?
No

Title
Advanced Mathematical Biology and Medicine

Abbreviated Title
Adv Math Bio-Med

Description

This course explores a range of topics related to recent research developments in advanced mathematical biology and medicine. Emphasis will be placed on modern mathematical methods and modeling techniques arising in areas such as mathematical modeling of disease processes and cancer treatments, epidemiology and ecology, systems biology, theoretical neuroscience, and the mathematical analysis of treatment strategies for conditions such as brain tumours and hydrocephalus. Topics draw on tools from dynamical systems, differential equations, and control theory. Specific topics may vary depending on the instructor and recent developments in the field.

Units
0.50

Exceptions to Fees or Academic Progress Units
No

Components
Lecture

Primary Component
Lecture

Grading Information

Grading Basis
Numerical Grading Basis

Repeatable Courses

Can this course be repeated for credit?
Yes

Total Completions Allowed
02

Allow Multiple Enrol in a Term
No

Enrolment Rules

Consent to Add
No consent required

Consent to Drop
No consent required

Prerequisites

Corequisites

Antirequisites

Course Notes

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow

Faculty of Mathematics

Dependencies

There are no dependencies

AMATH 843 - Advanced Scientific Computing Methods

Top

Effective Date & Career

Career
Graduate

Effective Term and Year
Winter 2027

Proposal Details

Proposal Type
New

Academic Unit Approval
2026-06-22

Rationale and Background for New Course

This new course is designed to better align with the core topics and evolving needs of graduate students across the Department's various research areas. In particular, it provides a flexible framework for offering advanced and contemporary material that reflects ongoing developments in scientific computing methods, while allowing students to engage with modern interdisciplinary methods and current research directions. The course will also help broaden the range of graduate-level offerings available to students and facilitate stronger connections between coursework and active research programs within the Department. The Department will reduce the offering of highly specialized courses with fixed topics in favor of this new more flexible course format.

Course Information

Faculty
Faculty of Mathematics

Academic Unit
Department of Applied Mathematics

Subject Code
AMATH

Number
843

Is this course cross-listed?
No

Title
Advanced Scientific Computing Methods

Abbreviated Title
Adv Sci Comp Methods

Description
This course explores a range of topics related to recent research developments in advanced numerical analysis and scientific computing. Emphasis will be placed on modern mathematical methods and computational techniques arising in areas such as numerical methods for partial and ordinary differential equations, numerical linear algebra, discontinuous Galerkin and finite element methods, inverse problems, numerical optimization, and sparse modeling and data-driven approaches. Topics draw on tools ranging from the development and mathematical analysis of numerical algorithms to advanced implementations on parallel supercomputers and GPUs, with applications spanning fluid mechanics, medical imaging, space physics, and large-scale networks. Specific topics may vary depending on the instructor and recent developments in the field.

Units
0.50

Exceptions to Fees or Academic Progress Units
No

Components
Lecture

Primary Component
Lecture

Grading Information

Grading Basis
Numerical Grading Basis

Repeatable Courses

Can this course be repeated for credit?
Yes

Total Completions Allowed
02

Allow Multiple Enrol in a Term
No

Enrolment Rules

Consent to Add
No consent required

Consent to Drop
No consent required

Prerequisites

Corequisites

Antirequisites

Course Notes

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Mathematics

Dependencies

There are no dependencies

AMATH 853 - Advanced Dynamical Systems and Control Theory

Top

Effective Date & Career

Career
Graduate

Effective Term and Year
Winter 2027

Proposal Details

Proposal Type
New

Academic Unit Approval
2026-06-22

Rationale and Background for New Course

This new course is designed to better align with the core topics and evolving needs of graduate students across the Department's various research areas. In particular, it provides a flexible framework for offering advanced and contemporary material that reflects ongoing developments in dynamical systems and control, while allowing students to engage with modern interdisciplinary methods and current research directions. The course will also help broaden the range of graduate-level offerings available to students and facilitate stronger connections between coursework and active research programs within the Department. The Department will reduce the offering of highly specialized courses with fixed topics in favor of this new more flexible course format.

Course Information

Faculty

Faculty of Mathematics

Academic Unit

Department of Applied Mathematics

Subject Code

AMATH

Number

853

Is this course cross-listed?

No

Title

Advanced Dynamical Systems and Control Theory

Abbreviated Title

Adv Dyn Syst Ctrl

Description

This course explores a range of topics related to recent research developments in advanced control theory and dynamical systems. Emphasis will be placed on modern mathematical methods and modeling techniques arising in areas such as ordinary, partial, delay, and stochastic differential equations, stability and bifurcation analysis, hybrid dynamical systems, feedback control design, and PDE-constrained optimization. Topics draw on tools from nonlinear systems theory, stochastic stability and filtering, data assimilation, machine learning and other data-driven approaches to control synthesis, and formal methods for control design, with applications spanning robotics, biological systems, imaging, and AI. Specific topics may vary depending on the instructor and recent developments in the field.

Units

0.50

Exceptions to Fees or Academic Progress Units

No

Components

Lecture

Primary Component

Lecture

Grading Information

Grading Basis

Numerical Grading Basis

Repeatable Courses

Can this course be repeated for credit?

Yes

Total Completions Allowed

02

Allow Multiple Enrol in a Term

No

Enrolment Rules

Consent to Add
No consent required

Consent to Drop
No consent required

Prerequisites

Corequisites

Antirequisites

Course Notes

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Mathematics

Dependencies

There are no dependencies

CO 636 - Combinatorial Algebraic Geometry

Top

Effective Date & Career

Career
Graduate

Effective Term and Year
Fall 2027

Proposal Details

Proposal Type
New

Academic Unit Approval
2026-07-16

Rationale and Background for New Course

This course addresses an important topic in algebraic combinatorics -- namely, the use of combinatorial techniques to study objects in commutative algebra and algebraic geometry. The course has been offered as a special topics undergraduate and

graduate course (CO 439/739) twice (in Fall 2022 and Fall 2025), and both times has had solid interest from undergraduates and graduates alike:
Fall 2022 had 9 undergrads and 11 grads
Fall 2025 had 12 undergrads and 9 grads
To be held with the undergraduate version CO 436.

Course Information

Faculty

Faculty of Mathematics

Academic Unit

Department of Combinatorics and Optimization

Subject Code

CO

Number

636

Is this course cross-listed?

Yes

Cross-Listed Courses

PMATH 663 - Combinatorial Algebraic Geometry

Title

Combinatorial Algebraic Geometry

Abbreviated Title

Comb Algebraic Geometry

Description

Algebraic geometry and commutative algebra from a combinatorial perspective. Fundamental tools including monomial ideals, Hilbert functions, and initial ideals, with emphasis on translating geometric and algebraic phenomena into combinatorial models. Gröbner degeneration, Betti tables, and Stanley-Reisner Theory. Applications to determinantal varieties and other schemes with rich combinatorial structure.

Units

0.50

Exceptions to Fees or Academic Progress Units

No

Components

Lecture

Primary Component

Lecture

Grading Information

Grading Basis

Numerical Grading Basis

Repeatable Courses

Can this course be repeated for credit?
No

Enrolment Rules

Consent to Add
No consent required

Consent to Drop
No consent required

Prerequisites

Corequisites

Antirequisites

Course Notes

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Mathematics

Dependencies

There are no dependencies

PMATH 663 - Combinatorial Algebraic Geometry

Top

Effective Date & Career

Career
Graduate

Effective Term and Year
Fall 2027

Proposal Details

Proposal Type
New

Academic Unit Approval
2026-04-27

Rationale and Background for New Course

This course addresses an important topic in algebraic combinatorics -- namely, the use of combinatorial techniques to study objects in commutative algebra and algebraic geometry. This course is on a topic where the subjects of the departments of C&O and PMATH overlap and thus will be of considerable interest to students in PMATH.
To be held with the undergraduate version PMATH 463.

Course Information

Faculty

Faculty of Mathematics

Academic Unit

Department of Pure Mathematics

Subject Code

PMATH

Number

663

Is this course cross-listed?

Yes

Cross-Listed Courses

CO 636 - Combinatorial Algebraic Geometry

Title

Combinatorial Algebraic Geometry

Abbreviated Title

Comb Algebraic Geometry

Description

Algebraic geometry and commutative algebra from a combinatorial perspective. Fundamental tools including monomial ideals, Hilbert functions, and initial ideals, with emphasis on translating geometric and algebraic phenomena into combinatorial models. Gröbner degeneration, Betti tables, and Stanley-Reisner Theory. Applications to determinantal varieties and other schemes with rich combinatorial structure.

Units

0.50

Exceptions to Fees or Academic Progress Units

No

Components

Lecture

Primary Component

Lecture

Grading Information

Grading Basis

Numerical Grading Basis

Repeatable Courses

Can this course be repeated for credit?
No

Enrolment Rules

Consent to Add
No consent required

Consent to Drop
No consent required

Prerequisites

Corequisites

Antirequisites

Course Notes

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Mathematics

Dependencies

There are no dependencies

AMATH 905 - Reading Course

Top

Effective Date & Career

Career
Graduate

Effective Term and Year
Proposed

Effective Term and Year

Quest Course ID
17048

Offering Number
1

Winter 2027

Existing

Effective Term and Year
Winter 2026

Proposal Details

Proposal Type
Change

Academic Unit Approval
2026-06-22

Unit Weight/Number Changes
No

Rationale and Background for Change

Changing the grading basis from “Credit/No Credit” to “Numerical”. There was a clerical error when this course was created, it was meant to be on a numerical grading basis.

Course Information

Faculty
Faculty of Mathematics

Academic Unit
Department of Applied Mathematics

Subject Code
AMATH

Number
905

Is this course cross-listed?
No

Title
Reading Course

Abbreviated Title
Reading Course

Description
Reading course as announced by the Department.

Units
0.50

Exceptions to Fees or Academic Progress Units
No

Components

Reading

Primary Component

Reading

Grading Information

Grading Basis

Proposed

Grading Basis
Numerical Grading Basis

Existing

Grading Basis
Credit/No Credit

Repeatable Courses

Can this course be repeated for credit?

Yes

Total Completions Allowed

02

Allow Multiple Enrol in a Term

No

Enrolment Rules

Consent to Add

Instructor consent required

Consent to Drop

No consent required

Prerequisites

Corequisites

Antirequisites

Course Notes

Workflow Information

Workflow Path

Committee approvals

Faculty/AFIW Path(s) for Workflow

Faculty of Mathematics

Dependencies

There are no dependencies

CS 738 - Data Engineering for Data Science

Top

Effective Date & Career

Career
Graduate

Effective Term and Year

Proposed

Effective Term and Year
Winter 2027

Existing

Effective Term and Year
Winter 2025

Quest Course ID
16833

Offering Number
1

Proposal Details

Proposal Type
Change

Academic Unit Approval
2026-09-09

Unit Weight/Number Changes
No

Rationale and Background for Change

Students who have completed CS 451 during their undergraduate studies at the University of Waterloo should not enroll in CS 738, as it covers material included in CS 348—a prerequisite for CS 451. To address this, CS 451 should be added as an antirequisite for CS 738. This will prevent students who have already taken CS 451 from enrolling in CS 738.

Course Information

Faculty
Faculty of Mathematics

Academic Unit
David R. Cheriton School of Computer Science

Subject Code

Number

CS

738

Is this course cross-listed?
No

Title
Data Engineering for Data Science

Abbreviated Title
Data Engineering for Data Sci

Description
Introduction to data engineering issues in data science. Data management technology objectives. Relational database technology, relational algebra, SQL, transactions, data modelling methodology, entity-relationship models. No SQL databases including key-value stores, document databases, wide-column stores, graph databases. Overview of big data processing platforms. Data integration including data warehousing, data lakes, ETL and ELT approaches. Data preparation for analysis, data quality, data cleaning. Introduction to several current topics in database research, such as data mining, managing data streams, distributed/parallel databases, HTAP architectures. Open to Master of Data Science and Artificial Intelligence (MDSAI) students as well as Master of Mathematics (MMath) in Data Science students.

Units
0.50

Exceptions to Fees or Academic Progress Units
No

Components
Lecture

Primary Component
Lecture

Grading Information

Grading Basis
Numerical Grading Basis

Repeatable Courses

Can this course be repeated for credit?
No

Enrolment Rules

Consent to Add
Instructor consent required

Consent to Drop
No consent required

Prerequisites

Corequisites

Antirequisites

- **Not completed nor concurrently enrolled in: CS451**

Course Notes

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Mathematics

Dependencies

There are no dependencies

MMath in Combinatorics & Optimization - Master of Mathematics (MMath) in Combinatorics and Optimization

Top

Effective Date and Career

Career
Graduate

Effective Term and Year

Proposed

Effective Term and Year
Winter 2027

Existing

Effective Term and Year
Winter 2026

Proposal Details

Proposal Type
Change

Academic Unit Approval
2026-07-16

Quality Assurance Designation
Minor Modification Qad

Is there an impact to existing students?

Yes

Impact on Existing Students

Students enrolled in the Master's Research Paper study option will be able to remain in that option. Students enrolled in the Thesis study option will retain the ability to apply to switch to the Master's Research Paper study option per the revised Calendar text.

Is the credential name changing?

No

Graduate Co-operative Requirements

Not Applicable

Change to Learning Outcomes

No

Rationale and Background for Change(s)

Revising the GSAC to reflect that the Master's Research Paper study option is transfer-in entry only.

The focus of our program is on research leading to a thesis, and most faculty members are primarily interested in supervising students in the Thesis option. Moreover, applicants are frequently confused about the difference between the Thesis option and the Research Paper option.

Over the last few years, we have only admitted students to our Thesis option, not the Research Paper option; applicants who applied to the Research Paper option who supervisors wanted to supervise were asked to switch to the Thesis option, and all agreed.

This change makes it clear that our program aims to admit students to the Thesis option and reduces confusion for applicants. It retains the Research Paper option for students within the program who unexpectedly struggle with a heavier research project and would be more likely to successfully complete via the Research Paper option.

General Program/Plan Information

Faculty

Faculty of Mathematics

Academic Unit

Department of Combinatorics and Optimization

Graduate Field of Study

Combinatorics and Optimization

Faculty

Faculty of Mathematics

Program/Plan Name

Master of Mathematics (MMath) in Combinatorics and Optimization

Graduate Credential Type
Master's

Accelerated Program
Not applicable

Study Options (New)
Thesis / Master's Research Paper

Admit Term(s)
Fall, Winter, Spring

Delivery Mode
On-campus

Length of Program

- Students are required to complete the program in accordance with the University program time limits.

Registration Option(s)
Full-time, Part-time

Graduate Research Fields

- Algebraic and Enumerative Combinatorics
- Continuous Optimization
- Cryptography
- Discrete Optimization
- Graph Theory
- Quantum Computing

Admissions

Admission Requirements: Minimum Requirements

- A four-year Honours Bachelor degree or its equivalent in mathematics or in a closely related field with a 78% overall average or its equivalent for undergraduate work.
- Applicants educated outside of Canada, including those from the United States, are recommended to submit scores from the Graduate Record Examinations (GRE) subject test in mathematics. Neither the GRE general test nor the GRE subject test is required.
- English language proficiency (ELP) (if applicable)

Admission Requirements: Application materials

- Program-specific questions (PSQ)
- Statement of interest
- Transcript(s)

Admission Requirements: References

- Number of references: 3
- Type of references: normally from academic sources.

Requirements Information

Graduate Degree Requirements

Proposed

Graduate Degree Requirements

- Students must complete the course and milestone requirements associated with their chosen study option in addition to the Graduate Academic Integrity Module (Graduate AIM).
- Note: All students are admitted to the Thesis study option. Students can apply to transfer to the Master's Research Paper study option after completing at least one academic term. The transfer must be approved by the student's supervisor and the Graduate Officer.

Existing

Graduate Degree Requirements

- Students must complete the course and milestone requirements associated with their chosen study option in addition to the Graduate Academic Integrity Module (Graduate AIM).

Thesis Option: Course Requirements

Thesis Option: Course Requirements

Combinatorics and Optimization (C&O) core option

- Students must complete 4 courses, including 2 core courses and at least 1 other CO course. The 4th required course must be a graduate course in the Faculty of Mathematics, or a course approved by the CO Graduate Committee.
- Core courses:
  - CO 630 Algebraic Enumeration
  - CO 642 Graph Theory
  - CO 650 Combinatorial Optimization
  - CO 663 Convex Optimization and Analysis
  - CO 681 Quantum Information Processing
  - CO 685 The Mathematics of Public-Key Cryptography
- If students have credit for a course deemed equivalent to a particular required course by the Department Graduate Committee, then that part of the core requirement may be waived. An overall average of at least 75% must be maintained.
- A student may obtain credit for one graduate term course by completing two undergraduate term courses; however, any student wishing to exercise this option must seek the approval of the Department Graduate Committee.
- Unsatisfactory academic performance in any one course will result in a review of the student's status by the Department Graduate Committee. If a student with a failed course is permitted to continue, additional work may be required to clear the failure in that course, or by replacement of the failed course; alternatively, the student may be required to repeat part or all of the program.
- Students without the required prerequisite knowledge may find it necessary to complete some courses at the 3rd or 4th year undergraduate level before proceeding to the core courses. The core courses may be replaced with other courses provided the Department Graduate Committee agrees that they are equivalent. The choice of the precise set of core courses is left to the student and the student's supervisor.

Mathematics of Operations Research (MOR) core option

- Students must complete 4 courses, including CO 650 Combinatorial Optimization, CO 666 Continuous Optimization, and 2 core courses.
- Core courses:
  - CO 652 Integer Programming
  - CO 663 Convex Optimization and Analysis
  - CO 671 Semidefinite Optimization
  - MSCI 631 Probabilistic Models in Operations Research
  - MSCI 632 Discrete Event Simulation
  - STAT 833 Stochastic Processes
  - STAT 835 Statistical Methods for Process Improvement
- If students have credit for a course deemed equivalent to a particular required course by the Department Graduate Committee, then that part of the core requirement may be waived. An overall average of at least 75% must be maintained.
- A student may obtain credit for one graduate term course by completing two undergraduate term courses; however, any student wishing to exercise this option must seek the approval of the Department Graduate Committee.
- Unsatisfactory academic performance in any one course will result in a review of the student's status by the Department Graduate Committee. If a student with a failed course is permitted to continue, additional work may be required to clear the failure in that course, or by replacement of the failed course; alternatively, the student may be required to repeat part or all of the program.
- Students without the required prerequisite knowledge may find it necessary to complete some courses at the 3rd or 4th year undergraduate level before proceeding to the core courses. The core courses may be replaced with other courses provided the Department Graduate Committee agrees that they are equivalent. The choice of the precise set of core courses is left to the student and the student's supervisor.

Thesis Option: Milestone Requirements

Graduate Studies Research Skills Seminar

- Students must successfully complete a 2-term research skills seminar which focuses on development of research and presentation skills, including giving a presentation on a research topic.

Master's Thesis

- The thesis requirement consists of two parts: the writing of an expository or research thesis and giving an oral presentation on their work. The thesis topic is to be arranged with a faculty member who serves as the Thesis Supervisor. This requirement is met, and credit assigned, when the presentation is complete to the satisfaction of the Thesis Supervisor and when the Thesis Supervisor and two additional readers approve the thesis. In addition to distributing a copy of the MMath thesis to the supervisor and readers, the thesis should also be deposited in the Mathematics Graduate Office for display for a period of two weeks.

Master's Research Paper Option: Course Requirements

No Rules

Master's Research Paper Option: Course Requirements

Combinatorics and Optimization (C&O) core option

- Students must complete 7 courses, including 3 core courses and at least 1 other CO course. The remaining 3 courses must be graduate courses in the Faculty of Mathematics, or courses approved by the CO Graduate Committee.
- Core courses:
  - CO 630 Algebraic Enumeration
  - CO 642 Graph Theory
  - CO 650 Combinatorial Optimization
  - CO 663 Convex Optimization and Analysis
  - CO 681 Quantum Information Processing
  - CO 685 The Mathematics of Public-Key Cryptography
- If students have credit for a course deemed equivalent to a particular required course by the Department Graduate Committee, then that part of the core requirement may be waived. An overall average of at least 75% must be maintained.
- A student may obtain credit for one graduate term course by completing two undergraduate term courses; however, any student wishing to exercise this option must seek the approval of the Department Graduate Committee.
- Unsatisfactory academic performance in any one course will result in a review of the student's status by the Department Graduate Committee. If a student with a failed course is permitted to continue, additional work may be required to clear the failure in that course, or by replacement of the failed course; alternatively, the student may be required to repeat part or all of the program.
- Students without the required prerequisite knowledge may find it necessary to complete some courses at the 3rd or 4th year undergraduate level before proceeding to the core courses. The core courses may be replaced with other courses provided the Department Graduate Committee agrees that they are equivalent. The choice of the precise set of core courses is left to the student and the student's supervisor.

Mathematics of Operations Research (MOR) core option

- Students must complete 7 courses, including CO 650 Combinatorial Optimization, CO 666 Continuous Optimization, 2 core courses and at least 3 other courses.
- Core courses:
  - CO 652 Integer Programming
  - CO 663 Convex Optimization and Analysis
  - CO 671 Semidefinite Optimization
  - MSCI 631 Probabilistic Models in Operations Research
  - MSCI 632 Discrete Event Simulation
  - STAT 833 Stochastic Processes
  - STAT 835 Statistical Methods for Process Improvement
- The remaining 3 courses must be graduate courses in the Faculty of Mathematics, or courses approved by the CO Graduate Committee. It is recommended that they be selected from CO 652, CO 663, CO 664, CO 671, CS 657, and STAT 833.
- If students have credit for a course deemed equivalent to a particular required course by the Department Graduate Committee, then that part of the core requirement may be waived. An overall average of at least 75% must be maintained.
- A student may obtain credit for one graduate term course by completing two undergraduate term courses; however, any student wishing to exercise this option must seek the approval of the Department Graduate Committee.
- Unsatisfactory academic performance in any one course will result in a review of the student's status by the Department Graduate Committee. If a student with a failed course is permitted to continue, additional work may be required to clear the failure in that course, or by replacement of the failed course; alternatively, the student may be required to repeat part

or all of the program.
- Students without the required prerequisite knowledge may find it necessary to complete some courses at the 3rd or 4th year undergraduate level before proceeding to the core courses. The core courses may be replaced with other courses provided the Department Graduate Committee agrees that they are equivalent. The choice of the precise set of core courses is left to the student and the student's supervisor.

Master's Research Paper Option: Milestone Requirements

Graduate Studies Research Skills Seminar

- Students must successfully complete a 2-term research skills seminar which focuses on development of research and presentation skills, including giving a presentation on a research topic.

Master's Research Paper

- This requirement consists of two parts: the writing of a research paper, and the presentation of it in an appropriate seminar or class. The topic is arranged with the student's supervisor. The research paper requirement is met, and credit assigned, when the supervisor and reader return a signed Accreditation form to the Department Graduate Officer, approving the written document and the research paper presentation.

Notes

- Department of Combinatorics and Optimization website
- Master of Mathematics (MMath) in Combinatorics and Optimization future graduate students program page

Specializations

Undergraduate Plan Guidelines

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Mathematics

Dependencies

There are no dependencies

MMath in Combinatorics & Optimization-Co-op - Master of Mathematics (MMath) in Combinatorics and Optimization - Co-operative Program

Top

Effective Date and Career

Career
Graduate

Effective Term and Year

Proposed

Effective Term and Year
Winter 2027

Existing

Effective Term and Year
Spring 2026

Proposal Details

Proposal Type
Change

Academic Unit Approval
2026-07-16

Quality Assurance Designation
Minor Modification Qad

Is there an impact to existing students?
Yes

Impact on Existing Students

Students enrolled in the Master's Research Paper study option will be able to remain in that option. Students enrolled in the Thesis study option will retain the ability to apply to switch to the Master's Research Paper study option per the revised Calendar text.

Is the credential name changing?
No

Graduate Co-operative Requirements
No

Change to Learning Outcomes
No

Rationale and Background for Change(s)

Revising the GSAC to reflect that the Master's Research Paper study option is transfer-in entry only.

The focus of our program is on research leading to a thesis, and most faculty members are primarily interested in supervising

students in the Thesis option. Moreover, applicants are frequently confused about the difference between the Thesis option and the Research Paper option.

Over the last few years, we have only admitted students to our Thesis option, not the Research Paper option; applicants who applied to the Research Paper option who supervisors wanted to supervise were asked to switch to the Thesis option, and all agreed.

This change makes it clear that our program aims to admit students to the Thesis option and reduces confusion for applicants. It retains the Research Paper option for students within the program who unexpectedly struggle with a heavier research project and would be more likely to successfully complete via the Research Paper option.

