

MME 2023 - 2024 Graduate Handbook





Associate Chair's Message

On behalf of all faculty, staff and students participating in graduate programs with the Department of Mechanical and Mechatronics Engineering (MME), I am very pleased to welcome you to the University of Waterloo. We hope your time and efforts here will be productive, enjoyable and very memorable. You are now a member of a large and dynamic graduate community that first began in the 1960's. With the number of graduate students over 360, MME has one of the largest graduate programs in Canada including course-based (MEng and GDip) and research-based (MAsc and PhD) degrees.

MME has two graduate research programs, MAsc and PhD, one course-based program, MEng, two Graduate Diplomas (GDip) and one MEng specialization (Green Energy). The department has a broad range of expertise across all areas of mechanical, materials and mechatronics engineering organized into 5 areas of specialization namely Automation and Controls, Fluid Mechanics, Materials