General Program/Plan Information

Faculty

Faculty of Mathematics

Academic Unit

Department of Combinatorics and Optimization

Graduate Field of Study

Combinatorics and Optimization

Faculty

Faculty of Mathematics

Program/Plan Name

Master of Mathematics (MMath) in Combinatorics and Optimization - Co-operative Program

Graduate Credential Type

Master's

Accelerated Program

Not applicable

Study Options (New)

Thesis / Master's Research Paper

Program Types

Co-operative

Admit Term(s)

Fall, Winter, Spring

Delivery Mode

On-campus

Length of Program

- Students are required to complete the program in accordance with the University program time limits.

Registration Option(s)

Full-time, Part-time

Graduate Research Fields

- Algebraic and Enumerative Combinatorics
- Continuous Optimization

- Cryptography
- Discrete Optimization
- Graph Theory
- Quantum Computing

Admissions

Admission Requirements: Minimum Requirements

- A four-year Honours Bachelor degree or its equivalent in mathematics or in a closely related field with a 78% overall average or its equivalent for undergraduate work.
- Applicants educated outside of Canada, including those from the United States, are recommended to submit scores from the Graduate Record Examinations (GRE) subject test in mathematics. Neither the GRE general test nor the GRE subject test is required.
- English language proficiency (ELP) (if applicable)

Admission Requirements: Application materials

- Program-specific questions (PSQ)
- Statement of interest
- Transcript(s)

Admission Requirements: References

- Number of references: 3
- Type of references: normally from academic sources.

Requirements Information

Graduate Degree Requirements

Proposed

Graduate Degree Requirements

- Students must complete the course and milestone requirements associated with their chosen study option in addition to the Graduate Academic Integrity Module (Graduate AIM).
- Note: All students are admitted to the Thesis study option. Students can apply to transfer to the Master's Research Paper study option after completing at least one academic term. The transfer must be approved by the student's supervisor and the Graduate Officer.

Existing

Graduate Degree Requirements

- Students must complete the course and milestone requirements associated with their chosen study option in addition to the Graduate Academic Integrity Module (Graduate AIM).

Thesis Option: Course Requirements

Thesis Option: Course Requirements

Combinatorics and Optimization (C&O) core option

- Students must complete 4 courses, including 2 core courses and at least 1 other CO course. The 4th required course must be a graduate course in the Faculty of Mathematics, or a course approved by the CO Graduate Committee.
- Core courses:
  - CO 630 Algebraic Enumeration
  - CO 642 Graph Theory
  - CO 650 Combinatorial Optimization
  - CO 663 Convex Optimization and Analysis
  - CO 681 Quantum Information Processing
  - CO 685 The Mathematics of Public-Key Cryptography
- If students have credit for a course deemed equivalent to a particular required course by the Department Graduate Committee, then that part of the core requirement may be waived. An overall average of at least 75% must be maintained.
- A student may obtain credit for one graduate term course by completing two undergraduate term courses; however, any student wishing to exercise this option must seek the approval of the Department Graduate Committee.
- Unsatisfactory academic performance in any one course will result in a review of the student's status by the Department Graduate Committee. If a student with a failed course is permitted to continue, additional work may be required to clear the failure in that course, or by replacement of the failed course; alternatively, the student may be required to repeat part or all of the program.
- Students without the required prerequisite knowledge may find it necessary to complete some courses at the 3rd or 4th year undergraduate level before proceeding to the core courses. The core courses may be replaced with other courses provided the Department Graduate Committee agrees that they are equivalent. The choice of the precise set of core courses is left to the student and the student's supervisor.

Mathematics of Operations Research (MOR) core option

- Students must complete 4 courses, including CO 650 Combinatorial Optimization, CO 666 Continuous Optimization, and 2 core courses.
- Core courses:
  - CO 652 Integer Programming
  - CO 663 Convex Optimization and Analysis
  - CO 671 Semidefinite Optimization
  - MSCI 631 Probabilistic Models in Operations Research
  - MSCI 632 Discrete Event Simulation
  - STAT 833 Stochastic Processes

    - STAT 835 Statistical Methods for Process Improvement
- If students have credit for a course deemed equivalent to a particular required course by the Department Graduate Committee, then that part of the core requirement may be waived. An overall average of at least 75% must be maintained.
- A student may obtain credit for one graduate term course by completing two undergraduate term courses; however, any student wishing to exercise this option must seek the approval of the Department Graduate Committee.
- Unsatisfactory academic performance in any one course will result in a review of the student's status by the Department Graduate Committee. If a student with a failed course is permitted to continue, additional work may be required to clear the failure in that course, or by replacement of the failed course; alternatively, the student may be required to repeat part or all of the program.
- Students without the required prerequisite knowledge may find it necessary to complete some courses at the 3rd or 4th year undergraduate level before proceeding to the core courses. The core courses may be replaced with other courses provided the Department Graduate Committee agrees that they are equivalent. The choice of the precise set of core courses is left to the student and the student's supervisor.

Thesis Option: Milestone Requirements

Graduate Studies Research Skills Seminar

- Students must successfully complete a 2-term research skills seminar which focuses on development of research and presentation skills, including giving a presentation on a research topic.

Graduate Studies Work Report

- Students must complete a 2-term co-op work placement with a suitable industrial organization. The work placement must be related to the student's research and is subject to the approval of the Graduate Committee and the student's research supervisor. After completing the work placement, the student is required to submit a work report and make a formal oral presentation.

Master's Thesis

- The thesis requirement consists of two parts: the writing of an expository or research thesis and giving an oral presentation on their work. The thesis topic is to be arranged with a faculty member who serves as the Thesis Supervisor. This requirement is met, and credit assigned, when the presentation is complete to the satisfaction of the Thesis Supervisor and when the Thesis Supervisor and two additional readers approve the thesis. In addition to distributing a copy of the MMath thesis to the supervisor and readers, the thesis should also be deposited in the Mathematics Graduate Office for display for a period of two weeks.

Master's Research Paper Option: Course Requirements

No Rules

Master's Research Paper Option: Course Requirements

Combinatorics and Optimization (C&O) core option

- Students must complete 7 courses, including 3 core courses and at least 1 other CO course. The remaining 3 courses must be graduate courses in the Faculty of Mathematics, or courses approved by the CO Graduate Committee.
- Core courses:
    - CO 630 Algebraic Enumeration
    - CO 642 Graph Theory
    - CO 650 Combinatorial Optimization
    - CO 663 Convex Optimization and Analysis
    - CO 681 Quantum Information Processing
    - CO 685 The Mathematics of Public-Key Cryptography
- If students have credit for a course deemed equivalent to a particular required course by the Department Graduate Committee, then that part of the core requirement may be waived. An overall average of at least 75% must be maintained.
- A student may obtain credit for one graduate term course by completing two undergraduate term courses; however, any student wishing to exercise this option must seek the approval of the Department Graduate Committee.
- Unsatisfactory academic performance in any one course will result in a review of the student's status by the Department Graduate Committee. If a student with a failed course is permitted to continue, additional work may be required to clear the failure in that course, or by replacement of the failed course; alternatively, the student may be required to repeat part or all of the program.
- Students without the required prerequisite knowledge may find it necessary to complete some courses at the 3rd or 4th year undergraduate level before proceeding to the core courses. The core courses may be replaced with other courses provided the Department Graduate Committee agrees that they are equivalent. The choice of the precise set of core

courses is left to the student and the student's supervisor.

Mathematics of Operations Research (MOR) core option

- Students must complete 7 courses, including CO 650 Combinatorial Optimization, CO 666 Continuous Optimization, 2 core courses and at least 3 other courses.
- Core courses:
  - CO 652 Integer Programming
  - CO 663 Convex Optimization and Analysis
  - CO 671 Semidefinite Optimization
  - MSCI 631 Probabilistic Models in Operations Research
  - MSCI 632 Discrete Event Simulation
  - STAT 833 Stochastic Processes
  - STAT 835 Statistical Methods for Process Improvement
- The remaining 3 courses must be graduate courses in the Faculty of Mathematics, or courses approved by the CO Graduate Committee. It is recommended that they be selected from CO 652, CO 663, CO 664, CO 671, CS 657, and STAT 833.
- If students have credit for a course deemed equivalent to a particular required course by the Department Graduate Committee, then that part of the core requirement may be waived. An overall average of at least 75% must be maintained.
- A student may obtain credit for one graduate term course by completing two undergraduate term courses; however, any student wishing to exercise this option must seek the approval of the Department Graduate Committee.
- Unsatisfactory academic performance in any one course will result in a review of the student's status by the Department Graduate Committee. If a student with a failed course is permitted to continue, additional work may be required to clear the failure in that course, or by replacement of the failed course; alternatively, the student may be required to repeat part or all of the program.
- Students without the required prerequisite knowledge may find it necessary to complete some courses at the 3rd or 4th year undergraduate level before proceeding to the core courses. The core courses may be replaced with other courses provided the Department Graduate Committee agrees that they are equivalent. The choice of the precise set of core courses is left to the student and the student's supervisor.

Master's Research Paper Option: Milestone Requirements

Graduate Studies Research Skills Seminar

- Students must successfully complete a 2-term research skills seminar which focuses on development of research and presentation skills, including giving a presentation on a research topic.

Graduate Studies Work Report

- Students must complete a 2-term co-op work placement with a suitable industrial organization. The work placement must be related to the student's research and is subject to the approval of the Graduate Committee and the student's research supervisor. After completing the work placement, the student is required to submit a work report and make a formal oral presentation.

Master's Research Paper

- This requirement consists of two parts: the writing of a research paper, and the presentation of it in an appropriate seminar or class. The topic is arranged with the student's supervisor. The research paper requirement is met, and credit assigned, when the supervisor and reader return a signed Accreditation form to the Department Graduate Officer, approving the written document and the research paper presentation.

Notes

- Department of Combinatorics and Optimization website
- Master of Mathematics (MMath) in Combinatorics and Optimization - Co-operative Program future graduate students program page

Specializations

Undergraduate Plan Guidelines

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Mathematics

Dependencies

There are no dependencies

Master of Mathematics for Teachers (MMT) - Master of Mathematics for Teachers (MMT)

Top

Effective Date and Career

Career
Graduate

Effective Term and Year
Proposed

Effective Term and Year
Winter 2027

Existing

Effective Term and Year
Fall 2023

Proposal Details

Proposal Type
Change

Academic Unit Approval
2026-09-16

Quality Assurance Designation
Minor Modification Qad

Is there an impact to existing students?
No

Is the credential name changing?
No

Graduate Co-operative Requirements
Not Applicable

Change to Learning Outcomes
No

Rationale and Background for Change(s)

Articulating and lowering the minimum length of program. The MMT program requires nine courses. While the most typical route through the program is to take the equivalent of one course per term across 9 terms (three years), some students can handle two courses per term. In these cases, they can finish the program in 5 terms (just under two years) without concern. Approval will be required for exceptional circumstances leading to completion of the program in less than 5 terms.

General Program/Plan Information

Faculty
Faculty of Mathematics

Academic Unit
Dean of Mathematics Office

Graduate Field of Study
Mathematics for Teachers

Faculty
Faculty of Mathematics

Program/Plan Name
Master of Mathematics for Teachers (MMT)

Graduate Credential Type
Master's

Accelerated Program
Not applicable

Study Options (New)
Coursework

Admit Term(s)
Fall

Delivery Mode

Online

Length of Program

- Typically 9 terms (36 months).
- The program can be completed within a minimum of 5 terms (20 months). Exceptions may be possible with explicit approval.

Registration Option(s)
Part-time

Admissions

Admission Requirements: Minimum Requirements

- Four year Bachelors degree (or equivalent) with sufficient university-level mathematical background and with a 75% average.
- At least one year of prior work experience in education, with preference given to those actively teaching in mathematics, science, or computer science at the time of application.
- English language proficiency (ELP) (if applicable)

Admission Requirements: Application materials

- Résumé
- Transcript(s)

Admission Requirements: References

- Number of references: 2
- Type of references: professional

Requirements Information

Graduate Degree Requirements

- Students must complete the course requirements listed below in addition to the Graduate Academic Integrity Module (Graduate AIM).

Coursework Option: Course Requirements

Coursework Option: Course Requirements

- Students are required to complete the equivalent of 9 one-term (0.50 unit weight) graduate level courses.
- Among their courses totaling 4.50 unit weight, students must complete:
  - MATH 600 Introduction to Mathematical Software for Teachers (0.25 unit weight)
  - MATH 692 Reading, Writing and Discovering Proofs (0.25 unit weight)
  - MATH 681 Problem Solving and Mathematical Discovery (0.50 unit weight)
  - MATH 699 Master of Mathematics for Teachers Capstone (0.50 unit weight)
- MATH 600 and MATH 692 should be taken in a student's first term in the program.
- The remaining courses are to be MATH courses at the 600 and/or 700 level.
- MATH 699 Master of Mathematics for Teachers Capstone: the capstone project is designed to give students an opportunity to showcase the knowledge that they have gained and to provide a forum for bringing that knowledge into their own classroom. In most cases, with the guidance of a faculty member, students will be asked to choose a mathematical concept or area of study, perform all necessary background reading, and then design and complete a project consisting of a short three week mini-course on the chosen topic that would be accessible to their students and colleagues. To be successfully completed, the capstone project must be approved by the student's capstone supervisor. Students can begin the capstone requirement any time after they have completed the equivalent of 6 courses (0.50 unit weight).
- Students must maintain an overall average of 75% in the program. Only courses with grades of at least 70% contribute to the required 4.50 units but all numeric grades contribute to the overall average. Student performance is assessed after each term for progress towards the MMT degree.

Notes

- Mathematics for Teachers website

- Master of Mathematics for Teachers (MMT) future students program page

Specializations

Undergraduate Plan Guidelines

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Mathematics

Dependencies

Prerequisites

- MATH 692 - Reading, Writing and Discovering Proofs — View Program
- MATH 600 - Introduction to Mathematical Software for Teachers — View Program

Antirequisites

- MATH 900 - University Mathematics Teaching Techniques — View Program

UNIVERSITY OF WATERLOO

Senate Graduate Council
Graduate Studies Course/Milestone Form

Prior to form submission, review the instructions. For questions about the form submission, contact Trevor Clews, Graduate Studies and Postdoctoral Affairs (GSPA).

Faculty: Mathematics

Effective date: Term: Winter Year: 2027

Milestone

Note: milestone changes also require the completion/submission of the Graduate Studies Program Revision Template.

☐ New: Choose an item.

☐ Inactivate: Choose an item.

☐ Revise: from Choose an item. to Choose an item.

Course

Note: some course changes also require the completion/submission of the Graduate Studies Program Revision Template.

☐ New: Complete all course elements below

☐ Inactivate: Complete the following course elements:
Course subject code, Course number, Course title

☒ Revise: Complete all course elements below to reflect the proposed change(s) and identify the course elements being revised (*e.g. Course description, Course title*):

Changing MATH 600 and MATH 692 from corequisites to prerequisites for the courses listed below.

Course elements (complete as indicated above. Review the glossary of terms for details on course elements)

Course subject code: MATH

Course numbers and titles:

1) 630 Foundations of Probability
2) 636 Linear Algebra for Teachers
3) 640 Number Theory for Teachers
4) 641 Algorithm Design and Analysis
5) 642 Introduction to Computer Science: A Mathematical Perspective
6) 643 Theory of Computation
7) 647 Foundations of Calculus I
8) 655 Differential Equations - Techniques and Applications
9) 661 Problem Solving and Proof in Geometry
10) 674 Special Topics in Mathematical Connections
11) 681 Problem Solving and Mathematical Discovery
12) 682 History of Mathematics I: Antiquity

13) 683 History of Mathematics II: Early Modern Period
14) 685 Math and Peace for Teachers
15) 690 Workshop for Teachers of Mathematics

Grading basis: Choose an item.

Course credit weight: Choose an item.

Course consent required: Choose an item.

Course description:

Course component(s): Choose an item. Choose an item. Choose an item. Choose an item.

Primary course component: Choose an item.

Requisites (identify antirequisites, corequisites, or prerequisites if applicable to the course):

~~Corequisites:~~
~~Completed or concurrently enrolled in:~~
~~MATH 600 Introduction to Mathematical Software for Teachers (0.25)~~
~~MATH 692 Reading, Writing and Discovering Proofs (0.25)~~

Prerequisites:
Must have completed the following:
MATH 600 Introduction to Mathematical Software for Teachers (0.25)
MATH 692 Reading, Writing and Discovering Proofs (0.25)

Special topics course: Yes ☐ No ☐
Special topics course total completions allowed (max. 30):
Can students enrol in multiple sections of the same special topics course in the same term? Yes ☐ No ☐

Cross-listed course: Yes ☐ No ☐
If yes, list the course subject code(s) and number(s) that this course is/will be cross-listed with:
Note: cross-listed courses must share all course elements except the subject code(s), course number(s), and requisites, and require a separate Graduate Studies Course/Milestone form submission for each course.

Rationale for request:

Most students are best served by starting the Master of Mathematics for Teachers (MMT) program by taking only MATH 600 and MATH 692. There are always some students who wish to take an additional course when starting the program and who have the background to handle this. However, we now wish to only allow this with explicit approval. This change is being made in conjunction with the lowering of the minimum number of terms for completion of the program. It seeks to bring the residence requirements to the attention of students and seeks a balance between providing fully autonomous flexibility and the opportunity to provide advice and guidance as the students start their studies.

Form completed by: J.P. Pretti
Reviewed by GSPA (for GSPA use only) ☒ date (mm/dd/yy): 07/10/26
Department/School approval date (mm/dd/yy): 09/16/26
Graduate Faculty Sub-Committee approval date (mm/dd/yy): 09/22/26
Faculty Council approval date (mm/dd/yy):

Graduate Studies
Program Revision Template

Prior to form submission, review the instructions and information regarding major/minor modifications. For questions about the form submission, contact Trevor Clews, Graduate Studies and Postdoctoral Affairs (GSPA).

Faculty: Mathematics

Programs:

1) Doctor of Philosophy (PhD) in Applied Mathematics

2) Doctor of Philosophy (PhD) in Applied Mathematics - Aeronautics

3) Doctor of Philosophy (PhD) in Applied Mathematics - Quantum Information

4) Doctor of Philosophy (PhD) in Applied Mathematics - Water

5) Master of Mathematics (MMath) in Applied Mathematics

6) Master of Mathematics (MMath) in Applied Mathematics - Aeronautics

7) Master of Mathematics (MMath) in Applied Mathematics - Co-operative Program

8) Master of Mathematics (MMath) in Applied Mathematics - Quantum Information

9) Master of Mathematics (MMath) in Applied Mathematics - Water

Program contact name(s): Florian Girelli

Form completed by:

Description of proposed changes:
Note: changes to courses and milestones also require the completion/submission of the SGC Graduate Studies Course/Milestone Form.

Adding a "Colloquium Attendance" milestone to the degree requirements.

Is this a major modification to the program? No

Rationale for change(s):

A Colloquium Attendance milestone ensures that students develop a broad and adaptable scientific perspective, consistent with the goals of graduate education. Regular exposure to high-quality presentations is essential for developing students' own communication skills, a core graduate competency. Attendance fosters community integration, mentorship opportunities, and professional networking. Regular attendance helps students internalize research standards and develop the judgment required for independent research.

Proposed effective date: Term: Winter Year: 2027

Current Graduate Studies Academic Calendar (GSAC) page (include the link to the web page where the changes are to be made):

https://uwaterloo.ca/academic-calendar/graduate-studies/catalog#/programs?group=Applied%20Mathematics

Current Graduate Studies Academic Calendar content:	Proposed Graduate Studies Academic Calendar content:

PhD in Applied Mathematics
PhD in Applied Mathematics - Aeronautics
 	
Milestone requirements:
• PhD Comprehensive Examination
• PhD Lecturing Requirement
• PhD Thesis
 	
PhD in Applied Mathematics - Quantum Information
 	
Milestone requirements:
• PhD Comprehensive Examination
• PhD Lecturing Requirement
• PhD Quantum Information Seminar
• PhD Thesis
 	
PhD in Applied Mathematics - Water
 	
Milestone requirements:
• Collaborative Research Seminar I
• Collaborative Research Seminar II
• Collaborative Academic Contribution
• PhD Comprehensive Examination
• PhD Lecturing Requirement
• PhD Thesis
 	
MMath in Applied Mathematics
 	
Thesis option: Milestone requirements:
• Master's Thesis
 	
Master's Research Paper option: Milestone requirements:
• Master's Research Paper
 	
MMath in Applied Mathematics - Aeronautics
MMath in Applied Mathematics - Quantum Information
 	
Milestone requirements:
• Master's Thesis
 	
MMath in Applied Mathematics - Co-operative Program
 	
Thesis option: Milestone requirements:
• Graduate Studies Work Report
• Master's Thesis
	PhD in Applied Mathematics
	PhD in Applied Mathematics - Aeronautics
	
	Milestone requirements:
	• Colloquium Attendance
	  ○ Over the course of their degree program, students are required to attend at least 24 colloquia (i.e., about 6 colloquia per year on average). Students that entered the program directly from a Bachelor's program are required to attend at least 30 colloquia. Colloquium attendance should be reported in the students' Term Activity Report.
	• PhD Comprehensive Examination
	• PhD Lecturing Requirement
	• PhD Thesis
	
	PhD in Applied Mathematics - Quantum Information
	
	Milestone requirements:
	• Colloquium Attendance
	  ○ Over the course of their degree program, students are required to attend at least 24 colloquia (i.e., about 6 colloquia per year on average). Students that entered the program directly from a Bachelor's program are required to attend at least 30 colloquia. Colloquium attendance should be reported in the students' Term Activity Report.
	• PhD Comprehensive Examination
	• PhD Lecturing Requirement
	• PhD Quantum Information Seminar
	• PhD Thesis
	
	PhD in Applied Mathematics - Water
	
	Milestone requirements:
	• Colloquium Attendance
	  ○ Over the course of their degree program, students are required to attend at least 24 colloquia (i.e., about 6 colloquia per year on average). Students that entered the program directly from a Bachelor's program are required to attend at least 30 colloquia. Colloquium attendance should be

Current Graduate Studies Academic Calendar content:	Proposed Graduate Studies Academic Calendar content:
Master's Research Paper option: Milestone requirements: • Graduate Studies Work Report • Master's Research Paper ## MMath in Applied Mathematics - Water **Milestone requirements:** • Collaborative Research Seminar I • Master's Thesis	reported in the students' Term Activity Report. • Collaborative Research Seminar I • Collaborative Research Seminar II • Collaborative Academic Contribution • PhD Comprehensive Examination • PhD Lecturing Requirement • PhD Thesis ## MMath in Applied Mathematics **Thesis option: Milestone requirements:** • Colloquium Attendance o Over the course of their degree program, students are required to attend at least 12 colloquia (i.e., about 6 colloquia per year on average). Colloquium attendance should be reported in the students' Term Activity Report. • Master's Thesis **Master's Research Paper option: Milestone requirements:** • Colloquium Attendance o Over the course of their degree program, students are required to attend at least 12 colloquia (i.e., about 6 colloquia per year on average). Colloquium attendance should be reported in the students' Term Activity Report. • Master's Research Paper ## MMath in Applied Mathematics - Aeronautics ## MMath in Applied Mathematics - Quantum Information **Milestone requirements:** • Colloquium Attendance o Over the course of their degree program, students are required to attend at least 12 colloquia (i.e., about 6 colloquia per year on average). Colloquium attendance should be reported in the students' Term Activity Report. • Master's Thesis ## MMath in Applied Mathematics - Co-operative Program

Current Graduate Studies Academic Calendar content:	**Proposed Graduate Studies Academic Calendar content**:

	Thesis option: Milestone requirements:
	• Colloquium Attendance
	  ○ Over the course of their degree program, students are required to attend at least 12 colloquia (i.e., about 6 colloquia per year on average). Colloquium attendance should be reported in the students' Term Activity Report.
	• Graduate Studies Work Report
	• Master's Thesis
	
	Master's Research Paper option: Milestone requirements:
	• Colloquium Attendance
	  ○ Over the course of their degree program, students are required to attend at least 12 colloquia (i.e., about 6 colloquia per year on average). Colloquium attendance should be reported in the students' Term Activity Report.
	• Graduate Studies Work Report
	• Master's Research Paper
	
	MMath in Applied Mathematics - Water
	
	Milestone requirements:
	• Colloquium Attendance
	  ○ Over the course of their degree program, students are required to attend at least 12 colloquia (i.e., about 6 colloquia per year on average). Colloquium attendance should be reported in the students' Term Activity Report.
	• Collaborative Research Seminar I
	• Master's Thesis

How will students currently registered in the program be impacted by these changes?

Current students will not be impacted by the changes. Students that enter the program as of Winter 2027 will be required to complete the new milestone.

Reviewed by GSPA (for GSPA use only) ☒ date (mm/dd/yy): 09/22/26
Department/School approval date (mm/dd/yy): 06/22/26
Graduate Faculty Sub-Committee approval date (mm/dd/yy): 09/22/26
Faculty Council approval date (mm/dd/yy):
Senate Graduate Council (SGC) approval date (mm/dd/yy):

UNIVERSITY OF WATERLOO | Senate

For Approval **Open Session - Consent**

To:	Senate Graduate Council
From:	Mike Beazley Associate Dean, Graduate Studies
Date of Meeting:	November 2, 2026
Agenda Item:	**3.2.4. Faculty of Science**

Recommendation/Motion

To recommend that Senate Graduate Council approve, through its consent agenda, the proposed minor modifications to existing graduate courses and programs for the Faculty of Science, effective January 1, 2027, as presented.

Jurisdictional Information

As outlined in the council's Terms and Reference, Senate Graduate Council is empowered to make recommendation and approvals on behalf of Senate for a variety of matters:

- On behalf of Senate, consider and approve all new graduate courses, the deletion of graduate courses, and proposed minor modifications to existing graduate courses and programs, and provide Senate with a brief summary of Council's deliberations in this regard.

Governance Path

Senate Graduate Council: November 2, 2026

Date 2026/10/19

Show Empty Fields

Meeting Information

Agenda Page Title
SGC - Faculty of Science - Consent Agenda - November 2, 2026

Career Level
Graduate,

Faculty/Unit
Science

Date
2026-11-02

Summary

Course Proposals:

1) School of Pharmacy

a. *2 course revisions*

Program Proposals:

1) School of Pharmacy

1.1) PhD in Pharmacy

1.2) MSc in Pharmacy

a. *Revising the Graduate Studies Seminar milestone requirements.*

Other Business

Attachment(s)

Course Proposals

Courses: Retire
No proposals have been added.

Courses: New
No proposals have been added.

Courses: Changes

Code	Title	Type	Workflow Step
PHARM 609	Advanced Pharmacokinetics	Courses	SGC, Senate Graduate Council (SGC)

PHARM 653	Methods in Clinical and Applied Research	Courses	SGC, Senate Graduate Council (SGC)

Programs & Plans Proposals

Programs & Plans: Retire
No proposals have been added.

Programs & Plans: Major Modifications
No proposals have been added.

Programs & Plans: Minor Modifications

Code	Title	Type	Workflow Step
PhD in Pharmacy	Doctor of Philosophy (PhD) in Pharmacy	Programs	SGC, Senate Graduate Council (SGC)
MSc in Pharmacy	Master of Science (MSc) in Pharmacy	Programs	SGC, Senate Graduate Council (SGC)

Regulations Proposals

Regulations: Retire
No proposals have been added.

Regulations: New
No proposals have been added.

Regulations: Changes
No proposals have been added.

PHARM 609 - Advanced Pharmacokinetics

Top

Effective Date & Career

Career
Graduate

Effective Term and Year

Proposed

Effective Term and Year
Winter 2027

Existing

Effective Term and Year
Fall 2023

Quest Course ID
14082

Offering Number
1

Proposal Details

Proposal Type
Change

Academic Unit Approval
2026-05-28

Unit Weight/Number Changes
No

Rationale and Background for Change

Course description is updated to reflect change in software used for pharmacokinetic modelling (using NONMEM instead of Phoenix).

Course Information

Faculty
Faculty of Science

Academic Unit
School of Pharmacy

Subject Code
PHARM

Number
609

Is this course cross-listed?
No

Title
Advanced Pharmacokinetics

Abbreviated Title
Advanced Pharmacokinetics

Description

Proposed

Description
This course provides statistical hands-on knowledge for the implementation of nonlinear mixed effects (NLME) models in the analysis of population pharmacokinetic data. In order to provide a foundation for NLME, the content builds from simple to multiple linear regression models and to linear mixed effects models. Exploratory and descriptive analyses, as well as model implementation will be taught in R and NONMEM.

Existing

Description
This course provides statistical hands-on knowledge for the implementation of nonlinear mixed effects (NLME) models in the analysis of population pharmacokinetic data. In order to provide a foundation for NLME, the content builds from simple to multiple linear regression models and to linear mixed effects models. Exploratory and descriptive analyses as well as model implementation will be taught in R and Phoenix.

Units
0.50

Exceptions to Fees or Academic Progress Units
No

Components

Lecture

Primary Component

Lecture

Grading Information

Grading Basis

Numerical Grading Basis

Repeatable Courses

Can this course be repeated for credit?

No

Enrolment Rules

Consent to Add

Instructor consent required

Consent to Drop

No consent required

Prerequisites

Corequisites

Antirequisites

Course Notes

Workflow Information

Workflow Path

Committee approvals

Faculty/AFIW Path(s) for Workflow

Faculty of Science

Dependencies

There are no dependencies

PHARM 653 - Methods in Clinical and Applied Research

Top

Effective Date & Career

Career
Graduate

Effective Term and Year

Proposed

Effective Term and Year
Winter 2027

Existing

Effective Term and Year
Fall 2023

Quest Course ID
16372

Offering Number
1

Proposal Details

Proposal Type
Change

Unit Weight/Number Changes
No

Rationale and Background for Change

Changing the grading basis from CR/NCR to Numerical. This course was originally developed for the MPharm program and approved with a non-numerical grading basis by the Pharmacy Council in April 2021. It was offered only once under that program. In Spring 2025, the course was delivered to students in thesis-based graduate programs, which typically employ a numeric grading basis. To ensure consistency with other graduate courses and support appropriate academic evaluation, it is proposed that the course be revised to adopt a numeric grading basis for all future offerings.

Course Information

Faculty
Faculty of Science

Academic Unit
School of Pharmacy

Subject Code
PHARM

Number
653

Is this course cross-listed?
No

Title
Methods in Clinical and Applied Research

Abbreviated Title
Clinical Research

Description
This course will provide an overview of common research methods used to address questions in clinical, applied and translational research. Research ethics and responsible conduct of research will be addressed. This course will touch on basic concepts in successful grant writing.

Units
0.50

Exceptions to Fees or Academic Progress Units
No

Components
Lecture

Primary Component
Lecture

Grading Information

Grading Basis

Proposed

Grading Basis
Numerical Grading Basis

Existing

Grading Basis
Credit/No Credit

Repeatable Courses

Can this course be repeated for credit?
No

Enrolment Rules

Consent to Add
Instructor consent required

Consent to Drop
No consent required

Prerequisites

Corequisites

Antirequisites

Course Notes

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Science

Dependencies

There are no dependencies

PhD in Pharmacy - Doctor of Philosophy (PhD) in Pharmacy

Top

Effective Date and Career

Career
Graduate

Effective Term and Year
Proposed

Effective Term and Year
Winter 2027

Existing

Effective Term and Year
Fall 2025

Proposal Details

Proposal Type
Change

Academic Unit Approval
2026-05-28

Quality Assurance Designation
Minor Modification Qad

Is there an impact to existing students?

Yes

Impact on Existing Students

Students will be able to focus on post-defence revisions and final submission of their thesis to UWSpace.

Is the credential name changing?
No

Graduate Co-operative Requirements
Not Applicable

Change to Learning Outcomes
No

Rationale and Background for Change(s)

Revising the Graduate Studies Seminar milestone requirements. Students are currently required to attend seminars until their degree is fully completed. However, when students are working under tight program-completion deadlines, this requirement can create unnecessary barriers. In addition, final degree-completion coding is approved by the Science Dissertation Coordinator, who may not always be aware that a student has outstanding seminar requirements if they have not met the minimum before their defence. This change will help remove avoidable administrative obstacles.

General Program/Plan Information

Faculty
Faculty of Science

Academic Unit
School of Pharmacy

Graduate Field of Study
Pharmacy

Faculty
Faculty of Science

Program/Plan Name
Doctor of Philosophy (Ph D) in Pharmacy

Graduate Credential Type
PhD

Accelerated Program
Not applicable

Admit Term(s)
Fall, Winter, Spring

Delivery Mode
On-campus

Delivery Mode Information

Kitchener campus

Registration Option(s)
Full-time, Part-time

Graduate Research Fields

- Pharmaceutical Sciences
- Pharmacy Practice and Health Services Research
- Pharmacoepidemiology and Health Outcomes Research

Admissions

Admission Requirements: Minimum Requirements

- A 78% overall standing in a two-year Master of Science (MSc) or equivalent degree, in a relevant field.
- We expect that most students entering our program will have previously graduated from a thesis based MSc degree. There is a possibility to be admitted to the Ph D program in the absence of a thesis based MSc and equivalency will be established on a case-by-case basis. The Admissions Committee however, will require evidence that the student has fulfilled the expected MSc outcomes even in the absence of the MSc degree.
- Students in the MSc in Pharmacy program at the University of Waterloo may apply to transfer to the Ph D in Pharmacy program after their first year in the MSc program but not later than the end of the second year. To be eligible to transfer, the following conditions must be met:
  - The student must have completed at least 2 courses (a total of 1.00 credit units) at the graduate level, including PHARM 601, and have achieved a score of at least 75% in each course.
  - The student must be in good academic standing, including not being on probation or carrying incomplete grades.
  - The student must demonstrate good progress in a research project that the Advisory Committee considers could be expanded to a Ph D project.
  - The student must demonstrate superior academic, research and scientific writing and oral presentation skills such that the experience of conducting research, collecting and analyzing data and preparing and defending a thesis at the MSc level could be bypassed. Implicit in this is that the student must demonstrate the necessary potential for research skills and knowledge to successfully complete a Ph D.
- Enrolment in the Ph D program for transfer students will be counted from the date of initial registration in the MSc in Pharmacy program. The student may begin work on the Ph D only after the transfer is approved.
- English language proficiency (ELP) (if applicable)

Admission Requirements: Application materials

- Program-specific questions (PSQ)
- Résumé
- Transcript(s)

Admission Requirements: References

- Number of references: 3

- Type of references: at least 2 academic

Requirements Information

Graduate Degree Requirements

- Students must complete the course and milestone requirements listed below in addition to the Graduate Academic Integrity Module (Graduate AIM).
- Note: In their first year, students will establish their Supervisory Committee, begin their coursework and research, and define and present their thesis proposal.

Graduate Course Requirements

No Rules

Graduate Course Requirements

- Students must complete 3 to 5 one-term graduate-level courses (0.50 unit weight), depending on route of entry into the program.
- Students can only take 1 'Special Topics' course for credit toward their graduate degree program requirements (e.g. PHARM 608A or PHARM 611).
- Students admitted after completing the University of Waterloo MSc in Pharmacy degree must complete the following:
  - PHARM 616A Ph D Thesis Proposal (numerical), within the first year.
  - 2 additional one-term graduate elective courses (0.50 credit weight). Students who completed PHARM 610 Topics in Drug Development in their MSc program cannot take the course again for credit in the Ph D program. Another 0.50 credit weight graduate course from the School of Pharmacy graduate curriculum must be taken instead.
  - Completed by a maximum of 12 terms (four years).
- Students admitted with an MSc degree from a program other than the University of Waterloo MSc in Pharmacy (or admitted with an equivalent degree to an MSc degree) must complete the following:
  - PHARM 616A Ph D Thesis Proposal (numerical), within the first year.
  - PHARM 610 Topics in Drug Development.
  - 1 additional one-term graduate elective course (0.50 unit weight).
  - Completed by a maximum of 12 terms (four years).
- Students who transferred into the Ph D in Pharmacy program from the University of Waterloo MSc in Pharmacy program after successfully completing PHARM 601 MSc Thesis Proposal must complete the following:
  - PHARM 616B Ph D Thesis Proposal (credit/no credit granted).
  - PHARM 610 Topics in Drug Development.

    - 3 additional one-term graduate elective courses (0.50 unit weight).
    - Completed by a maximum of 18 terms (six years – students should note that the term count continues when they change their program from MSc to Ph D so this time period includes any terms completed in the University of Waterloo MSc program).
- Students who are admitted directly from a Bachelor of Science (BSc) degree must complete the following:
    - PHARM 616A Ph D Thesis Proposal (numerical), within the first year.
    - PHARM 610 Topics in Drug Development.
    - 3 one-term graduate elective courses (0.50 unit weight).
    - Completed by a maximum of 18 terms.

- Students must complete all graduate courses with a final mark of 70% or greater and an overall cumulative average of 75% or greater.
- Among the 3 to 5 courses taken, graduate-level courses from outside the School of Pharmacy curriculum may be accepted toward these requirements if approved by the supervisor, Advisory Committee and the Graduate Officer. The main criterion for acceptance will be gaining knowledge in an area that is outside the background of the student but will benefit their research program. Graduate students and their Advisory Committee must ensure that the course selection reflects a graduate degree in Pharmacy.

Milestone Requirements

Proposed

Milestone Requirements

Graduate Studies Seminar

- Students will be required to continuously attend the School of Pharmacy Research Seminar Series until they have completed their thesis defence. Attendance at 5 seminars each term will be the minimum required for full-time students. Attendance at 2 seminars each term will be the minimum required for part-time students.
- Students who defend their thesis before the 100% refund deadline are not required to attend seminar that term.
- Students who defend their thesis between the 100% and 50% refund deadlines must attend two seminars if enrolled full-time, or one seminar if enrolled part-time.
- Students who defend their thesis after the 50% refund deadline must attend the minimum required according to their enrollment status.
- Reasonable exceptions for not meeting minimum attendance in a term will be granted by the Graduate Officer in cases of illness, unavoidable TA or course conflict, and research conference attendance. Outside employment, experimental preparation, final thesis writing and vacation are not considered reasonable exceptions for attendance.
- This milestone also requires students enrolled in the Ph D in Pharmacy program to orally present their research within the Research Seminar Series or in rare and pre-approved circumstances at an acceptable alternative scientific forum. The milestone will be considered complete when the Graduate Officer has approved the setting (if not the Research Seminar Series) as a reasonable venue for scientific presentation and the presentation in either context has been completed.

Ph D Comprehensive Examination

- Students are required to meet the University-level Ph D Comprehensive Examination minimum requirements.

- In addition to the University-level Ph D Comprehensive Examination minimum requirements, students in the Ph D in Pharmacy program are also required to meet the following requirements:
    - Students with no previous studies at the Ph D level must begin the comprehensive examination not later than the end of their fourth term of studies.

Ph D Thesis

- Students must submit and defend a thesis, embodying the results of original research.
- The third and fourth years of the student‘s program are devoted to research, writing, and defending the thesis. In addition to demonstrating the ability to carry out research and teaching at the highest intellectual level, our students will be able to communicate the fruits of that research to a much wider audience than simply those in their particular area of specialty. At the thesis defense, students are required to make a public presentation of their research, which is part of the Program‘s commitment to ensuring the public intelligibility of scholarship.

Other requirements

- Thesis Advisory Committee meetings: the thesis advisory committee must be formed during the student’s first term.
- The thesis advisory committee must meet formally to report on the student’s progress, at least annually, according to the following schedule: 1) the first meeting of the thesis advisory committee meeting must be held by the end of the first term; 2) the thesis proposal examination should take place by the end of the second term and no later than the middle of the third term; 3) subsequent general meetings must be held at least annually.
- The student must submit a written report following each thesis advisory committee meeting.

Existing

Milestone Requirements

Graduate Studies Seminar

- This milestone requires students enrolled in the program to attend the School of Pharmacy Research Seminar Series continuously throughout their program. Attendance at 5 seminars each term will be the minimum required for full-time students. Attendance at 2 seminars each term will be the minimum required for part-time students.

- Reasonable exceptions for not meeting minimum attendance in a term will be granted by the Graduate Officer in cases of illness, unavoidable TA or course conflict, and research conference attendance. Outside employment, experimental preparation, final thesis writing and vacation are not considered reasonable exceptions for attendance.
- This milestone also requires students enrolled in the Ph D in Pharmacy program to orally present their research within the Research Seminar Series or in rare and pre-approved circumstances at an acceptable alternative scientific forum. The milestone will be considered complete when the Graduate Officer has approved the setting (if not the Research Seminar Series) as a reasonable venue for scientific presentation and the presentation in either context has been completed.
- Students who were admitted to the Ph D in Pharmacy program prior to Fall 2014 (1149) and who have already presented at a major national or international conference or acceptable alternative scientific forum may receive approval of completion of this component of this milestone, and will be considered on a case by case basis.

Ph D Comprehensive Examination

- Students are required to meet the University-level Ph D Comprehensive Examination minimum requirements.

- In addition to the University-level Ph D Comprehensive Examination minimum requirements, students in the Ph D in Pharmacy program are also required to meet the following requirements:
  - Students with no previous studies at the Ph D level must begin the comprehensive examination not later than the end of their fourth term of studies.

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Other requirements

- Thesis Advisory Committee meetings: the thesis advisory committee must be formed during the student’s first term.
- The thesis advisory committee must meet formally to report on the student’s progress, at least annually, according to the following schedule: 1) the first meeting of the thesis advisory committee meeting must be held by the end of the first term; 2) the thesis proposal examination should take place by the end of the second term and no later than the middle of the third term; 3) subsequent general meetings must be held at least annually.
- The student must submit a written report following each thesis advisory committee meeting.

Notes

- School of Pharmacy website
- Doctor of Philosophy (Ph D) in Pharmacy future graduate students program page

Specializations

Undergraduate Plan Guidelines

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Science

Dependencies

There are no dependencies

MSc in Pharmacy - Master of Science (MSc) in Pharmacy Top

Effective Date and Career

Career
Graduate

Effective Term and Year
Proposed

Effective Term and Year
Winter 2027

Existing

Effective Term and Year
Fall 2025

Proposal Details

Proposal Type
Change

Academic Unit Approval
2026-05-28

Quality Assurance Designation
Minor Modification Qad

Is there an impact to existing students?
Yes

Impact on Existing Students

Students will be able to focus on post-defence revisions and final submission of their thesis to UWSpace.

Is the credential name changing?
No

Graduate Co-operative Requirements
Not Applicable

Change to Learning Outcomes
No

Rationale and Background for Change(s)

Revising the Graduate Studies Seminar milestone requirements. Students are currently required to attend seminars until their degree is fully completed. However, when students are working under tight program-completion deadlines, this requirement can create unnecessary barriers. In addition, final degree-completion coding is approved by the Science Dissertation Coordinator, who may not always be aware that a student has outstanding seminar requirements if they have not met the minimum before their defence. This change will help remove avoidable administrative obstacles.

General Program/Plan Information

Faculty
Faculty of Science

Academic Unit
School of Pharmacy

Graduate Field of Study
Pharmacy

Faculty
Faculty of Science

Program/Plan Name
Master of Science (MSc) in Pharmacy

Graduate Credential Type
Master's

Accelerated Program
Not applicable

Study Options (New)
Thesis

Admit Term(s)
Fall, Winter, Spring

Delivery Mode
On-campus

Delivery Mode Information

Kitchener campus

Registration Option(s)
Full-time, Part-time

Registration Options Information

The program may be offered part-time on a case-by-case basis upon consideration of the circumstances by the Associate Director of Research and Graduate Studies, School of Pharmacy, and the Associate Dean of Graduate Studies, Faculty of Science.

Graduate Research Fields

- Pharmaceutical Sciences
- Pharmacy Practice and Health Services Research
- Pharmacoepidemiology and Health Outcomes Research

Admissions

Admission Requirements: Minimum Requirements

- Admission to the program requires a minimum 78% average in the last 2 years of a four-year Honours Bachelor of Science program or equivalent.
- English language proficiency (ELP) (if applicable)

Admission Requirements: Application materials

- Program-specific questions (PSQ)
- Résumé
- Transcript(s)

Admission Requirements: References

- Number of references: 2
- Type of references: academic

Requirements Information

Graduate Degree Requirements

- Students must complete the course and milestone requirements listed below in addition to the Graduate Academic Integrity Module (Graduate AIM).

Thesis Option: Course Requirements

Thesis Option: Course Requirements

- Students must successfully complete 4 one-term (0.50 unit weight) graduate courses including PHARM 601 MSc Thesis Proposal and PHARM 610 Topics in Drug Development.
- Graduate level courses from outside of the School of Pharmacy curriculum may be accepted toward these requirements if approved by the supervisor, Advisory Committee and Graduate Officer. Among the 4 courses taken, one 400-level course may be accepted toward this requirement if approved by the supervisor and Advisory Committee. The main criterion for acceptance will be based on gaining knowledge in an area that is outside the background of the student but will benefit their research program. Graduate students and their Advisory Committee must ensure that the course selection reflects a graduate degree in Pharmacy.
- Students can only take 1 'Special Topics' course for credit toward their graduate degree program requirements (e.g. PHARM 608 or PHARM 611).
- A minimum of 70% must be obtained in any graduate course taken by an MSc in Pharmacy student to be granted pass standing, and the candidate must obtain an average of at least 75% in the courses presented in fulfillment of the MSc in Pharmacy degree.

Thesis Option: Milestone Requirements

Proposed

Thesis Option: Milestone Requirements

Graduate Studies Seminar

- Students will be required to continuously attend the School of Pharmacy Research Seminar Series until they have

completed their thesis defence. Attendance at 5 seminars each term will be the minimum required for full-time students. Attendance at 2 seminars each term will be the minimum required for part-time students.
- Students who defend their thesis before the 100% refund deadline are not required to attend seminar that term.
- Students who defend their thesis between the 100% and 50% refund deadlines must attend two seminars if enrolled full-time, or one seminar if enrolled part-time.
- Students who defend their thesis after the 50% refund deadline must attend the minimum required according to their enrollment status.
- Reasonable exceptions for not meeting minimum attendance in a term will be granted by the Graduate Officer in cases of illness, unavoidable TA or course conflict and research conference attendance. Outside employment, experimental preparation, final thesis writing and vacation are not considered reasonable exceptions for attendance.

Master's Thesis

- Students must prepare and orally defend a thesis embodying the results of their research on a topic approved by their supervisor and Advisory Committee.

Other requirements

- Thesis Advisory Committee meetings: the thesis advisory committee must be formed during the student's first term.
- The thesis advisory committee must meet formally to report on the student's progress, at least annually, according to the following schedule: 1) the first meeting of the thesis advisory committee meeting must be held by the end of the first term; 2) the thesis proposal examination should take place by the end of the second term and no later than the middle of the third term; 3) subsequent general meetings must be held at least annually.
- The student must submit a written report following each thesis advisory committee meeting.

Existing

Thesis Option: Milestone Requirements

Graduate Studies Seminar

- This milestone requires students enrolled in the program to attend the School of Pharmacy Research Seminar Series continuously throughout their program. Attendance at 5 seminars each term will be the minimum required for full-time students. Attendance at 2 seminars each term will be the minimum required for part-time students.
- Reasonable exceptions for not meeting minimum attendance in a term will be granted by the Graduate Officer in cases of illness, unavoidable TA or course conflict and research conference attendance. Outside employment, experimental preparation, final thesis writing and vacation are not considered reasonable exceptions for attendance.

Master's Thesis

- Students must prepare and orally defend a thesis embodying the results of their research on a topic approved by their supervisor and Advisory Committee.

Other requirements

- Thesis Advisory Committee meetings: the thesis advisory committee must be formed during the student's first term.
- The thesis advisory committee must meet formally to report on the student's progress, at least annually, according to the following schedule: 1) the first meeting of the thesis advisory committee meeting must be held by the end of the first term; 2) the thesis proposal examination should take place by the end of the second term and no later than the middle of the third term; 3) subsequent general meetings must be held at least annually.
- The student must submit a written report following each thesis advisory committee meeting.

Notes

- School of Pharmacy website
- Master of Science (MSc) in Pharmacy future graduate students program page

Specializations

Undergraduate Plan Guidelines

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Science

Dependencies

There are no dependencies

UNIVERSITY OF WATERLOO | Graduate Studies and Postdoctoral Affairs

October 20, 2026

TO: Ashley Day, Associate University Secretary
Tony Kongly, Governance Officer

FROM: Heidi Mussar, Associate Director, Graduate Financial Aid & Awards

RE: Agenda items for Senate Graduate Council – November 2026

Awards for Information

a) Dr. E. Palmer Patterson II Graduate Scholarship in Indigenous Histories – endowment/trust

Originally established in 2025, this award is being amended to update the purpose and award criteria to align with the Faculty of Arts' new program structure. The revised criteria also expand eligibility to include both full-time and part-time graduate students.

The updated award description is as follows:

One award, valued at $1,500, will be provided annually to a graduate student registered full time or part time in the History program in the Faculty of Arts. Selection will be based on academic achievement and a demonstrated interest in Indigenous histories. Interested students should submit a letter between 500 – 750 words demonstrating their interest in and engagement with Indigenous Studies by the advertised deadline. Selection will be made by the History program. The scholarship has been established by Francesca Patterson, with support from the Patterson Rozee Family Foundation, in memory of her father Dr. E Palmer Patterson II who taught in the History Department from 1964 to 1992. In 1972, Dr. Patterson wrote the first comprehensive academic history of the Indigenous Peoples of Canada, "The Canadian Indian: A History Since 1500".

b) Faculty of Arts School Graduate Scholarships – operating

Originally established as the "Faculty of Arts Departmental Graduate Scholarships" in 2015 and then amended in April 2026, the award is being further amended to reflect the changes resulting from the reorganization of the Faculty of Arts into six Schools. Five of the Schools have graduate programs that typically nominate students for this award.

Effective for the 2027/2028 fiscal year onwards, the 15 departmental scholarships will be collapsed into five based on the Schools. Any references to "department" are replaced with "School".

The updated award description will be as follows:

Established through graduate student fees, the Faculty of Arts School Graduate Scholarships are available to students registered full time in a master's or doctoral program in the Faculty of Arts. Recipients will be automatically selected by their School based on academic achievement.

c) Sponsored Master's Award Program [S-MAP Course-Based + S-MAP Research] – operating

Previously approved at SGC in September 2026 and recognizing that the terms of this program are a benefit to both the sponsor and the student, the terms are being amended to clarify that this "award" is actually being provided as a tuition discount. The updated description for this program is as follows:

International students who are admitted to and registered full time in any course-based or research-based master's program will be automatically considered for this award that is applied as a tuition discount. Students must be admitted full time to a master's program under a signed international sponsorship agreement for the duration of their academic program. Students in a course-based program will receive an award of up to $10,000 via a tuition discount; research-based master's students will receive an annual award, via a tuition discount, of up to $12,500 as part of an annual minimum funding package of $19,500. Selection will be based on academic achievement and research potential, as determined through assessment for admission.

UNIVERSITY OF WATERLOO | Senate

For Information **Open Session**

To:	Senate Graduate Council
From:	Justin Wan Associate Vice-President, Graduate Studies and Postdoctoral Affairs
Date of Meeting:	November 2, 2026
Agenda Item:	**5. Chair's Remarks**

Summary

Justin Wan, Chair, Senate Graduate Council, will provide opening remarks and updates on items of importance to begin the meeting.

Documentation Provided

N/A

UNIVERSITY OF WATERLOO | Senate

For Approval **Open Session**

To:	Senate Graduate Council
From:	Christopher Nielsen Associate Dean, Graduate Studies
Date of Meeting:	November 2, 2026
Agenda Item:	**6.1. Faculty of Engineering**

Recommendation/Motion

That Senate approve the major modifications to the Master of Engineering (MEng) in Systems Design Engineering within the Faculty of Engineering, effective September 1, 2027, as presented.

Proposal/Rationale

The Faculty of Engineering has expressed intent to add a program-level work integrated learning (WIL) experience (co-op) option to their graduate program. The co-op components of the degree will be fully administered by Co-operative & Experiential Education (CEE) with the degree requirements being managed by the program.

CEE, in principle, supports the new proposed MEng Systems Design Engineering (SYDE) Co-op program with the understanding of a cap of 10 students for Fall 2027, admitted termly, and growth to 60 students per year admitted termly, in steady state. CEE will utilize existing staff, resources, and co-op processes across the portfolio to support this new program, as it does for other graduate co-op programs in Engineering and will collaborate with the academic unit on the development and administration of co-op components of the degree.

Our analysis of the current industry and co-op job data indicates the need for a distinct value proposition for the technical, professional and interpersonal skills that the MEng SYDE program will deliver. Clarity on this will impact CEE's ability to develop quality co-op work terms that meet program requirements as well as student expectations and priorities (brand recognition of firms to support career paths, affordability, location). When the program is approved, CEE will initiate work to develop employer and future job potential for students in the program, the required WIL and career programming, as well as ensuring that backend system and records processing needs are in place.

CEE recommends the faculty consider the following:

- Establish co-op admission requirements well in advance of Fall 2027 and set it as a direct admission program to reduce barriers for international students who

are required to obtain a co-op work permit to work in Canada.
- Review the implications of involvement in co-op as related to items such as, but not limited to, student statuses, funding packages and scholarships, and co-op fees.
- Establishment of strategic enrolment management goals in the context of overall engineering student enrolment, program enrolment and the impact on co-op jobs.
- The current job market is rapidly evolving as it responds to AI and uncertainty in the economy. Future co-op employment opportunities are difficult to predict, and students will need to be flexible in their work term expectations (e.g., location, employer brand recognition, salary). To support our work in developing jobs, it will be important that the program collaborate with CEE to identify the specific technical, professional and interpersonal skill development outcomes of the program.
- Engaging and collaborating with CEE, as the program develops over time, to understand the skills MEng SYDE students are gaining and comparing these with the skill requirements of co-op employers (ex. Sharing data from the Graduate Studies Reflective Report).

CEE, with leadership from the designated Faculty Relations Manager, will:

- Provide labour market and co-op job analysis for MEng SYDE Co-op to the job development working group to establish strong connections between the program and CEE that will inform industry and job development activities, including funding programs such as MITACS and SWPP.
- Collaborate with the Associate Chair Graduate Studies for Systems Design Engineering and the Graduate Officer/Coordinator to work through the Co-op Program Implementation Plan.

Jurisdictional Information

As outlined in the council's Terms and Reference, Senate Graduate Council is empowered to make approvals on behalf of Senate for a variety of matters:

- Consider, study and review all proposals for new graduate programs, the deletion of graduate programs, and/or major modifications to existing graduate programs, and make recommendations to Senate thereon.

Governance Path

Faculty of Engineering: June 18, 2026

Senate Graduate Council: November 2, 2026

Senate: November 23, 2026

Documentation Provided

6.1. Faculty of Engineering

Date 2026/10/22

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Meeting Information

Agenda Page Title
SGC - Faculty of Engineering - Regular Agenda - November 2, 2026

Career Level
Graduate,

Faculty/Unit
Engineering

Date
2026-11-02

Summary

Program Proposals:

1) Systems Design Engineering:

2.1) MEng in Systems Design Engineering - Co-operative Program *(attached)*

a. *Adding a direct entry Co-operative program/option to the MEng in Systems Design Engineering program.*

Attachment(s)

- MEng in SYDE - Co-op graduate_studies_program_revision_template - Reviewed by GSPA - Revised.pdf
- M. Eng SYDE CEE Assessment for New Graduate Co-op Program - January 2026.pdf
- M. Eng SYDE Co-op Industry and Job Analysis - January 2026.pdf

Course Proposals

Courses: Retire
No proposals have been added.

Courses: New
No proposals have been added.

Courses: Changes
No proposals have been added.

Programs & Plans Proposals

Programs & Plans: Retire
No proposals have been added.

Programs & Plans: Major Modifications
No proposals have been added.

Programs & Plans: Minor Modifications
No proposals have been added.

Regulations Proposals

Regulations: Retire
No proposals have been added.

Regulations: New
No proposals have been added.

Regulations: Changes
No proposals have been added.

Graduate Studies
Program Revision Template

Prior to form submission, review the instructions and information regarding major/minor modifications. For questions about the form submission, contact Trevor Clews, Graduate Studies and Postdoctoral Affairs (GSPA).

Faculty: Engineering

Program: Master of Engineering (MEng) in Systems Design Engineering - Co-operative Program

Program contact name(s): Nasser Lashgarian Azad

Form completed by: Tara Campbell, Nasser Lashgarian Azad

Description of proposed changes:
Note: changes to courses and milestones also require the completion/submission of the SGRC Graduate Studies Course/Milestone Form.

Adding a direct entry Co-operative program/option to the MEng in Systems Design Engineering program.

Is this a major modification to the program? Yes

Rationale for change(s):

The new co-op program/option will allow the selected MEng students to apply their knowledge gained in their coursework in the workplace and reinforce their professional development. Further benefits include:

- *Helps in developing communication skills, networking, and new collaborations.*
- *Aligns well with the University's and the province's vision on "Work Integrated Learning" in graduate studies.*
- *Helps attract good applicants to the MEng in Systems Design Engineering program.*
- *Allows students to maximize their employability potential by providing them with job search skills and valuable co-op work experience.*

Feedback from graduate students and potential employers has been collected through the program's most recent cyclical review indicating clear support of the program. Initially, the program capacity will be limited to 10 students for Fall 2027, admitted termly, and growth to 60 students per year admitted termly, in steady state. The program capacity will be reviewed yearly based on the number of work experiences, types of jobs and employers' evaluations. In the event of a student not finding a co-op work experience, or maintaining academic excellence, the student may transfer to the regular MEng program without co-op.

The co-op program/option will be supported by Co-operative Education. Attached are the Assessment for New Graduate Co-op Program and Industry and Job Analysis that were completed by Co-operative Education.

Proposed effective date: Term: Fall Year: 2027

Current Graduate Studies Academic Calendar (GSAC) page (include the link to the web page where the changes are to be made):

https://uwaterloo.ca/academic-calendar/graduate-studies/catalog#/programs?group=Systems%20Design%20Engineering&bc=true&bcCurrent=Systems%20Design%20Engineering&bcItemType=programs

Current MEng in Systems Design Engineering Graduate Studies Academic Calendar content:	Proposed MEng in Systems Design Engineering - Co-operative Program Graduate Studies Academic Calendar content:
MASTER OF ENGINEERING (MENG) IN SYSTEMS DESIGN ENGINEERING **Faculty** • Faculty of Engineering **Academic unit** • Department of Systems Design Engineering **Admit term(s)** • Fall • Winter • Spring **Delivery mode** • On-campus **Registration option(s)** • Full-time • Part-time **Study option(s)** • Coursework **Length of program** • Full-time: 4 terms (16 months) • Part-time: 8 terms (32 months) **Graduate specializations** • Artificial Intelligence and Machine Learning • Biomedical Systems • Human Factors • Mechatronics and Physical Systems • Vision, Image and Signal Processing **Admission requirements: Minimum requirements** • A 4-year Honours Bachelor's degree in engineering. For applicants whose previous degree was completed in Canada, a 75% overall standing in the last two years, or equivalent (at the sole discretion of the University of Waterloo, in all cases), in a four-year Honour's Bachelor's degree in engineering is the minimum requirement for admission to a Master's program. • Due to the variable nature of international credentials, for applicants whose previous degree was completed outside of Canada, a 75% overall standing in a four-year Honours Bachelor's degree in engineering or equivalent is the minimum requirement for admission.	**MASTER OF ENGINEERING (MENG) IN SYSTEMS DESIGN ENGINEERING – CO-OPERATIVE PROGRAM** **Faculty** • Faculty of Engineering **Academic unit** • Department of Systems Design Engineering **Admit term(s)** • Fall • Winter • Spring **Delivery mode** • On-campus **Program type(s)** • Co-operative **Registration option(s)** • Full-time • ~~Part-time~~ **Study option(s)** • Coursework **Length of program** • Full-time: 4-5 terms (16-20 months) • ~~Full-time: 4 terms (16 months)~~ • ~~Part-time: 8 terms (32 months)~~ **Graduate specializations** • Artificial Intelligence and Machine Learning • Biomedical Systems • Human Factors • Mechatronics and Physical Systems • Vision, Image and Signal Processing **Admission requirements: Minimum requirements** • A 4-year Honours Bachelor's degree in engineering. For applicants whose previous degree was completed in Canada, a 75% overall standing in the last two years, or equivalent (at the sole discretion of the University of Waterloo, in all cases), in a four-year Honour's Bachelor's degree in engineering is the minimum requirement for admission to a Master's program. • Due to the variable nature of international credentials, for applicants whose previous

Current MEng in Systems Design Engineering Graduate Studies Academic Calendar content:	Proposed MEng in Systems Design Engineering - Co-operative Program Graduate Studies Academic Calendar content:

• Applicants who do not hold a Honours Bachelor's degree in engineering must justify their suitability by demonstrating formal or informal training in engineering through the supplementary information form (SIF), their resume/CV, or other supporting material.
• English language proficiency (ELP) (if applicable)
 	
Admission requirements: Application materials
• Program-specific questions (PSQ)
• Résumé
• Transcript(s)
 	
Admission requirements: References
• Number of references: 2
• Type of references: a minimum of 1 academic reference. Applicants who complete their degree five or more years before the application date may submit 2 professional references.
 	
Degree requirements
• Students must complete the course requirements listed below in addition to the Graduate Academic Integrity Module (Graduate AIM).
 	
Coursework option: Course requirements
• Students must complete the following 2 core Systems Design Engineering graduate courses:
  ○ SYDE 600 Systems Theory, Models, Research & Design
  ○ 1 of:
  ▪ SYDE 660A Systems Design Graduate Workshop 1 - AI and Machine Learning,
  ▪ SYDE 660B Systems Design Graduate Workshop 1 - Biomedical Systems,
  ▪ SYDE 660C Systems Design Graduate Workshop 1 - Human Factors,
  ▪ SYDE 660D Systems Design Graduate Workshop 1 - Mechatronic & Physical Systems,
  ▪ SYDE 660E Systems Design Graduate Workshop 1 - Vision, Image & Signal Processing, or
  ▪ SYDE 660 Systems Design Graduate Workshop 1
	degree was completed outside of Canada, a 75% overall standing in a four-year Honours Bachelor's degree in engineering or equivalent is the minimum requirement for admission.
	• Applicants who do not hold a Honours Bachelor's degree in engineering must justify their suitability by demonstrating formal or informal training in engineering through the supplementary information form (SIF), their resume/CV, or other supporting material.
	• English language proficiency (ELP) (if applicable)
	
	Admission requirements: Application materials
	• Program-specific questions (PSQ)
	• Résumé
	• Transcript(s)
	
	Admission requirements: References
	• Number of references: 2
	• Type of references: a minimum of 1 academic reference. Applicants who complete their degree five or more years before the application date may submit 2 professional references.
	
	Degree requirements
	• Students must complete the course and milestone requirements listed below in addition to the Graduate Academic Integrity Module (Graduate AIM).
	• The MEng in Systems Design Engineering – Co-operative Program will enable students to combine graduate studies with work experience. The program requires successful completion of 1-2 credited standard work terms. The work term(s) typically takes place in term 3 (or terms 3 and 4). The work term(s) must meet CEE standard work term requirements and Departmental requirements. Students should apply to jobs related to their program of study. Note: the program must start and end on an academic term.
	• Students are required to complete WIL 601 Career Foundations for Work-Integrated Learning in their first academic term of their co-op program. Students must complete WIL 601 in addition to the program's course requirements.
	
	Coursework option: Course requirements
	• Students must complete the following 2 core Systems Design Engineering graduate courses:

Current MEng in Systems Design Engineering Graduate Studies Academic Calendar content:	**Proposed MEng in Systems Design Engineering - Co-operative Program Graduate Studies Academic Calendar content**:

• In addition to the 2 core courses, students must complete 6 Engineering graduate courses (0.50 unit weight per course) counting towards degree credit from the University of Waterloo satisfying the following criteria:
  o At least 2 Systems Design Engineering courses at the 500, 600 or 700 level.
  o At most 2 courses at the 500 level.
  o At most 2 graduate courses may be taken from the Faculty of Mathematics.
• Students in the MEng in Systems Design Engineering program may also choose to pursue one of the following five Graduate Specializations:
1. Artificial Intelligence and Machine Learning
2. Biomedical Systems
3. Human Factors
4. Mechatronics and Physical Systems
5. Vision, Image and Signal Processing
• A Graduate Specialization is a University credential that is recognized on the student's transcript but not on the diploma and is intended to reflect that a student has successfully completed a set of courses that together provide an in-depth study in the area of the Graduate Specialization. A student will only obtain the Graduate Specialization on their transcript if they have completed the requirements associated with the MEng degree and the requirements associated with the Graduate Specialization.
• All MEng Graduate Specializations in Systems Design Engineering consist of a set of 4 graduate (0.50 weight) level courses and this set is comprised of a mix of specified and elective courses. Specified courses are those that are prescribed as part of the Graduate Specialization. Elective courses are those that are on a list of courses designated as electives for a given Graduate Specialization. The requirements for each of the five Graduate Specializations are described below.
1. Graduate Specialization in Artificial Intelligence and Machine Learning
• Students must satisfy the following:
• 3 Specified courses:
  o SYDE 522 Foundations of AI or SYDE 552 Computational Neurosciences
  o SYDE 660A Systems Design Graduate Workshop 1 – AI and Machine Learning
  o SYDE 675 Pattern Recognition
• Elective courses (at least 1 course from the following list):
	o SYDE 600 Systems Theory, Models, Research & Design
	o 1 of:
	▪ SYDE 660A Systems Design Graduate Workshop 1 - AI and Machine Learning,
	▪ SYDE 660B Systems Design Graduate Workshop 1 - Biomedical Systems,
	▪ SYDE 660C Systems Design Graduate Workshop 1 - Human Factors,
	▪ SYDE 660D Systems Design Graduate Workshop 1 - Mechatronic & Physical Systems,
	▪ SYDE 660E Systems Design Graduate Workshop 1 - Vision, Image & Signal Processing, or
	▪ SYDE 660 Systems Design Graduate Workshop 1
	• In addition to the 2 core courses, students must complete 6 Engineering graduate courses (0.50 unit weight per course) counting towards degree credit from the University of Waterloo satisfying the following criteria:
	  o At least 2 Systems Design Engineering courses at the 500, 600 or 700 level.
	  o At most 2 courses at the 500 level.
	  o At most 2 graduate courses may be taken from the Faculty of Mathematics.
	• Students in the MEng in Systems Design Engineering program may also choose to pursue one of the following five Graduate Specializations:
	1. Artificial Intelligence and Machine Learning
	2. Biomedical Systems
	3. Human Factors
	4. Mechatronics and Physical Systems
	5. Vision, Image and Signal Processing
	• A Graduate Specialization is a University credential that is recognized on the student's transcript but not on the diploma and is intended to reflect that a student has successfully completed a set of courses that together provide an in-depth study in the area of the Graduate Specialization. A student will only obtain the Graduate Specialization on their transcript if they have completed the requirements associated with the MEng degree and the requirements associated with the Graduate Specialization.
	• All MEng Graduate Specializations in Systems Design Engineering consist of a set of 4

Current MEng in Systems Design Engineering Graduate Studies Academic Calendar content:	**Proposed MEng in Systems Design Engineering - Co-operative Program Graduate Studies Academic Calendar content**:
○ SYDE 670 Deployment of Deep Learning Models ○ SYDE 671 Advanced Image Processing ○ SYDE 672 Statistical Image Processing ○ SYDE 673 Video Processing & Analytics 2. Graduate Specialization in Biomedical Systems • Students must satisfy the following: • 3 Specified courses: ○ SYDE 660B Systems Design Graduate Workshop 1 – Biomedical Systems ○ BME 544 Biomedical Measurement and Signal Processing ○ SYDE 684 Materials Biocompatability • Elective courses (at least 1 course from the following list) ○ SYDE 652 Dynamics of Multibody Systems ○ SYDE 677 Medical Imaging 3. Graduate Specialization in Human Factors • Students must satisfy the following: • 3 Specified courses: ○ SYDE 660C Systems Design Graduate Workshop 1 – Human Factors ○ At least 2 from the following list: ▪ SYDE 542 Interface Design or SYDE 543 Cognitive Ergonomics ▪ SYDE 642 Cognitive Engineering Methods ▪ SYDE 644 Human Factors Testing • Elective courses (or an additional course from the Specified course list): ○ SYDE 533 Conflict Resolution • Note that only one 500 level course may be used to satisfy the requirements of a Graduate Specialization. Therefore, if SYDE 542 or SYDE 543 is taken as a Specified course, then SYDE 533 cannot be taken to satisfy the Elective course requirement. 4. Graduate Specialization in Mechatronic and Physical Systems • Students must satisfy the following: • 3 Specified courses: ○ SYDE 660D Systems Design Graduate Workshop 1 - Mechatronic & Physical Systems ○ At least 2 from the following list: ▪ SYDE 553 Advanced Dynamics ▪ SYDE 652 Dynamics of Multibody Systems ▪ SYDE 655 Optimal Control	graduate (0.50 weight) level courses and this set is comprised of a mix of specified and elective courses. Specified courses are those that are prescribed as part of the Graduate Specialization. Elective courses are those that are on a list of courses designated as electives for a given Graduate Specialization. The requirements for each of the five Graduate Specializations are described below. 1. Graduate Specialization in Artificial Intelligence and Machine Learning • Students must satisfy the following: • 3 Specified courses: ○ SYDE 522 Foundations of AI or SYDE 552 Computational Neurosciences ○ SYDE 660A Systems Design Graduate Workshop 1 – AI and Machine Learning ○ SYDE 675 Pattern Recognition • Elective courses (at least 1 course from the following list): ○ SYDE 670 Deployment of Deep Learning Models ○ SYDE 671 Advanced Image Processing ○ SYDE 672 Statistical Image Processing ○ SYDE 673 Video Processing & Analytics 2. Graduate Specialization in Biomedical Systems • Students must satisfy the following: • 3 Specified courses: ○ SYDE 660B Systems Design Graduate Workshop 1 – Biomedical Systems ○ BME 544 Biomedical Measurement and Signal Processing ○ SYDE 684 Materials Biocompatability • Elective courses (at least 1 course from the following list) ○ SYDE 552 Computational Neurosciences ○ SYDE 652 Dynamics of Multibody Systems ○ SYDE 677 Medical Imaging • Note that only one 500 level course may be used to satisfy the requirements of a Graduate Specialization. Therefore, if BME 544 is taken as a Specified course, then SYDE 552 cannot be taken to satisfy the Elective course requirement. 3. Graduate Specialization in Human Factors • Students must satisfy the following: • 3 Specified courses: ○ SYDE 660C Systems Design Graduate Workshop 1 – Human Factors ○ At least 2 from the following list:

Current MEng in Systems Design Engineering Graduate Studies Academic Calendar content:	**Proposed MEng in Systems Design Engineering - Co-operative Program Graduate Studies Academic Calendar content**:
▪ SYDE 682 Advanced MEMS, Physics, Design & Fabrication ▪ SYDE 683 Modelling, Simulation & Design of MEMS • Elective courses (at least 1 from the following list or an additional course from the Specified course list): o SYDE 531 Design Opt. under Probabilistic Uncertainty o SYDE 631 Time Series Modelling • Note that only one 500 level course may be used to satisfy the requirements of a Graduate Specialization. Therefore, if SYDE 553 is taken as a Specified course, then SYDE 531 cannot be taken to satisfy the Elective course requirement. 5. Graduate Specialization in Vision, Image and Signal Processing • Students must satisfy the following: • 3 Specified courses: o SYDE 660E Systems Design Graduate Workshop 1 - Vision, Image & Signal Processing o At least 2 from the following list: ▪ SYDE 575 Image Processing ▪ SYDE 671 Advanced Image Processing ▪ SYDE 677 Medical Imaging • Elective courses (at least 1 from the following list or an additional course from the Specified course list): o BME 544 Biomedical Measurement and Signal Processing o SYDE 633 Remote Sensing Systems o SYDE 672 Statistical Image Processing o SYDE 673 Video Processing & Analytics o SYDE 675 Pattern Recognition • Note that only one 500 level course may be used to satisfy the requirements of a Graduate Specialization. Therefore, if SYDE 575 is taken as a specified course, then BME 544 cannot be taken to satisfy the Elective course requirement. • All course selections are arranged by the student. • Note: these requirements are in addition to satisfactory completion of any transitional courses that may be specified at the time of admission. • For any Graduate Specialization, an equivalent course related to the Graduate Specialization may replace an elective course with the approval of the Department Graduate Officer.	▪ SYDE 542 Interface Design or SYDE 543 Cognitive Ergonomics ▪ SYDE 642 Cognitive Engineering Methods ▪ SYDE 644 Human Factors Testing • Elective courses (or an additional course from the Specified course list): o SYDE 533 Conflict Resolution • Note that only one 500 level course may be used to satisfy the requirements of a Graduate Specialization. Therefore, if SYDE 542 or SYDE 543 is taken as a Specified course, then SYDE 533 cannot be taken to satisfy the Elective course requirement. 4. Graduate Specialization in Mechatronic and Physical Systems • Students must satisfy the following: • 3 Specified courses: o SYDE 660D Systems Design Graduate Workshop 1 - Mechatronic & Physical Systems o At least 2 from the following list: ▪ SYDE 553 Advanced Dynamics ▪ SYDE 652 Dynamics of Multibody Systems ▪ SYDE 655 Optimal Control ▪ SYDE 682 Advanced MEMS, Physics, Design & Fabrication ▪ SYDE 683 Modelling, Simulation & Design of MEMS • Elective courses (at least 1 from the following list or an additional course from the Specified course list): o SYDE 531 Design Opt. under Probabilistic Uncertainty o SYDE 631 Time Series Modelling • Note that only one 500 level course may be used to satisfy the requirements of a Graduate Specialization. Therefore, if SYDE 553 is taken as a Specified course, then SYDE 531 cannot be taken to satisfy the Elective course requirement. 5. Graduate Specialization in Vision, Image and Signal Processing • Students must satisfy the following: • 3 Specified courses: o SYDE 660E Systems Design Graduate Workshop 1 - Vision, Image & Signal Processing o At least 2 from the following list: ▪ SYDE 575 Image Processing

Current MEng in Systems Design Engineering Graduate Studies Academic Calendar content:	**Proposed MEng in Systems Design Engineering - Co-operative Program Graduate Studies Academic Calendar content**:
Additional 700-level courses relevant to the various Graduate Specializations may be offered periodically throughout the academic year. Students should contact the Graduate Coordinator to inquire about courses that align with their Graduate Specialization elective.	▪ SYDE 671 Advanced Image Processing ▪ SYDE 677 Medical Imaging • Elective courses (at least 1 from the following list or an additional course from the Specified course list): o BME 544 Biomedical Measurement and Signal Processing o SYDE 633 Remote Sensing Systems o SYDE 672 Statistical Image Processing o SYDE 673 Video Processing & Analytics o SYDE 675 Pattern Recognition • Note that only one 500 level course may be used to satisfy the requirements of a Graduate Specialization. Therefore, if SYDE 575 is taken as a specified course, then BME 544 cannot be taken to satisfy the Elective course requirement. • All course selections are arranged by the student. • Note: these requirements are in addition to satisfactory completion of any transitional courses that may be specified at the time of admission. • For any Graduate Specialization, an equivalent course related to the Graduate Specialization may replace an elective course with the approval of the Department Graduate Officer. Additional 700-level courses relevant to the various Graduate Specializations may be offered periodically throughout the academic year. Students should contact the Graduate Coordinator to inquire about courses that align with their Graduate Specialization elective. **Graduate WIL Reflective Report Milestone** • The Graduate WIL Reflective Report requires students to critically reflect on their co-op work term experience, connecting academic knowledge to practical tasks and professional development. Students must complete one reflective report per required work term. The report is administered, evaluated, and graded by the Centre for Work-Integrated Learning. • Students are responsible for following the roles and responsibilities of Cooperative and Experiential Education (CEE).

How will students currently registered in the program be impacted by these changes?

No impact for current students as this is a direct entry co-operative program, and students cannot transfer into this program.

Reviewed by GSPA (for GSPA use only) ☒ date (mm/dd/yy): 09/09/26
Department/School approval date (mm/dd/yy): 06/18/26
Graduate Faculty Sub-Committee approval date (mm/dd/yy):
Faculty Council approval date (mm/dd/yy):
Senate Graduate & Research Council (SGRC) approval date (mm/dd/yy):

CO-OPERATIVE AND EXPERIENTIAL EDUCATION
Co-operative Education
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Co-operative & Experiential Education (Co-op) Assessment for New Graduate Co-op Plan

January 30, 2026

Proposed Program: Master of Engineering in Systems Design Engineering (Co-op)

Program Effective Date: Fall 2027

Requested by: Nasser Azad, Professor, Associate Chair

Prepared by: Eva Skuza, Faculty Relations Manager, Engineering, Richard Wikkerink, Director, Student & Faculty Relations and Diego Orbe, Analyst

Executive Summary

The Faculty of Engineering has expressed intent to add a program-level work integrated learning (WIL) experience (co-op) option to their graduate program. The co-op components of the degree will be fully administered by Co-operative & Experiential Education (CEE) with the degree requirements being managed by the program.

CEE, in principle, supports the new proposed M. Eng Systems Design Engineering (SYDE) Co-op program with the understanding of a cap of 10 students for Fall 2027, admitted termly, and growth to 60 students per year admitted termly, in steady state. CEE will utilize existing staff, resources, and co-op processes across the portfolio to support this new program, as it does for other graduate co-op programs in Engineering and will collaborate with the academic unit on the development and administration of co-op components of the degree.

Our analysis of the current industry and co-op job data indicates the need for a distinct value proposition for the technical, professional and interpersonal skills that the M. Eng SYDE program will deliver. Clarity on this will impact CEE's ability to develop quality co-op work terms that meet program requirements as well as student expectations and priorities (brand recognition of firms to support career paths, affordability, location). When the program is approved, CEE will initiate work to develop employer and future job potential for students in the program, the required WIL and career programming, as well as ensuring that backend system and records processing needs are in place.

CEE recommends the faculty consider the following:

- Establish co-op admission requirements well in advance of Fall 2027 and set it as a direct admission program to reduce barriers for international students who are required to obtain a co-op work permit to work in Canada.
- Review the implications of involvement in co-op as related to items such as, but not limited to, student statuses, funding packages and scholarships, and co-op fees.
- Establishment of strategic enrolment management goals in the context of overall engineering student enrolment, program enrolment and the impact on co-op jobs.
- The current job market is rapidly evolving as it responds to AI and uncertainty in the economy. Future co-op employment opportunities are difficult to predict, and students will need to be flexible in their work term expectations (e.g., location, employer brand recognition, salary). To support our work in developing jobs, it will be important that the program collaborate with CEE to identify the specific technical, professional and interpersonal skill development outcomes of the program.



- Engaging and collaborating with CEE, as the program develops over time, to understand the skills M. Eng SYDE students are gaining and comparing these with the skill requirements of co-op employers (ex. Sharing data from the Graduate Studies Reflective Report).

CEE, with leadership from the designated Faculty Relations Manager, will:

- Provide labour market and co-op job analysis for M. Eng SYDE Co-op to the job development working group to establish strong connections between the program and CEE that will inform industry and job development activities, including funding programs such as MITACS and SWPP.
- Collaborate with the Associate Chair Graduate Studies for Systems Design Engineering and the Graduate Officer/Coordinator to work through the Co-op Program Implementation Plan.

Work-Integrated Learning at UW

Co-operative Education is a form of work integrated learning (WIL), which allows students to apply classroom learning to the workplace and, likewise, connect workplace learning to their degree and areas of specialization. For those students who are seeking a stronger connection between their studies and industry, the University of Waterloo's co-op programs distinguish it amongst Canadian institutions. Furthermore, CEE provides a robust system of support for students (domestic and international visa) seeking work experiences in Canada or internationally.

Benefits go beyond the students. Industry partners benefit by gaining access to a wider range of students who bring varied experiences personally, professionally, and academically. All stakeholders will benefit from opportunities for idea exchange and strengthened connection between academic research and innovations in industry.

Introducing a new co-op plan aligns with UW's strategic focus at an institutional level and will continue to reinforce UW as a WIL leader for both undergraduate and graduate programs.

The key components of a quality WIL experience are pedagogy, experience, assessment and reflection, or P.E.A.R. Making sure all four elements are included in the development of program-level WIL are critical for creating a quality WIL experience.

- Pedagogy – includes the academic course content and the WIL curriculum
- Experience – meaningful and aligned appropriately with the WIL model
- Assessment – including the learning outcomes for the program + Future Ready Talent Framework
- Reflection – on the WIL experience and in alignment with the idea of "purposeful work"

Co-op Program Structure

The M. Eng SYDE Co-op program, as with other graduate co-op programs, will follow the existing co-op model. All co-op students are responsible for following the procedures, roles and responsibilities of co-op students. Each student is assigned a Co-op Advisor, who acts as a guide and expert resource for the duration of the program.

Co-op students are automatically enrolled in WIL 601 in their first study term. WIL 601 provides students with information on navigating the co-op employment process, foundational career preparation and teaches students how to prepare professional job search documents.

The Centre for Career Development (CCD) provides career and co-op preparation resources and services (e.g.: building self-awareness to support career storytelling and effective job searching; labour market awareness; iterative career planning and goal-setting, etc.) for all students. These services are accessed more readily when incorporated into existing courses and promoted by the academic program.

Co-op work terms must meet standard work term requirements for all graduate students. M. Eng SYDE students will have access to the co-op job board through WaterlooWorks or may arrange their own employment, externally, which must be approved by CEE. During the experience, graduate students will be supported by Co-op Advisors through site visits, e-check-ins, work term ratings. Employers will evaluate the work performance of students via the Student Performance Evaluation (SPE); a rating of 'marginal' or above will grant the student credit for the work term.

As a best practice, it is recommended students in Graduate Co-op plans return for a final study term following the co-op work experience. The program will facilitate a work report or reflection assignment post-experience, which will also be a co-op degree milestone, however, there are currently discussions taking place around a Graduate Studies Reflective Report that, if passed, will replace the current report or reflection and will be administered by the Centre for Work-Integrated Learning.

To evaluate program effectiveness and WIL outcomes, the CEE Faculty Relations Manager, Engineering, will monitor key metrics annually to ensure program quality.

Co-op Sequence

Students in M. Eng SYDE Co-op will be required to complete one standard co-op work term; however, CEE strongly recommends that the program allow for two consecutive co-op work terms in their program structure. Strategically, this proposed sequence would provide a longer immersive work experience for students, which is particularly appealing to industry partners, and would be consistent with other UW graduate co-op plans.

For the first cohort, the proposed program will have students scheduled for Spring and Fall work terms, which historically has a high number of students scheduled out for work terms in both undergraduate and graduate programs, increasing internal competition for jobs alongside strong external competition for Spring jobs, in particular.

Proposed M. Eng SYDE Co-op Sequence (note that students will be admitted termly):

Term 1	Term 2	Term 3	Term 4	Term 5
Study	Study	Work Term	Work Term	Study

Co-op Admissions

Programs seeking to add co-op as an option for their students, must do so by creating a direct-entry co-op program. There are a range of benefits to this structure, including CEE's ability to forecast earlier the number of students expected to be scheduled for a work term from the program and adjust employer and student-facing resources as necessary. Most notably, CEE can assist visa students in their work permit applications upon program admission, ensuring work terms are not negatively impacted by processing times.

Students will apply and be directly admitted into the M. Eng SYDE Co-op Program plan in Fall 2027. The academic unit will need to establish a specific process and criteria for admissions into this new program.

Where there is demand for co-op, consideration should be given to the value and intention of a WIL experience, as academic standing is not always an indicator of workplace success. Additionally, graduate students bring a range of personal, professional, and academic experiences and so while the more experienced students may ultimately be successful in finding co-op employment, they arguably may not be the students to benefit most from the WIL experience.

Degree Requirements

Graduate students completing the co-operative education degree requirements will receive a "Co-operative Education" degree designation. These requirements include the following:

- Complete a minimum of 1 standard co-op work term and receive a Student Performance Evaluation of "marginal" or better
- Complete a work report/reflection requirement administered by the academic department (or complete the proposed Graduate Studies Reflective Report administered by Centre for WIL)

Job Development

A job and labour market analysis has been completed by the Faculty Relations Manager, Engineering in collaboration with the Data Analytics and Reporting and the Industry Relations teams in CEE. It is the key resource for specific information about the labour market, job demands, and areas for business development related to the proposed M. Eng SYDE program. With the newly established job development structure within

CEE, there is additional focus on strategies to develop jobs that are meaningful for the learning of co-op students.

Generally, there are two years of lead time needed to develop jobs ahead of the first work term. With strong connections into associated industries, CEE can provide a range of suitable opportunities for students. Existing services and expertise within CEE will be leveraged to support students in their job search, noting that the new program plan will examine the resources required to provide these supports.

Additional Considerations

International Students and Work Experiences

The CEE international team will support work terms held outside of Canada, adhering to UW and Global Affairs Canada (GAC) travel polices and advisories.

International students requiring a Study Permit must also obtain a Co-op Work Permit in order to work in Canada for co-op credit. For direct-entry-to-co-op programs, students may use their Letter of Acceptance to apply for their Study Permit and Co-op Work Permit concurrently at the point of admission (before arrival to Canada). Doing so typically ensures that Co-op Work Permits are in-hand prior to students' first scheduled work terms, thereby enabling their complete participation in the job search. However, applying for a co-op work permit, or work permit extension from within Canada (e.g. after beginning studies) can result in delays, with recent processing times exceeding six months. Accordingly, international students are encouraged to regularly monitor and act upon communication from CEE and the Regulated Canadian Immigration Consultants to ensure they maintain eligibility for co-op participation.

Equity

Equity is an important component to consider within a competitive admissions and co-op process. For example, international students may encounter additional barriers such as: varying levels and types of work experience of incoming students, potential for travel restrictions, as well as the complexities of obtaining funding and/or security clearance that may be required for some roles. These can often be a disadvantage to international students and can delay or impact work term opportunities.

Co-op Program Implementation Plan

Following all levels of academic program approval for this new program and before the first term of admission, a Co-op Program Implementation Plan will be required. The Co-op Program Implementation Plan is a checklist of information, records, system, communications, etc., that ensures CEE administered co-op plans are set-up appropriately and necessary decisions are made. This is a collaborative activity led by a designated Faculty Relations Manager and the academic unit.

Signature



Richard Wikkerink
Director, Student & Faculty Relations
Co-operative & Experiential Education

January 30, 2026

Date

INDUSTRY AND JOB ANALYSIS FOR

MASTER OF ENGINEERING IN SYSTEMS DESIGN ENGINEERING CO-OP

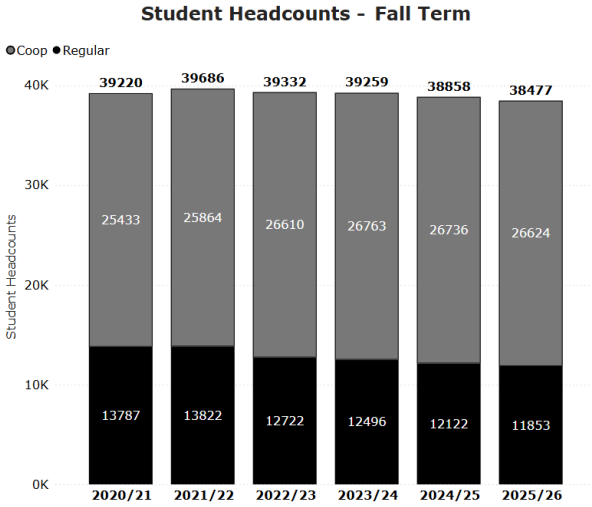
Prepared by: Eva Skuza, Faculty Relations Manager, Engineering & Diego Orbe, Analyst

January 30, 2026

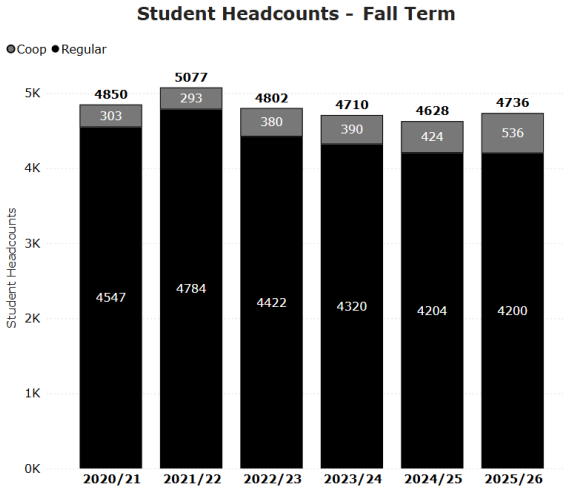
Introduction

Labour market and employment trends are volatile and change quickly. While this report is a snapshot in time, Co-operative and Experiential Education (CEE) actively monitors labour market and employment changes. Additional insights will be provided through regular updates at the faculty and program level, and more detailed data is provided in Cyclical Program Reviews.

As of Fall 2025, approximately 69% or roughly 26,600 undergrad and graduate students at the University of Waterloo are enrolled in co-operative education programs. Both the number of students in co-op and the proportion of students in co-op programs has shown steady increase until 2021 and slight decrease since 2022.



The number of graduate students enrolled in co-op programs from all faculties has been increasing steadily and most recent data shows that approximately 13% of graduate students have selected to participate in co-op.



The proposed Master of Engineering in Systems Design Engineering (Co-op) program is expected to add an additional 30 co-op students (yearly, 10 per term), which will equate to an additional 60 work terms in the first run of the program (10 students X 3 terms X 2 work terms). The projected growth for the program is 60 students admitted yearly over three terms (60 students X 2 work terms = 120 work terms).

To ensure that students in the M. Eng SYDE Co-op program are set up to succeed in co-op, Co-operative and Experiential Education (CEE) has conducted an analysis to understand co-op employment trends, job opportunities, external labour markets, and surveyed employer interest in these co-op students. Given the uncertainty in the labour market and the potential impacts of AI on co-op student employment, managing enrolment growth in step with labour market conditions and patterns will be vital.

Labour Market Potential: Employment Rates and Trends (2020-2025)

To get a sense of the labour market potential for students in the M. Eng SYDE Co-op program, the Faculty Relations Manager, Engineering, and the Associate Chair of Systems Design Engineering, collaborated on selecting relevant programs at Waterloo, which CEE then analyzed. The list of programs and the number of students scheduled out each year used for comparison are listed below.

While most data is summarized at the aggregate level, program level data is available upon request.

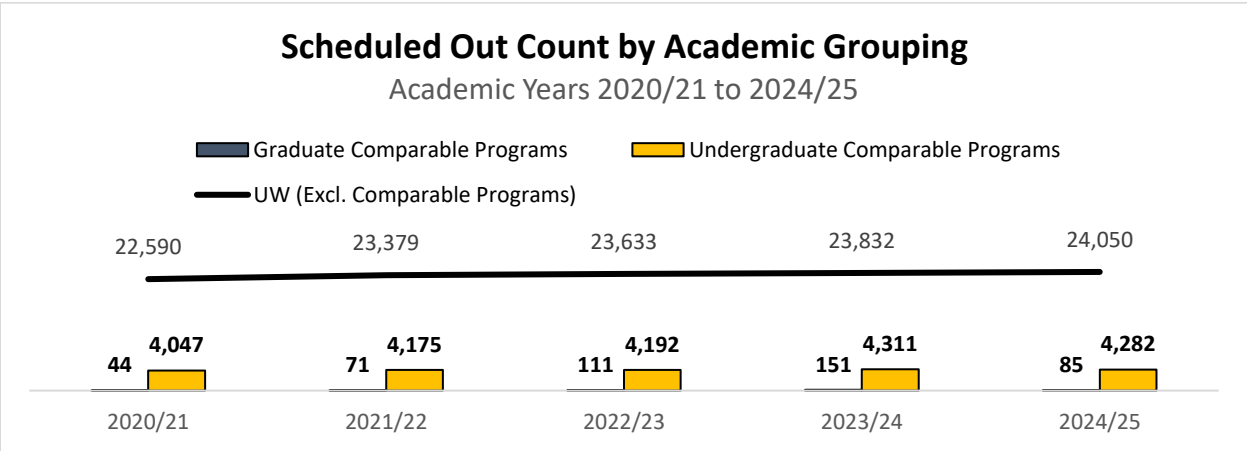
Undergraduate Comparable Programs

- Computer Engineering
- Electrical Engineering
- Management Engineering
- Software Engineering
- Systems Design Engineering

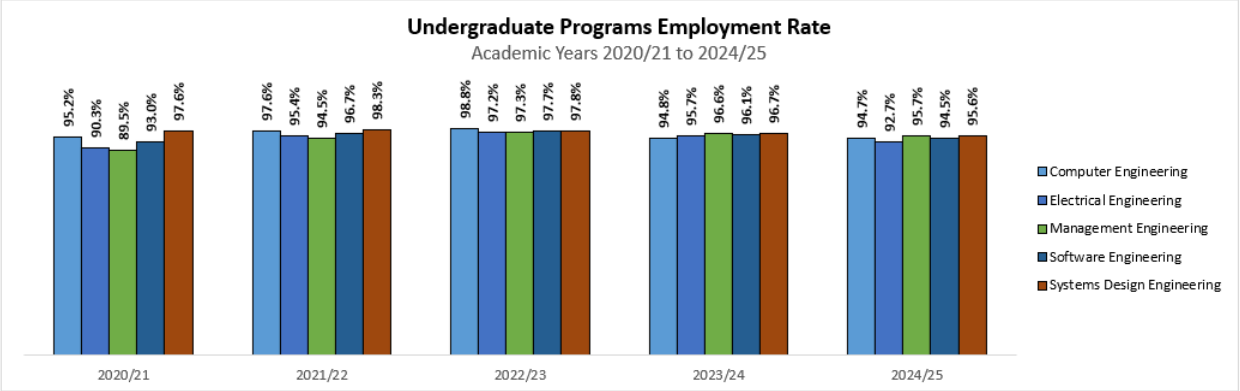
Graduate Comparable Programs

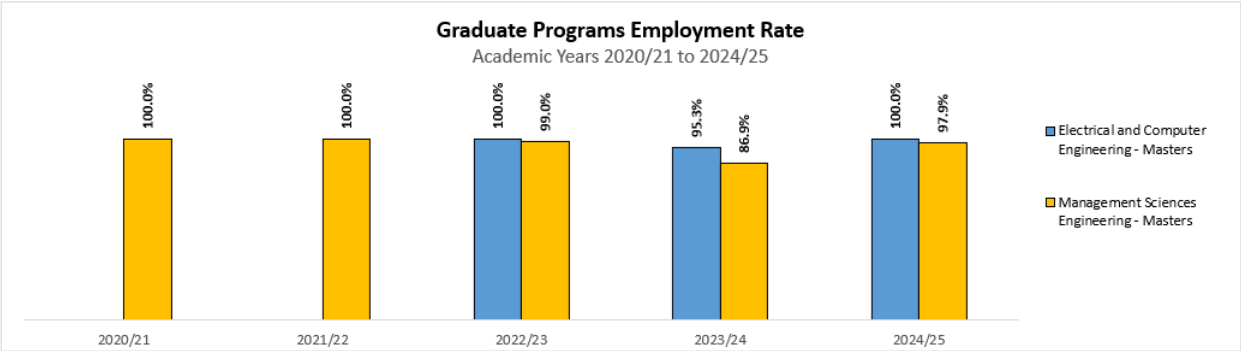
- Electrical and Computer Engineering - Masters
- Management Sciences Engineering - Masters

The number of students scheduled to go out on work terms each academic year appeared to be fairly consistent amongst comparable undergraduate programs from 2020 – 2025, with approximately 4000 students scheduled out each year with a slight dip in 2024/2025. Comparable graduate co-op programs saw significant growth until 2024 with 151 students and experienced a more significant a drop in scheduled out numbers in 2025 with 85 students, compared to comparable undergraduate programs.



Although the employment rates in 2020 and 2021 were impacted by the Covid-19 pandemic, the comparable undergraduate programs all seemed to follow the same trend in employment recovery from the pandemic (see 2020/21 employment), to maximal employment in 2022/23 and a decrease in the following years. This is consistent with larger economic trends. Comparable graduate programs did not follow this trend and appeared to experience strong employment overall, excluding outliers.





Although overall employment rates appear strong, shifting labour markets and economic downturns mean that students will need to access a variety of job search supports prior to their recruitment terms. Actively engaging with their Co-op Advisor and accessing both general and specific supports offered by the Centre for Career Development to understand potential career pathways and expand the work search would be beneficial. By searching for jobs both in and outside of WaterlooWorks, students would uncover more work opportunities aligned with their interests.

Co-op Hires by Volume and Industry (2020 – 2025)

Analysis of data on co-op hires by volume in WaterlooWorks, broken down by industry using the North American Industry Classification System NAICS, indicates strong alignment between the skills developed by students in the aforementioned programs and the sectors in which they worked from 2020-2025, however, it also shows that many M. Eng SYDE-relevant industries which expected future growth are trending downward, particularly those relevant to the comparable Masters programs (ECE and Management Sciences).

- There is large overlap between the top NAICS codes for undergraduate and graduate comparable programs
- The key difference between undergraduate and graduate is that graduate student have found more employment in the financial and retail sectors
- For many of these NAICS codes we see a downward trend (with the exception of Entrepreneurial work, and Architectural, Engineering and Related Services, and Management, Scientific and

Technical Consulting Services) and in employing students from these comparable programs. This could suggest that competition for roles in many sectors will be more intense.

Overall Top 10 NAICS Codes by Employed Count for Comparable Undergraduate Programs from AY2020/21 to AY2024/25

Employer NAICS Code	AY 2020/21 # Emp.	/Rank	AY 2021/22 # Emp.	/Rank	AY 2022/23 # Emp.	/Rank	AY 2023/24 # Emp.	/Rank	AY 2024/25 # Emp.	/Rank	Overall 20/21 to 24/2025	Trend	Overall Rank Change
5415 - Computer systems design and related services	607	1	697	1	605	1	539	1	571	1	3,019		0
5132 - Software publishers	463	2	496	2	403	2	336	2	365	2	2,063		0
6113 - Universities	224	3	117	7	111	7	166	4	175	3	793		0
5416 - Management, scientific and technical consulting services	146	4	150	3	132	5	161	5	141	5	730		-1
3361 - Motor vehicle manufacturing	95	10	120	6	138	3	179	3	147	4	679		6
0999 - Entrepreneurial	100	8	94	11	134	4	91	8	141	5	560		3
5614 - Business support services	135	5	139	4	99	9	91	8	77	12	541		-7
5413 - Architectural, engineering and related services	60	14	70	16	118	6	134	6	138	7	520		7
3344 - Semiconductor and other electronic component manufacturing	96	9	121	5	106	8	85	11	106	9	514		0
3342 - Communications equipment manufacturing	104	6	106	8	92	10	91	8	57	16	450		-10

Overall Top 10 NAICS Codes by Employed Count for Comparable Graduate Programs from AY2020/21 to AY2024/25

Employer NAICS Code	2018 # Emp.	/Rank	2019 # Emp.	/Rank	2020 # Emp.	/Rank	2021 # Emp.	/Rank	2022 # Emp.	/Rank	Overall 20/21 to 24/2025	Trend	Overall Rank Change
5415 - Computer systems design and related services	3	2	9	2	10	3	8	2	9	1	39		0
9129 - Other provincial and territorial public administration	3	2	10	1	7	4	7	3	4	3	31		0
4451 - Grocery and convenience retailers	8	1	6	3	14	2	2	18	1	18	31		0
5221 - Depository credit intermediation	2	4	1	12	15	1	10	1	0	48	28		-3
5416 - Management, scientific and technical consulting services	1	10	1	12	3	9	7	3	8	2	20		1
3361 - Motor vehicle manufacturing		27	1	12	3	9	7	3	2	7	13		3
5239 - Other financial investment activities		27	2	7	4	6	6	6	1	18	13		10
5241 - Insurance carriers		27	2	7	4	6	4	11	1	18	11		-7
5412 - Accounting, tax preparation, bookkeeping and payroll services		27	4	4	6	5	1	28	0	48	11		2
5132 - Software publishers	1	10	1	12	2	11	5	8	2	7	11		-9

It will be very important for students to be patient, flexible and adaptable in their job searches and open to accepting a wide array of job opportunities. CEE will continue to monitor trends and report back to the program.

Top Employers, Common Job Titles & NOC Codes (2020 - 2025)

The top 10 employers of co-op students by volume from the selected comparable programs are provided below. Overall, this is not a significant number of hires, and with the NAICS trends mostly indicating downward trends, incoming students will need to be aware that they will need to be open to working in organizations they may not be familiar with as competition with well-known employers may be significant.

Top employers from 2020-2025 for all comparable undergraduate programs

Top Employers for Comparable Undergraduate Programs from AY2020/21 to AY2024/25

Organization Name	Overall Hires 20/21 to 24/25
University of Waterloo	680
Ford Motor Company of Canada Limited	394
Tesla Inc	180
Meta	172
BlackBerry	172
RBC Financial Group	167
Shopify	159
Bridging Entrepreneurs to Student Initiative - University of Waterloo	157
Amazon.com Inc	157
Huawei Technologies Co., Ltd	147

Top employers from 2020-2025 for all comparable graduate programs

Top Employers for Comparable Graduate Programs from AY2020/21 to AY2024/25

Organization Name	Overall Hires 20/21 to 24/25
Loblaw Companies Limited	31
TD Bank Group	23
University of Waterloo	9
BDO Canada LLP	7
Ford Motor Company of Canada Limited	7
Workplace Safety and Insurance Board of Ontario 1	7
Nissan Canada Inc	6
Huawei Technologies Co., Ltd	6
Ontario Ministry of Transportation	6
Geotab Inc	6

In terms of the type of work co-op students have been focusing on at these top employers, students in the selected comparable programs are either in software-related roles or analyst roles.

Top job titles from 2020-2025 for all comparable undergraduate programs

Top Job Titles for Comparable Undergraduate Programs from AY2020/21 to AY2024/25

Job Title	Overall Hires 20/21 to 24/25
Software Engineering Intern	1183
Software Developer	986
Software Engineering	625
Full Stack Developer	336
Software Developer Intern	189
Software Developer Co-Op	122
Software Engineering Co-op	112
Software Development Engineering Intern	95
Product Manager	91
Research Assistant	89

Top job titles from 2020-2025 for all comparable graduate programs

Top Job Titles for Comparable Graduate Programs from AY2020/21 to AY2024/25

Job Title	Overall Hires 20/21 to 24/25
Business Systems Analyst	19
Data Analyst	10
Business Analyst	8
Data Scientist	7
Software Developer Intern	5
Software Engineering Intern	5
Software Development Intern	5
SAP iXp Intern-Product Management	4
Marketing Analyst	4
Business Data Analyst - Co-op	4

The NOC is Canada's national system for describing occupations. Based on data in WaterlooWorks, an analysis of the relevant occupational codes that M. Eng SYDE students are suited to pursue showed that:

- Similarly to the NAICS, there is large overlap between the top NOC codes for undergraduate and graduate comparable programs.
- The key difference between undergraduate and graduate is that graduate students have found more employment in business and data centered roles.
- Nearly all top NOC codes have decreasing employment trends for hiring students from the comparable programs. Electrical and Electronics Engineers and Professional Occupations in Business Management Consulting are the only occupational codes showing increase in employing students in comparable undergraduate programs.

Overall Top 10 NOC Codes by Employed Count for Comparable Undergraduate Programs from AY2020/21 to AY2024/25

Employer NOC Code	AY 2020/21 # Emp.	/Rank	AY 2021/22 # Emp.	/Rank	AY 2022/23 # Emp.	/Rank	AY 2023/24 # Emp.	/Rank	AY 2024/25 # Emp.	/Rank	Overall 20/21 to 24/25	Trend	Overall Rank Change
21231 Software Engineers and Designers	1342	1	1599	1	1524	1	1417	1	1044	1	6,926		0
21234 Web Developers and Programmers	469	2	416	2	370	2	325	2	184	7	1,764		0
21232 Software Developers and Programmers	387	3	313	3	267	4	265	3	262	4	1,494		0
21311 Computer Engineers (Except Software Engineers and Designers)	272	4	287	4	309	3	243	5	240	5	1,351		-1
21310 Electrical and Electronics Engineers	130	7	163	6	219	5	258	4	277	3	1,047		6
11201 Professional Occupations in Business Management Consulting	164	5	212	5	180	6	205	6	204	6	965		3
21211 Data Scientists	109	8	154	7	103	7	108	7	103	8	577		7
21222 Information Systems Specialists	91	9	81	8	93	8	97	8	71	11	433		-7
41201 Post-Secondary Teaching and Research Assistants	132	6	61	10	67	10	72	9	93	9	425		0
21223 Database Analysts and Data Administrators	66	10	49	12	79	9	71	10	72	10	337		-10

Overall Top 10 NOC Codes by Employed Count for Comparable Graduate Programs from AY2020/21 to AY2024/25

Employer NOC Code	2018 # Emp.	/Rank	2019 # Emp.	/Rank	2020 # Emp.	/Rank	2021 # Emp.	/Rank	2022 # Emp.	/Rank	Overall 20/21 to 24/25	Trend	Overall Rank Change
11201 Professional Occupations in Business Management Consulting	8	4	14	2	18	2	19	3	16	3	75		0
21223 Database Analysts and Data Administrators	11	2	14	2	15	4	12	4	5	7	57		0
21231 Software Engineers and Designers	1	7	2	8	7	8	23	2	6	4	39		0
21211 Data Scientists	9	3	7	4	8	6	7	9	4	8	35		-3
21221 Business Systems Specialists	1	7	5	5	17	3	9	6	1	14	33		1
11101 Financial and Investment Analysts		18	2	8	9	5	9	6	4	8	24		3
21311 Computer Engineers (Except Software Engineers and Designers)	1	7	1	15	1	14	11	5	6	4	20		10
41402 Business Development Officers and Market Researchers and Analysts	1	7	4	6	8	6	3	10	1	14	17		-7
21222 Information Systems Specialists	2	5	4	6	6	9	3	10	1	14	16		2
21234 Web Developers and Programmers	1	7	1	15	1	14	9	6	3	10	15		-9

CEE also looked at a few of the key companies that the proposed M. Eng SYDE program identified as most relevant to their future students and was able to gather some general hiring insights from 2020-2025:

- **Vector Institute** – This organization has shared 27 opportunities with UW since 2018 with the last posted job being in Fall 2025 consisting of one opening and focusing on Computer Science students from the Faculty of Math
- **MILA** – This organization has had 7 opportunities shared with UW since 2021 with the latest being in Fall 2025 and the role was posted on the Part Time, Contract and Volunteer job board in WaterlooWorks with a focus on students with hardware skills
- **Machine learning organizations (Google, Nvidia, AWS)** – All of these companies have interacted many times with UWaterloo, however their main process for hiring is via Arrange Own Job (AOJ) and the number of positions available is limited so competition between applicants will be intense
- **Human factors engineering organizations (Kinectrics, Inertia Group)** – These companies have been active in hiring through WaterlooWorks and focus on Engineering students

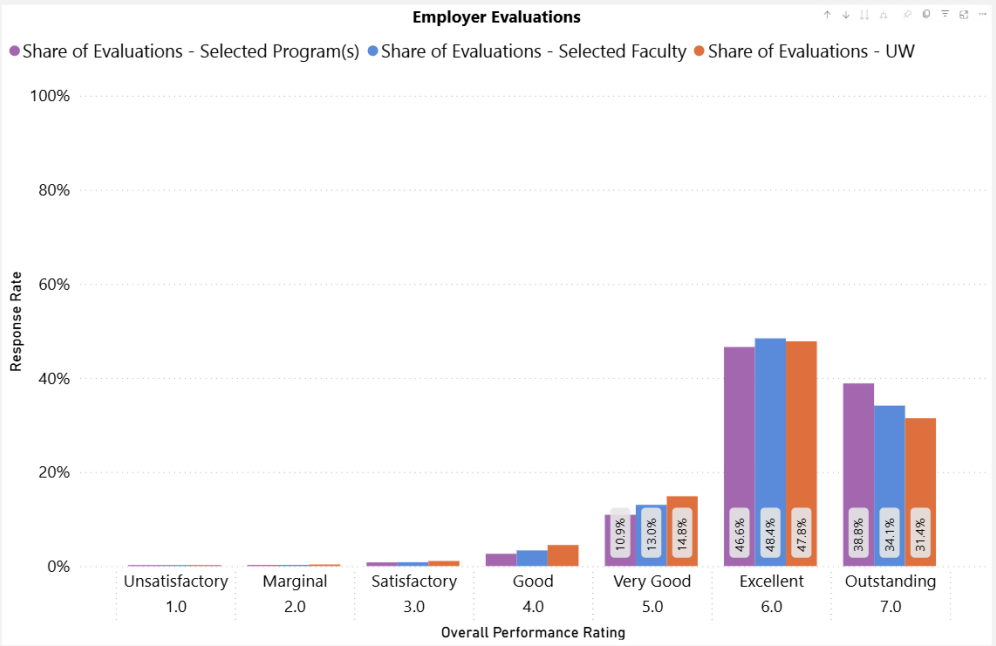
These insights suggest that it will be important for M. Eng SYDE students to recognize that some opportunities may be limited and they will need to be proactive in their application processes. It will also be important for students to remain flexible with work term location, pay rates, employers and using their own connections and networks to expand their job prospects. The faculty will need to identify the specific technical, transferable and professional skills that M. Eng SYDE students will develop during their program so that employers will understand the unique contributions they will be able to make during their work terms and upon graduation.

We note that NAICS and NOC have some limitations as they do not always reflect industries and jobs with the level of specificity that is needed for such analysis. For example, newer job titles may not be included until the next time NOC is updated.

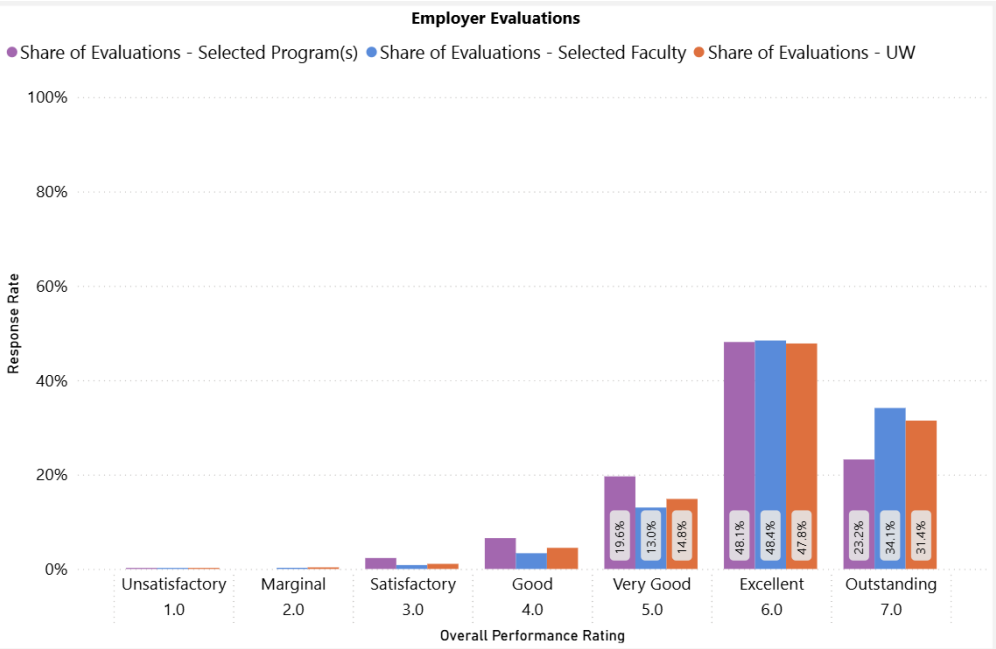
Co-op Work Term Experiences (2020-2025)

Analysis of the evaluations submitted by any co-op employers (not just the top 10 listed above) of students on their work terms in comparable co-op programs revealed that students received strong overall performance ratings with undergraduate students receiving an “outstanding” rating (above that of the faculty and UW co-op averages) and graduate students receiving a “very good” or “excellent” rating.

Undergraduate Programs

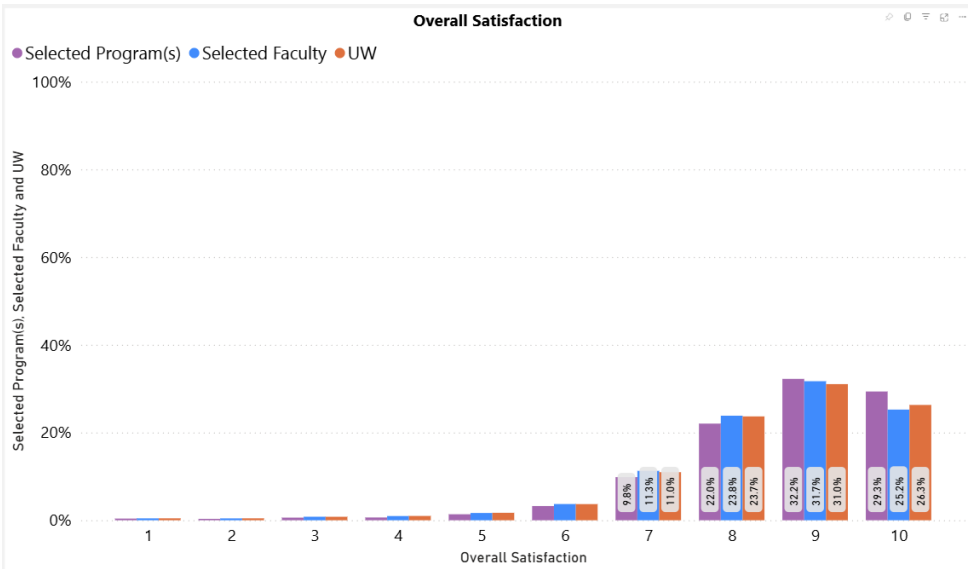


Graduate Programs

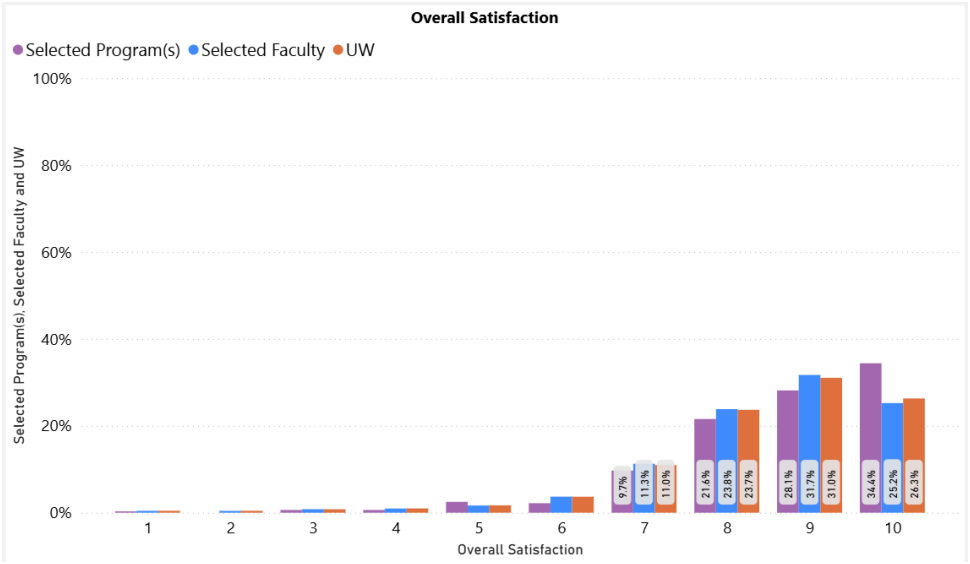


Students in comparable co-op programs appeared to be very satisfied with their work term experiences, with the most common rating being a 9 or 10 out of 10. This may indicate that students are finding employment in jobs that strongly align with their expectations

Undergraduate Programs

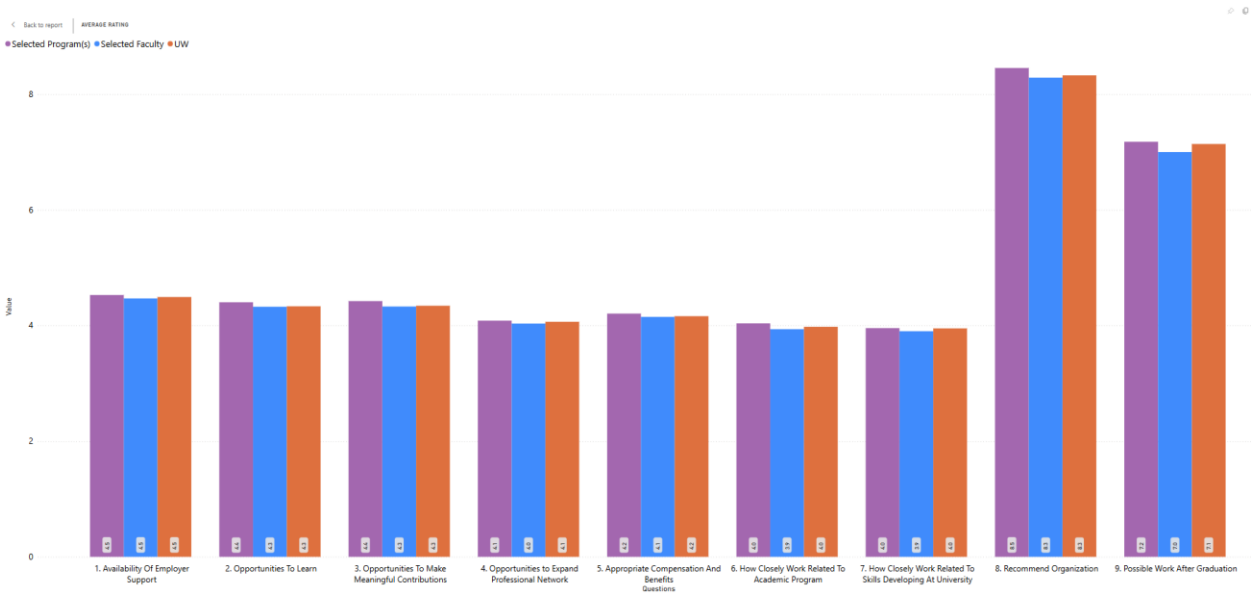


Graduate Programs

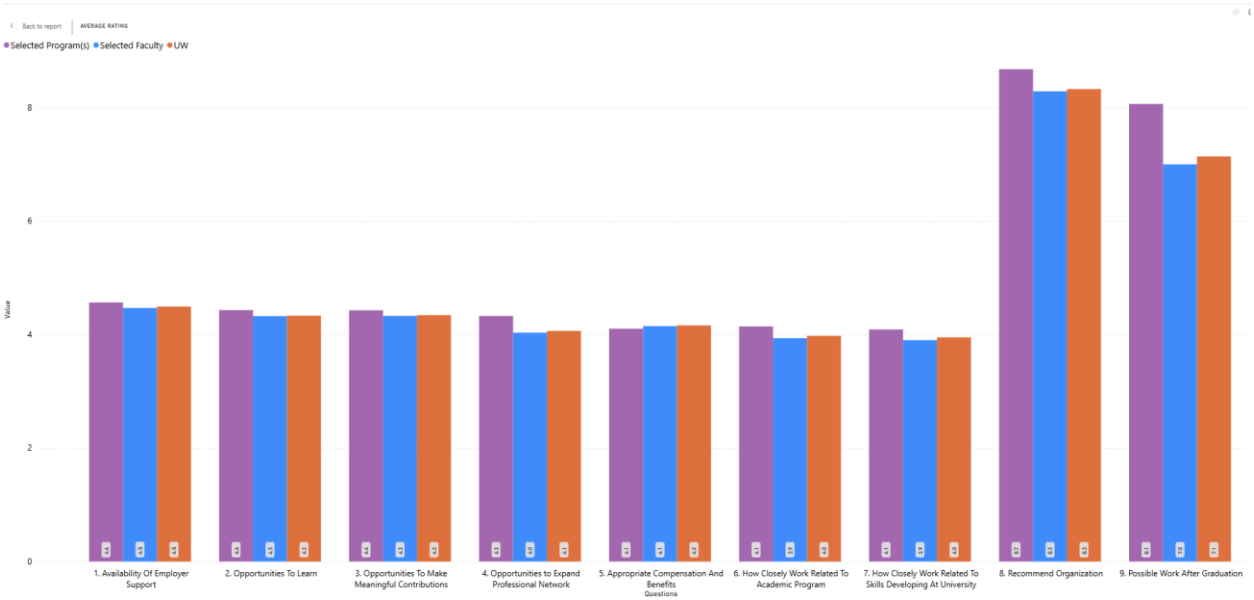


Students in comparable programs also rated their overall satisfaction with their work terms in nine specific areas, which were above their faculty averages as well as that of UWaterloo co-op students, overall. This suggests that students in the relevant programs are quite satisfied with their work term experiences and positive about their prospects after graduation.

Undergraduate Programs



Graduate Programs



Sourcing Relevant Employment Opportunities from Existing Employers

To understand the potential to source relevant employment opportunities from within the existing hiring base of active employers in WaterlooWorks, CEE identified relevant NAICS codes that would likely be of most interest to M. Eng SYDE students. Based on the selected NAICS codes, 3,121 organizations are currently active in WaterlooWorks, and could be relevant to M. Eng SYDE students.

Count Active Organizations by Top NAICS Codes Employing All Comparable Programs

Employer NAICS Code	Organization Count	Rank for Employing Comparable Students
5415 - Computer systems design and related services	937	1
5413 - Architectural, engineering and related services	717	8
5132 - Software publishers	601	2
5416 - Management, scientific and technical consulting services	428	4
5614 - Business support services	140	7
6113 - Universities	106	3
0999 - Entrepreneurial	95	6
3344 - Semiconductor and other electronic component manufacturing	47	9
3342 - Communications equipment manufacturing	25	10
3361 - Motor vehicle manufacturing	25	5

Those organizations hired over 15,000 undergraduate students and over 300 graduate students since 2020, however, hiring volumes have been unpredictable with decline in most roles in 2025, as noted below.

Overall Top 10 NOC Codes by Employed Count for Comparable Undergraduate Programs from AY2020/21 to AY2024/25

Employer NOC Code	2020/21	2021/22	2022/23	2023/24	2024/25	Overall 20/21 to 24/25
21231 Software Engineers and Designers	1,342	1,599	1,524	1,417	1,044	6,926
21234 Web Developers and Programmers	469	416	370	325	184	1,764
21232 Software Developers and Programmers	387	313	267	265	262	1,494
21311 Computer Engineers (Except Software Engineers and Designers)	272	287	309	243	240	1,351
21310 Electrical and Electronics Engineers	130	163	219	258	277	1,047
11201 Professional Occupations in Business Management Consulting	164	212	180	205	204	965
21211 Data Scientists	109	154	103	108	103	577
21222 Information Systems Specialists	91	81	93	97	71	433
41201 Post-Secondary Teaching and Research Assistants	132	61	67	72	93	425
21223 Database Analysts and Data Administrators	66	49	79	71	72	337

Overall Top 10 NOC Codes by Employed Count for Comparable Graduate Programs from AY2020/21 to AY2024/25

Employer NOC Code	2020/21	2021/22	2022/23	2023/24	2024/25	Overall 20/21 to 24/25
11201 Professional Occupations in Business Management Consulting	8	14	18	19	16	75
21223 Database Analysts and Data Administrators	11	14	15	12	5	57
21231 Software Engineers and Designers	1	2	7	23	6	39
21211 Data Scientists	9	7	8	7	4	35
21221 Business Systems Specialists	1	5	17	9	1	33
11101 Financial and Investment Analysts		2	9	9	4	24
21311 Computer Engineers (Except Software Engineers and Designers)	1	1	1	11	6	20
41402 Business Development Officers and Market Researchers and Analysts	1	4	8	3	1	17
21222 Information Systems Specialists	2	4	6	3	1	16
21234 Web Developers and Programmers	1	1	1	9	3	15

Existing Employer Feedback

CEE reached out to selected, relevant employers hiring students from existing, related co-op programs by introducing the proposed program and soliciting feedback on the level of interest in future M. Eng SYDE students.

No employers provided feedback so additional engagement both within Waterloo and outside of Waterloo will be necessary to identify new connections as well as those that already exist so that we can build a robust employment market for these students (e.g., alumni connections).

External Labour Market Analysis

As well as analyzing the current co-op landscape pertaining to relevant undergraduate and graduate co-op programs as a proxy for the upcoming M. Eng SYDE program, CEE also analyzed external labour market data to understand relevant industry trends and business development opportunities to support co-op program growth.

Based on the top NAICS and NOC codes employing comparable students, projections for the top NOC codes forecast a balanced market. While this is favorable, it might present challenges in finding employment if the intention is to create a new program while maintaining current enrollment for other programs. This is especially concerning given our data that shows a decrease in employment for comparable programs the past year within the top NOC codes. Additionally, although a balanced market is projected, increased competition for jobs in overlapping program areas could create significant challenges for co-op students unless they can position themselves as particularly valuable in the current labour market.

Employment and Social Development Canada (ESDC) uses the Canadian Occupational Projection System (COPS) and the National Occupational Classification (NOC, 2021 version) to identify occupations that may face labour shortage or labour surplus conditions over the projection period. The latest projections cover the 2024 to 2033 period. Their analysis of occupations expected to align with the new program indicates:

Professional occupations in business management consulting (11201) – BALANCE: Over the period 2024-2033, the number of job openings for **Professional occupations in business management consulting** is expected to total 61,600, which is **relatively similar** to the number of job seekers (74,400).

The number of job openings for **Professional occupations in business management consulting** is expected to total 61,600, resulting from both job creation (30%) and replacement demand (70%). A total of **74,400 job seekers** arising from mainly school leavers and followed by immigrants, re-entrants into the labour market, and those changing occupations are expected.

Software engineers and designers (21231) – BALANCE: The occupation showed **signs of balanced labour market** conditions in recent years. The analysis of key labour market indicators, including job vacancies, employment growth, and the unemployment rate suggests that while there was strong demand initially, the labour market adjusted over time so the labour supply was sufficient to meet the labour demand in this occupation over the 2021-2023 period.

Over the period 2024-2033, the number of job openings for **Software engineers and designers** is expected to total 46,900, which is **relatively similar** to the number of job seekers (60,400). As a result, the occupation is expected to experience **balanced labour market** conditions over the projection period (2024-2033).

Database analysts and data administrators (21223) – BALANCE: The occupation showed **signs of balanced labour market** conditions in recent years. The analysis of key labour market indicators, including job vacancies, employment growth, and the unemployment rate suggests that while there was strong demand initially, the labour market adjusted over time so the labour supply was sufficient to meet the labour demand in this occupation over the 2021-2023 period.

Over the period 2024-2033, the number of job openings for **Database analysts and data administrators** is expected to total 29,800, which is **relatively similar** to the number of job seekers (33,500). As a result, the occupation is expected to experience **balanced labour market** conditions over the projection period (2024-2033).

Employment and Social Development Canada (ESDC) uses the Canadian Occupational Projection System (COPS) and the National Occupational Classification (NOC, 2021 version) to identify occupations that may face labour shortage or labour surplus conditions over the projection period. The latest projections cover the 2024 to 2033 period. Their analysis of occupations is also expanded to industries. Below are the industries expected to align with the new program indicates:

Legal, Accounting, Consulting and Other Professional Services (NAICS 5411; 5412; 5416; 5418; 5419)

This industry comprises establishments that provide highly specialized business services. It is composed of five segments of which accounting, tax preparation, bookkeeping and payroll services are key segments. The workforce is characterized by a high level of education, and a large proportion of self-employed (33%).

Key occupations (5-digit NOC) include:

Finance & Accounting	Auditors, accountants, financial managers, bookkeepers	10010, 11100, 12200
Legal Services	Lawyers, paralegals, legal assistants, sheriffs and bailiffs	41101, 42200, 13111, 43200
Business & Management Consulting	Business consultants, development officers, business services managers	10029, 11201, 41402
Marketing & Communications	Advertising, marketing, PR professionals and managers	10022, 11202, 52120
Creative & Language Services	Photographers, translators, terminologists, interpreters	53110, 51114
Veterinary & Animal Health	Veterinarians, animal health technologists and technicians	31103, 32104
Science & Research	Statisticians, science policy researchers, agricultural and forestry specialists	21210, 41400, 21111, 21112

Real GDP is projected to grow at an average annual rate of 1.9%

- Growth will be limited due to high interest rates suppressing corporate profits. Expected interest rate cuts will boost profits, housing and capital markets, and government consulting demand, driving sector growth. Continued expansion will be supported by more M&As (mergers and acquisitions) and IPOs, rising cybersecurity needs, and stricter Canadian regulations.

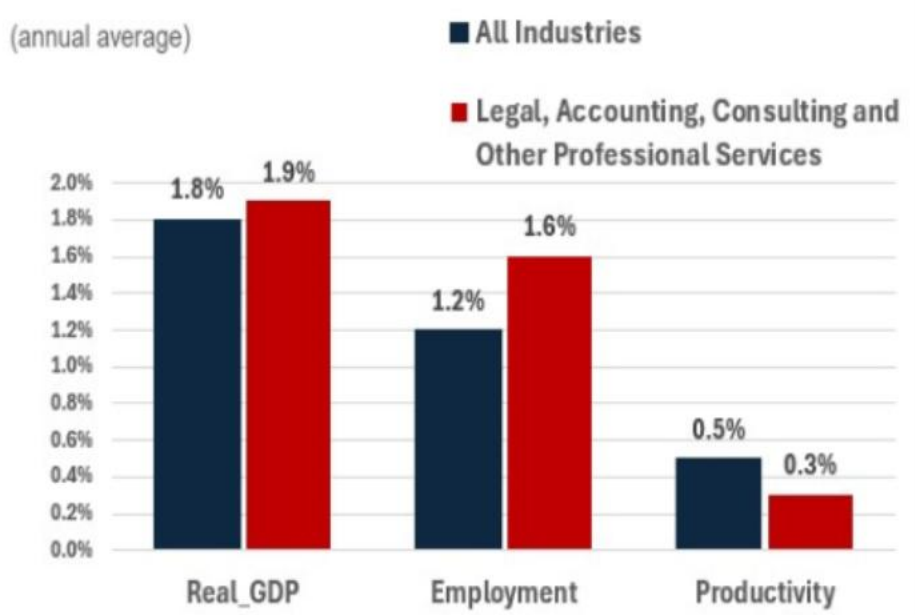
Productivity is expected to grow at an average annual rate of 0.3%

- While AI tools, like ChatGPT, have helped some occupations typical in these industries, such as lawyers, consultants and accountants streamline activities, it has also started to reduce the need for certain services.
- Counterintuitively, this might not lead to strong productivity growth, as it concentrates the sector's activities on the more complicated and labour-intensive cases, while reducing the quantity of high throughput cases which require less human input.

Employment is projected to increase by 1.6% annually

- Although the adoption of new technological tools and processes is expected to reduce the demand for routine tasks, the increase in more complicated tasks, and increasingly complex client requirements, is expected to continue to require highly educated and specialized individuals for the rigorous analysis and face-to-face interactions at the core of the sector's services.

Real GDP, Employment and Productivity Growth rate (2024-2033)



Computer Systems Design and Related Services (NAICS 5415)

This industry focuses on IT services such as software development, system integration, and managing clients' computing operations. It excludes hardware and packaged software sales. The workforce is highly educated and includes a notable share of self-employed professionals (17%). Computer systems design and related services is still a growing industry with many opportunities.

Key occupations (5-digit NOC) include:

Software Development & Engineering	Developers, programmers, software engineers, and designers	21230, 21231, 21232, 21234
Information Systems & Data	Information systems specialists, data scientists, database and business systems analysts	21211, 21221-21223
IT Management & Support	IT managers, user support technicians	20012, 22221
Web & Graphic Design	Web developers, designers, graphic designers and illustrators	21233-21234, 52120
Cybersecurity & Testing	Cybersecurity specialists, information systems testing technicians	21220, 22222
Computer Engineering & Networking	Computer engineers, network and web technicians	21311, 22220
Technical Sales	Technical sales specialists in wholesale trade	62100

Real GDP is projected to grow at an average annual rate of 2.2%

- Medium-term demand should rebound with falling interest rates and rising profits. Long-term growth will be driven by increasing demand for big data systems and analytics, especially from the financial sector.

Productivity is expected to decline at an average annual rate of 0.3%

- More niche and sophisticated computer systems continue to gain popularity requiring more complex and time intensive solutions, and thus more people to set up, manage and maintain.

Employment is projected to increase by 2.4% annually

- As output increases throughout the projection period and productivity is expected to remain stagnant, employment is expected to see strong gains, slightly outpacing real GDP growth as more labour-intensive products are developed.

UNIVERSITY OF WATERLOO | Senate

For Approval **Open Session**

To:	Senate Graduate Council
From:	Ian Rowlands Associate Dean, Graduate Studies
Date of Meeting:	November 2, 2026
Agenda Item:	**6.2. Faculty of Environment**

Recommendation/Motion

That Senate approve the closure of the Master of Planning (MPlan) program within the Faculty of Environment, effective January 1, 2027, as presented.

Proposal/Rationale

The Faculty of Environment is proposing to discontinue the Master of Planning (MPlan) program. The MPlan program has suffered from low enrollment since its creation. The main issues relate to the duration and structure of the program. The main market for the program is working professional planners; however, the program is too long to be attractive to this market. Additionally, it has been difficult to commit resources to updating and modernizing the program content.

There are currently 9 students registered in the program and the School of Planning is working with each student to develop a pathway to completion. The required courses that students have remaining or relevant alternatives will be offered. We do not anticipate any negative impacts to students in the program.

Jurisdictional Information

As outlined in the council's Terms and Reference, Senate Graduate Council is empowered to make approvals on behalf of Senate for a variety of matters:

- Consider, study and review all proposals for new graduate programs, the deletion of graduate programs, and/or major modifications to existing graduate programs, and make recommendations to Senate thereon.

Governance Path

Faculty of Environment: February 27, 2026

Senate Graduate Council: November 2, 2026

Senate: November 23, 2026

Documentation Provided

6.2. Faculty of Environment

Date 2026/10/22

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Meeting Information

Agenda Page Title
SGC - Faculty of Environment - Regular Agenda - November 2, 2026

Career Level
Graduate,

Faculty/Unit
Environment

Date
2026-11-02

Summary

Program Proposals:

1) Planning

1.1) Master of Planning (MPlan)

a. *Discontinuing the Master of Planning (MPlan) program.*

Other Business

Attachment(s)

Course Proposals

Courses: Retire
No proposals have been added.

Courses: New
No proposals have been added.

Courses: Changes
No proposals have been added.

Programs & Plans Proposals

Programs & Plans: Retire
No proposals have been added.

Programs & Plans: Major Modifications

Code	Title	Type	Workflow Step
Master of Planning (MPlan)	Master of Planning (MPlan)	Programs	SGC, Senate Graduate Council (SGC)

Programs & Plans: Minor Modifications
No proposals have been added.

Regulations Proposals

Regulations: Retire
No proposals have been added.

Regulations: New
No proposals have been added.

Regulations: Changes
No proposals have been added.

Master of Planning (MPlan) - Master of Planning (MPlan) Top

Effective Date and Career

Career
Graduate

Effective Term and Year
Proposed

Effective Term and Year
Winter 2027

Existing

Effective Term and Year
Winter 2025

Proposal Details

Proposal Type
Retire

Academic Unit Approval
2026-02-27

Quality Assurance Designation
Major Modification Qad

Major Modification Categories
Closure of a program

Is there an impact to existing students?
Yes

Impact on Existing Students

There are currently 9 students registered in the program and the School of Planning is working with each student to develop a pathway to completion. The required courses that students have remaining or relevant alternatives will be offered. We do not anticipate any negative impacts to students in the program.

Rationale and Background for Change(s)

Discontinuing the Master of Planning (MPlan) program.

The MPlan program has suffered from low enrollment since its creation. The main issues relate to the duration and structure of the program. The main market for the program is working professional planners; however, the program is too long to be attractive to this market. Additionally, it has been difficult to commit resources to updating and modernizing the program content.

General Program/Plan Information

Faculty

Faculty of Environment

Academic Unit

School of Planning

Graduate Field of Study

Planning

Faculty
Faculty of Environment

Program/Plan Name
Master of Planning (MPlan)

Graduate Credential Type
Master's

Accelerated Program
Not applicable

Study Options (New)
Coursework

Admit Term(s)
Fall, Winter, Spring

Delivery Mode

Online

Length of Program

- 10 terms (40 months)

Registration Option(s)
Part-time

Admissions

Admission Requirements: Minimum Requirements

- A four-year honours bachelor degree with a minimum overall average of 78%.
- Two years of planning or planning-related work experience.
- English language proficiency (ELP) (if applicable)

Admission Requirements: Application materials

- Résumé/Curriculum vitae
- Supplementary information form
- Transcript(s)
- Writing sample
    - At least one substantial example of work completed during the last two years of academic study. Students with professional experience may submit a professional report of which they were sole or senior author.

Admission Requirements: References

- Number of references: 3
- Type of references: references can be academic, professional, or a combination of the two. Professional referees need to have been the student's direct supervisor in a paid or volunteer position, at least one in a planning-related field. Academic referees should normally have taught the student in a senior undergraduate class or acted as a supervisor for a major research paper/thesis.

Requirements Information

Graduate Degree Requirements

- Students must complete the course requirements listed below in addition to the Graduate Academic Integrity Module (Graduate AIM).

Coursework Option: Course Requirements

- **Complete all of the following:**
  - PLAN625 - Methods of Social Investigation for Planners (0.50)
  - PLAN700 - Planning Paradigms and Theory (0.50)
  - PLAN702 - Critical Assessment of Theories, Methods and Practices of Planning (0.50)
  - PLAN704 - Methods of Planning Analysis (0.50)
  - PLAN705 - Design in Planning (0.50)
  - PLAN706 - Contemporary Issues in Planning (0.50)
- **4 online elective one-term graduate courses drawn from the School of Planning, or approved electives from other departments, for a total of 2.00 units.**

Coursework Option: Milestone Requirements

Other requirements

- Transfer between programs: permission to transfer from the Master of Planning (MPlan) program to the Master of Arts (MA) in Planning or Master of Environmental Studies (MES) in Planning programs, or from the MA or MES programs to the MPlan program, may be granted after the end of the first term of year one by the Associate Director, Graduate Studies (Graduate Officer) providing the student fulfills the requirements of the program they want to transfer to. A key requirement for MPlan students transferring to the MA or MES program is the written agreement of an appropriate faculty member to advise the students and of another appropriate faculty member to act as a committee member. The transfer does not imply any financial commitment by the School of Planning to support the student after the change in program of studies. However, this does not preclude a faculty member providing research support from grants or contract funds.

Notes

- School of Planning website
- Master of Planning (MPlan) future students program page

Specializations

Undergraduate Plan Guidelines

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Environment

Dependencies

Prerequisites

- PLAN 700 - Planning Paradigms and Theory — View Program
- PLAN 710 - Research Design — View Program
- PLAN 703 - Planning Professional Practice — View Program
- PLAN 702 - Critical Assessment of Theories, Methods and Practices of Planning — View Program
- PLAN 721 - Advanced Planning Project Studio — View Program
- PLAN 704 - Methods of Planning Analysis — View Program

UNIVERSITY OF WATERLOO | Senate

For Discussion **Open Session**

To:	Senate Graduate Council
From:	Charmaine B. Dean Vice-President, Research
Date of Meeting:	November 2, 2026
Agenda Item:	**7. Foreign Influence Transparency and Accountability Act and Research Security**

Recommendation

- FITAA carries institution-wide obligations and therefore requires a unified and coordinated institutional implementation approach.
- This proposed implementation process approach is being brought to Senate Graduate Council for awareness and discussion.

Summary

- The *Foreign Influence Transparency and Accountability Act* ("FITAA") took effect on August 4th, 2026. It established the Office of the Foreign Influence Commissioner, and requires registration when an organization or individual undertakes influence activities pursuant to an arrangement with a foreign principal and those activities are in relation to a Canadian political or governmental process.
- FITAA does not prohibit any activities. It requires disclosing information about certain arrangements with foreign principals on a public registry. Failure to register risks administrative monetary penalties.
- 'Foreign principals' include state-owned or state-controlled universities and research centres, and 'influence activities' include communicating and disseminating information; this means that a range of arrangements undertaken by members of the University of Waterloo may require registration. The University is legally responsible for registering such arrangements.
- The institution is currently developing a registration process and a communication plan. The aim is to assist specific units within the University and individual researchers to determine their obligations under FITAA and to support them in registering when required. Universities are collaborating on a coordinated approach to registration via U15, Universities Canada and OCUR.
- The President and Provost requested for VPR office to take executive lead on FITAA implementation (email correspondence on Aug. 5, 2026)
    - OVPR is the suitable home for this work because (a) most registerable arrangements are likely to involve research; (b) OVPR has stewardship of both Research Agreements and Partnerships, including international partnerships; (c) the Research Security team with existing expertise in compliance is housed in OVPR.

Jurisdictional Information

- *Foreign Influence Transparency and Accountability Act* ("FITAA"), Office of the Foreign Influence Commissioner

Governance Path

- Research Operations Council (Associate Deans Research) (ROC): September 2026
- Senate Research and Innovation Council: September 2026
- Presidents Leadership Team: October 2026

Documentation Provided

- FITTA proposed implementation process 16_Oct_2026
- Advisory Opinion – Guidance for the Academic Sector, released by the Foreign Influence Commissioner on Oct. 7th, 2026.

October 20, 2026

FITAA Oversight and Processes *Draft*

The Foreign Influence Transparency and Accountability Act (FITAA), which took effect on Aust 4th, 2026, requires registration whenever an individual or organization "undertakes influence activities pursuant to an arrangement with a foreign principal and those activities are in relation to a Canadian political or governmental process". Since academic research and international partnerships and collaborations can satisfy the criteria for registration, FITAA imposes obligations on the University of Waterloo. This document recommends a process for meeting those obligations.

Overall Responsibility

1. Who is responsible for registering **institutional** arrangements (i.e. University, Faculty, Department, or Centre & Institute-level arrangements/partnerships)?
   - The University of Waterloo is responsible for registering institutional arrangements. Registrations will be handled centrally by the OVPR with legal advice provided by LIS
   - **Rationale:** Placing responsibility in a single Office ensures consistency and avoids duplication of effort. While not all arrangements will be research-related, most will have a research component, making the OVPR a suitable home.

2. Who is responsible for registering **individual** arrangements (i.e. individual researchers, research teams/labs)?
   - FITAA does not mark a legal distinction between institutional and individual arrangements**.** Most arrangements undertaken by individual researchers relate to employment responsibilities with the University of Waterloo, and so the individual would be entering into the arrangement on behalf of the University; in these instances, the University is legally responsible for registering. Individual researchers are responsible under the Act for registering their own arrangements when the arrangement is independent of the duties of employment with the University of Waterloo.
   - **Rationale:** Circumstances under which an individual may be seen to act independently of their role with the University are expected to be uncommon. Regardless of central awareness of an arrangement entered into by an employee, the University is expected to retain legal obligation under FITAA.

Process

3. Who receives, processes, and submits **institutional** arrangements?
    - The Research Security Team within OVPR, in consultation with LIS.
    - **Rationale:** Locating the process within a single Office ensures consistency and avoids duplication, and most registerable arrangements will be research related. Research security personnel are seen by the Government of Canada as a primary inroad for communicating FITAA updates to universities across Canada, and the Research Security Team is appropriately qualified to assist with due-diligence assessments (e.g., to understand whether or not an entity may constitute a *foreign principal* under FITAA) related to FITAA registrations, as necessary. Finally, given that registerable arrangements under FITAA by definition must include a foreign principal, there is potential for research-security implications of FITAA-registerable arrangements for individual researchers (e.g., disclosure of certain types of arrangements at time of application for funding proposals) and the broader institution (e.g., disclosure of some agreements with foreign entities to MCURES under SMA-4 requirements).

4. Who processes and submits **individual** arrangements?
    - The University is legally responsible for most arrangements undertaken by individual researchers. As a matter of process, however, the researchers themselves will be required to submit the necessary documents through the Foreign Influence Commissioner's website. Researchers will be required to contact the OVPR via the uw-fitaa@uwaterloo.ca address prior to registering for (a) guidance, and (b) institutional awareness.
    - **Rationale:** While the University is legally responsible for registering most individual arrangements, the process of registration can be carried out by the individuals who entered into the arrangement(s). Institutional processing of all individual registrations would generate significant additional administrative workload.

Staffing

5. Are any staffing changes required to manage the process of (a) advising researchers, and (b) registering institutional arrangements?
    - Two staffing changes are proposed to help manage the additional administrative, due-diligence, and consultative burdens of FITAA. First, a change in scope is proposed for the Research Security Manager to encompass oversight of FITAA and to reclassify this existing position as Research Security Senior Manager. The Research Security Senior Manager, Research Security Director, and LIS will evaluate

cases and provide guidance to faculty members and University of Waterloo business units regarding whether specific arrangements meet the requirements to be registered under FITAA. In addition, a net-new position may be required, depending on workload assessment over the next months. The Research Security Senior Manager would supervise such a proposed net-new position, tentatively titled the FITAA Administrative and Compliance Officer. The Officer will assist with liaising with campus stakeholders, collating information received from campus stakeholders, and inputting final information into the Registry on behalf of the University of Waterloo. The request for this position will follow after workload assessment is considered for the remainder of the year.

- **Rationale:** Fulfillment of institutional responsibilities under FITAA is expected to require significant personnel time from the Research Security Team and from LIS. This workload increase will be monitored. New arrangements must be registered within 14 days of the arrangement being entered into, so this portfolio will also require rapid turnaround of inquiries.

Communications

6. How should the FITAA requirements and registration processes be communicated to the campus community?
    - Memo to USLC, CAL (same content in both messages)
    - Memo to all faculty members
    - Post in Daily Bulletin
    - Web page with overview, registration criteria, links, and FAQs hosted on OVPR website.
    - New uw-fitaa@uwaterloo.ca inbox managed by OVPR Research Security team
    - OVPR leadership team presentations to individual Faculty Council/Faculty Leadership meetings
    - Campus-wide Town Hall
    - Consultation with AFIW Heads

    - **Rationale:** This strategy has broad reach. The website can be updated as requirements/interpretations change, and a dedicated inbox allows for prompt responses to questions.
    Registration of arrangements under FITAA will require a significant amount of time and information. To facilitate this process, the Research Security Team will prepare a mirrored document that replicates the fillable fields required for formal

registration. The mirrored document will then be made available on the University of Waterloo FITAA website and links to it will be circulated using the memos and daily bulletin post referenced above so that all required information will be on hand to enable registration. A fillable form template will be used to prevent the submission of partial/incomplete registration materials.

7. Who is responsible for preparing and circulating communications?
   - Website content updates will be managed by the Research Security Team in collaboration with LIS and with assistance from University Relations and other groups within the OVPR, as applicable. E-mail updates will be prepared within the OVPR.
   - **Rationale**: as above, the office of the VPR is the primary interlocutor that receives updates on FITAA from the Office of the Foreign Influence Commissioner of Canada via the Research Security Center. It is expected that the Research Security Team and the VPR will receive timely updates and guidance related to FITAA from the Office of the Foreign Influence Commissioner of Canada, the Research Security Center, and other resources. Website content updates will be made with web support form University Relations.

8. Who monitors the uw-fitaa@uwaterloo.ca inbox and responds to submitted questions?
   - The Research Security Team will monitor this e-mail address and respond to questions, with legal advice provided by LIS, as appropriate.
   - **Rationale:** as above #7.

Ongoing review

9. Should the University conduct a systematic review of existing institutional agreements and partnerships that might lead to influence activities in the future? If so, which office should conduct this review?
   - Yes; a systematic review of existing agreements and partnerships should be conducted, with the most contemporary arrangements disclosed first. The OVPR will require input from Faculties, Departments, Centers and Institutes, and other sub-units of the University to have full transparency into the nature of existing agreements.
   - **Rationale**: Existing arrangements that meet the FITAA eligibility criteria must be registered, and there is a legal obligation to do so. Visibility into agreements in place within sub-units of the University is limited, and there is as-yet no centralized location for storing this information internally.

Remaining Issues

10. Students
    - Most students who are parties to registerable arrangements as part of their research or academic program are likely part of the arrangement under the supervision of a faculty member who serves as a supervisor or PI. In those cases, the University or faculty member would be responsible for registering the arrangement.
    - Many international students receive funding from foreign principals. The Office of the Foreign Influence Commissioner's guidance to the academic sector makes clear that "receiving a grant, contribution, donation, or other funding agreement from a foreign principal" **does not,** by itself, constitute an arrangement. But some students might have funding connected to specific arrangements with foreign principals that would require registration.

11. The AFIW are distinct legal entities and so are legally responsible for registering their own institutional and individual agreements. They may benefit from guidance or support from the University of Waterloo or direction where such support may be obtained. Consultations will be conducted with the AFIWs.

Registration Requirements related to the Academic Sector

Commissioner's opinion

Academic research, applied research, and international collaboration does not, in and of itself, require registration under the *Foreign Influence Transparency and Accountability Act* (FITAA).

Registration is required where an individual or organization undertakes influence activities pursuant to an arrangement with a foreign principal and those activities are in relation to a Canadian political or governmental process.

A foreign university, college, polytechnic, institute, funding body, or other academic organization is not a foreign principal merely because it receives foreign government funding.

Academic research, teaching, scholarly exchange, and the dissemination of knowledge will not generally be considered to be in relation to a Canadian political or governmental process solely because they concern matters of public policy or may be considered by policymakers.

Whether registration is required depends on the facts of each case. The individual or organization who has the arrangement is responsible for assessing any registration obligations and registering the arrangement.

The guidance and examples that follow illustrate how the Commissioner interprets and applies these principles in common academic sector contexts.

Identifying a Foreign Principal

The definition of a foreign principal is broad and is not limited to foreign governments. In the academic context, examples of foreign principals may include:

- a foreign government department or ministry;
- a foreign government research agency or funding body;
- a state-owned or state-controlled academic institution or research institute; or
- another organization that is controlled, in law or in fact, by a foreign state or foreign power.

Many foreign universities, colleges, polytechnics, institutes, and other organizations receive funding from foreign governments or other international sources.

An entity is a foreign principal if it is controlled, in law or in fact, by a foreign state or group of foreign states. An entity is also a foreign principal if it is substantially owned by a foreign state or group of foreign states. In the academic sector, this includes state-owned academic institutions.

Where it is unclear whether an entity is controlled, in law or in fact, by a foreign state or group of states, all relevant facts and circumstances should be considered including whether a foreign state can appoint leadership, direct strategic priorities, influence decision-making, control operations, or otherwise exercise authority over the entity. No single factor is determinative, and the significance of any particular consideration will depend on the specific circumstances.

The Office of the Foreign Influence Commissioner of Canada (OFICC or the Office) will verify all submitted registrations, including whether the organization listed as the foreign principal meets the criteria.

Identifying an Arrangement

In the academic sector, arrangements may arise in a variety of contexts, including memoranda of understanding, research collaborations, funding agreements, partnership agreements, pathways agreements, academic exchange programs, sponsorship arrangements, curriculum development, and other forms of cooperation.

Registration is only required where influence activities are undertaken pursuant to an arrangement with a foreign principal and in relation to a Canadian political or governmental process.

When assessing whether an arrangement exists, relevant considerations may include:

- the terms and conditions governing the relationship with the foreign principal;
- any expectations of the foreign principal regarding activities to be undertaken;
- whether the parties have agreed to work together toward a particular objective;
- the overall nature of the relationship between the parties.

The following activities do not, by themselves, satisfy the elements of an arrangement:

- receiving a grant, contribution, donation, or other funding agreement from a foreign principal;

- participating in research collaborations, including joint research, co-authorship, information-sharing, and consortium-based research;
- participating in applied research partnerships, including prototype development, product testing, technology transfer activities, contract research, and applied research and development collaborations;
- participating in joint funding arrangements, shared research infrastructure, academic exchange programs, or other forms of academic cooperation;
- complying with routine research funding requirements, including project milestones, reporting obligations, publication requirements, and dissemination requirements, where the researcher retains independence regarding the analysis, findings, conclusions, and content of communications arising from the research.

Influence Activities

Influence activities include:

- communicating with public office holders;
- communicating, disseminating, or causing to be communicated or disseminated, information; and
- providing money, services, use of facilities, or things of value.

Researchers routinely communicate findings and expertise through a wide range of activities.

The following forms of scholarly communication are influence activities**, when undertaken pursuant to an arrangement**:

- publishing journal articles, books, reports, policy papers, and research briefs;
- presenting at conferences, workshops, seminars, and public events;
- delivering lectures, keynote addresses, and guest presentations;
- participating in media interviews, podcasts, webinars, and panel discussions;
- publishing content through websites, newsletters, blogs, social media platforms, and other digital channels;
- disseminating research findings to public office holders or the public;
- responding to a government consultation (e.g., regulatory consultation)
- contributing expertise to advisory bodies, expert panels, and other governmental processes
- submitting briefs, position papers, or recommendations to government bodies; or

- organizing events intended to inform public or governmental discussion on a policy, legislative, or regulatory issue.

Activities undertaken independently of an arrangement are not subject to registration merely because the individual or organization has another relationship with a foreign principal.

Academic events and use of facilities

Universities, colleges, institutes, polytechnics, collège d'enseignement général et professionnel (CEGEPs), and institutes regularly make classrooms, auditoriums, meeting spaces, and other facilities available to students, faculty members, community groups, and external organizations. They may also provide administrative, logistical, communications, or other support services associated with events and activities.

A university, faculty, department, college, polytechnic, CEGEP, or institute provides a service or the use of a facility is carrying out the influence activity when it organizes, coordinates, promotes, or otherwise assists in delivering an event or activity in relation to a Canadian political or governmental process as part of an arrangement with a foreign principal.

By contrast, an institution would not itself be carrying out the influence activity when it is not part of an arrangement and merely provides facilities or services through its ordinary booking, rental, or administrative processes to enable **others** to execute an influence activity.

In Relation to a Canadian Political or Governmental Process

Political and governmental processes encompass legislative, executive, and electoral processes at all levels of government in Canada.

An activity will generally be considered to be in relation to a Canadian political or governmental process where it **seeks to affect, shape, or influence decisions, actions, opinions, or conduct** in connection with a specific legislative proposal, policy or program, regulatory process, government decision, election, referendum, or other political or governmental process identified in the Act.

The influence activity alone does not establish this connection. In assessing whether an activity is in relation to a Canadian political or governmental process, relevant considerations may include:

- the content of the activity;
- its purpose and intended audience;
- how the information is communicated or presented; and
- the setting in which the activity occurs.

Academic activities are not generally considered to be in relation to a Canadian political or governmental process merely because they contribute to public knowledge, academic debate, or discussions of public policy.

The administration of, or application for a Canadian government program, does not, by itself, constitute an activity in relation to a Canadian political or governmental process. Activities such as routine communications with Canadian officials regarding the administration, implementation, reporting, or delivery of such programs will not generally be considered activities in relation to a Canadian political or governmental process.

However, an activity may be in relation to a Canadian political or governmental process where, pursuant to an arrangement with a foreign principal, the activity seeks to affect, shape, or influence decisions, actions, opinions, or conduct of government. This includes research findings, expertise, or other information which are communicated or disseminated in connection with a specific political or governmental process in Canada.

There is currently no obligation to register influence activities directed at Indigenous public office holders or Indigenous political or governmental processes, as paragraphs (c) and (d) of the definition of "public office holder" in section 2 and paragraph 4(c) of the Act are not yet in force.

Who needs to register

The individual or organization who has an arrangement with a foreign principal will need to register. Where an institution has an arrangement with a foreign principal, the arrangement is registered by an individual authorized to act on the institution's behalf.

A faculty, department, research centre, or other affiliated entities that have an arrangement may register the arrangement when it is acting on its own behalf. Whether the affiliated

entity is acting on its own or on behalf of the broader institution will depend on the parent institution's governance framework and the relevant facts of the situation.

For example, an affiliated entity that is the party to the arrangement should use its own organization identification number in the registration submission. If it does not have its own organization identification number, it should use the parent institution's organization identification number.

If an individual who is affiliated with an institution (e.g., professor, researcher, student) is acting independently and has their own arrangement with a foreign principal, that individual will register their arrangement.

FITAA does not prescribe how academic institutions or other entities manage internal compliance, oversight, or decision-making processes related to registration obligations. Institutions should establish their own policies, procedures, and governance mechanisms to identify arrangements that could engage FITAA requirements and to determine how they will manage registration responsibilities within their organization.

Common Academic Sector Scenarios

The following examples illustrate how the principles discussed in this advisory opinion may apply in common academic sector contexts.

Research and Academic Collaborations

Foreign-funded research publication

Example 1(a): Registration not required

A Canadian researcher receives funding from a foreign principal to conduct a research project. The funding agreement requires financial reporting and acknowledgement of the funding source and preserves the researcher's independence regarding the content, findings, conclusions, and dissemination of the research. The researcher remains free to determine whether, when, and how research findings are published or communicated. The researcher publishes the results in academic journals and presents them at scholarly conferences. The research is not framed to influence a specific Canadian political or governmental process.

Registration would not be required. Although the researcher may be acting in association foreign principal given the funding relationship, the communications and dissemination

activities are not undertaken pursuant to the arrangement nor are they in relation to a Canadian political or governmental process. Therefore, not all elements of the Act have been satisfied.

Example 1(b): Registration required

A Canadian researcher receives funding from a foreign principal to conduct a research project. The funding agreement requires the researcher to publicly disseminate findings that support the foreign principal's interests in relation to a proposed Canadian law, policy, regulatory proposal, or government decision. The researcher publishes reports, participates in media interviews, and meets with federal officials to promote those findings.

Registration would be required. The researcher is undertaking influence activities pursuant to an arrangement with a foreign principal, and those activities are being carried out in relation to a Canadian political or governmental process. All elements of the act have been satisfied.

International research partnership

Example 2(a): Registration not required

A Canadian researcher participates in a multi-country research consortium that includes a foreign government research agency. Consortium members jointly publish research findings addressing climate adaptation and public health issues. The publication contains observations that may be relevant to Canadian policymakers but does not seek to influence a specific Canadian legislative, regulatory, policy, or governmental process.

Registration would not be required. Participation in collaborative research and publication activities does not, by itself, create a registration obligation. Although the publication may address issues of public policy importance, it is not being disseminated pursuant to an arrangement requiring influence activities in relation to a Canadian political or governmental process.

Example 2(b): Registration required

A Canadian college enters into a research agreement with a foreign state-owned polytechnic to develop a new technology for use in Canada. As part of the agreement, the college is required to communicate with federal officials and disseminate information supporting amendments to a Canadian regulatory framework governing the technology's deployment.

Registration would be required. The college is undertaking influence activities pursuant to an arrangement with a foreign principal and those activities are being carried out in relation to a Canadian governmental process. All elements of the Act have been satisfied.

International education partnership

Example 3(a): Registration not required

A Canadian college participates in a federally funded international capacity-building project with a foreign ministry of education. College staff communicate with Canadian officials regarding funding, reporting, implementation, and project administration.

Registration would not be required. Participation in and administration of the project, including routine communications required for program delivery, do not by themselves constitute activities in relation to a Canadian political or governmental process.

Example 3(b): Registration required

A Canadian college participates in an international education partnership with a foreign ministry of education. Pursuant to the arrangement, the college is asked to communicate with Canadian officials to advocate for changes to study permit eligibility criteria affecting students from that country.

Registration would be required. The college is undertaking influence activities pursuant to an arrangement with a foreign principal in relation to a Canadian governmental process.

Participation in Governmental Processes

Providing expert advice

Example 4(a): Registration not required

A professor has an arrangement with a foreign principal related to a research project. The professor is subsequently invited by a provincial ministry to serve on an expert advisory panel examining a public policy issue related to that research. In participating on the panel, the professor provides independent technical advice, answers questions about the relevant research, and does not advocate for any particular policy outcome.

Registration would not be required. Although the professor has an arrangement with a foreign principal and draws on knowledge developed through the research project, the professor's participation on the advisory panel is limited to providing neutral expert advice

in their independent academic capacity. The professor is not seeking to influence, shape, or alter a Canadian political or governmental process. Accordingly, the activities would not be considered influence activities in relation to a Canadian political or governmental process and therefore not all elements of the Act have been satisfied.

Example 4(b): Registration required

A researcher has an ongoing research collaboration with a foreign principal. Pursuant to the arrangement, the foreign principal requests that the researcher participate in a Canadian government consultation and submit recommendations supporting the foreign principal's interests regarding a proposed policy initiative.

Commissioner's opinion: Registration would be required. The submission constitutes an influence activity undertaken pursuant to an arrangement with a foreign principal in relation to a Canadian political or governmental process.

Immigration and visa administration

Example 5(a): Registration not required

A Canadian institution communicates with Immigration, Refugees and Citizenship Canada regarding the processing of individual study permit applications, administrative errors, or implementation issues affecting students participating in an international academic partnership.

Registration would not be required. Routine administrative communications regarding individual cases or program administration do not, by themselves, constitute influence activities in relation to a Canadian political or governmental process.

Example 5(b): Registration required

A Canadian institution has an arrangement with a foreign principal relating to an international education partnership. Pursuant to the arrangement, the institution communicates with Canadian officials seeking changes to study permit processing rules and eligibility requirements affecting students from the foreign principal's jurisdiction.

Registration would be required. The institution is communicating with public office holders pursuant to an arrangement with a foreign principal in relation to a Canadian governmental process.

Academic Events and Conferences

Example 6(a): Registration not required

A Canadian academic institution hosts an international academic conference that includes speakers from foreign universities, foreign government research agencies, and Canadian institutions. Some presentations discuss issues that may be relevant to Canadian public policy. The university organizes the conference as part of its ordinary academic activities and not pursuant to an arrangement with a foreign principal regarding a Canadian political or governmental process.

Registration would not be required. Although foreign principals may participate in the event, the university is not providing services or facilities pursuant to an arrangement connected to a Canadian political or governmental process. The event is being conducted for academic purposes rather than to influence a Canadian political or governmental process.

Example 6(b): Registration required

A Canadian university faculty enters into an arrangement with a foreign principal to organize and promote a public event on campus concerning proposed changes to a Canadian policy. The purpose of the event is to provide the foreign principal with a platform to present and promote its views on the Canadian policy. The faculty provides facilities, coordinates speakers and invitations, promotes the event, and provides administrative support.

Registration would be required. The faculty is providing services and the use of facilities pursuant to an arrangement with a foreign principal in relation to a Canadian political or governmental process. All elements of the Act have been satisfied.

Example 7(a): Registration not required

A researcher presents findings at an academic conference attended by federal, provincial, and municipal public office holders. The presentation is delivered in the ordinary course of the conference and is not undertaken pursuant to an arrangement requiring the researcher to communicate with public office holders or influence a Canadian political or governmental process.

Registration would not be required. There is no arrangement with a foreign principal, and the presence of public office holders in the audience does not transform an academic presentation into a registerable influence activity.

Example 7(b): Registration required

A researcher delivers a presentation pursuant to an arrangement with a foreign principal. The presentation is specifically organized to influence federal and provincial public office holders regarding proposed changes to a Canadian policy. Invitations are targeted to decision-makers and the researcher is expected under the arrangement to advocate for particular policy outcomes.

Registration would be required. The communication is undertaken pursuant to an arrangement with a foreign principal and is intended to influence a Canadian political or governmental process.

Conclusion

FITAA is a transparency regime. It is not intended to restrict international collaboration, academic freedom, or the communication of research findings.

When assessing a potential obligation, researchers and institutions should consider whether an arrangement exists, which will depend on the facts of each case. This analysis can be aided by the factors set out above.

This advisory opinion is issued by the Commissioner under the authority of subsection 13(1) of the *Foreign Influence Transparency and Accountability Act* (FITAA or the Act). Its purpose is to state the Commissioner's official view on the application of the Act to the academic sector.

This advisory opinion is not binding and is not a substitute for the law. It is intended as a guide for compliance with FITAA but should be read in light of FITAA, the *Foreign Influence Transparency and Accountability Regulations*, court decisions, and decisions of the Commissioner. If there is a discrepancy between the advisory opinion and FITAA or the Regulations, FITAA and the Regulations take precedence.

Interpretation bulletins have been issued by the Commissioner that address general concepts within the Act. This opinion helps ground those interpretations to the reality of the academic sector and should be read in conjunction with the interpretation bulletins.

Advisory opinions may evolve and be further refined over time.

For additional information, consult the Interpretation Bulletins, Registration Assessment Quiz, and other guidance materials available on the Office's website.

UNIVERSITY OF WATERLOO | Senate

For Information **Open Session**

To:	Senate Graduate Council
From:	Donna Ellis, Associate Director, Curriculum and Pedagogy
	Svitlana Taraban-Gordon, Graduate Programs Manager
Date of Meeting:	November 2, 2026
Agenda Item:	**8. Teaching Support and Innovation Unit**

Summary

This item is being brought forward for information. Donna Ellis, Associate Director, Curriculum and Pedagogy, and Svitlana Taraban-Gordon, Graduate Programs Manager, from the Teaching Support and Innovation (TSI) unit will provide an overview of its mandate and core functions, particularly the programs and services that support graduate studies at the University of Waterloo.

Documentation Provided

Presentation slide deck

Teaching Support and Innovation: Support for Graduate Studies

11/02/2026

Donna Ellis, Associate Director, Curriculum & Pedagogy
Svitlana Taraban-Gordon, Graduate Programs Manager
Teaching Support and Innovation (TSI)

Presentation to the Senate Graduate Council

UNIVERSITY OF WATERLOO

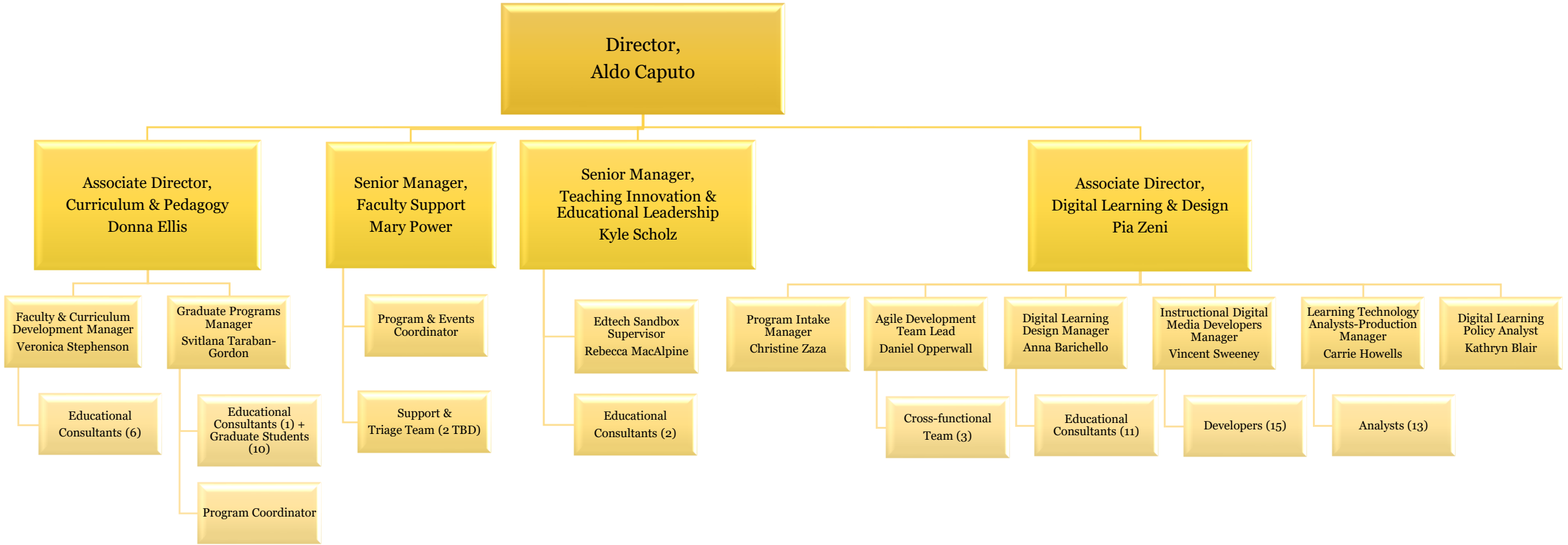
Teaching Support and Innovation (TSI)

TSI's mandate is to promote and advance teaching quality and ultimately enhance student learning at the University of Waterloo.

Our core functions include:

- Provide support responsive to the needs of instructors, departments and schools, and faculties
- Advise on, inform, and help implement institutional strategies and innovations that advance teaching and learning
- Support course, program, and curriculum development in alignment with institutional priorities and needs
- Support instructor pedagogical development and provide instructor training required or recommended by the institution or academic units
- Collaborate with instructors to develop and maintain digital learning materials and online courses and programs
- Support faculty educational leadership activities
- Conduct and support applied research that advances the unit's core activities and institutional priorities
- Advise the institution on physical classroom design and educational technology

TSI's Organizational Structure



UNIVERSITY OF WATERLOO

TSI Support

Accessing support:

- New online entry point: teachingsupport@uwaterloo.ca
- Primary Contacts for Faculties
- Direct access to any TSI staff member

Support options:

- Synchronous: Consultations, retreats, workshops and events
- Asynchronous: Email requests and 24/7 access to tip sheets, webinars, and other web resources like: AI and Teaching and Accessible Teaching

Key Programs and Supports for Graduate Studies

TA Training module in LEARN

- Online asynchronous module
- *TA Essentials* (1 hour, F26): 244 completions
- *Preparing to TA at Waterloo* (2 hours, F25): 405 completions

Certificate Programs for Graduate Students

- Introductory and advanced

TA Handbook and Teaching Tips for TAs

- Online resources available to TAs

Graduate Supervision Series *(for faculty)*

- Offered with GSPA (Fall & Winter)
- F25-F26: 66 instructors completed

UNIVERSITY OF WATERLOO

TA Essentials: Starting Strong as a TA

- Self-paced asynchronous module (approx. 1 hour) with content quizzes

Unit	Content
Roles and Responsibilities of Graduate TAs	• Link to Collective Agreement • Common tasks, planning for your TA role
Tips for TA Success	• Professional communication • Conflict management, workload
Artificial Intelligence & Academic Integrity	• Process for suspected academic misconduct • Student use of GenAI, GenAI use as a TA
Key Teaching Support Resources	• TSI, Employee Health and Accommodations resources • Faculty Teaching Fellows, Grad Program Coordinators
Common Scenarios for TAs	• Assignment reviews, grade disputes, student complaints, when you don't know the answer, handling difficult situations
Frequently Asked Questions	• Application process, hours, pay, leaves

Certificate Programs for Graduate Students

	Fundamentals of University Teaching	Certificate in University Teaching	New Instructor Foundations
Intended audience	Graduate students and postdoctoral scholars	PhD students who have completed Fundamentals	Graduate students and postdoctoral scholars teaching a course
Program components	6 workshops 3 microteaching sessions	3 graduate-level courses	3-half days focused on preparing to teach
Program participation	F25-S26 participants (total) - Workshops: 1,021 - Microteaching: 421 - Certificate completions: 135	F25-S26 completions: 34	Offered 4 times since S23 Total completions: 70


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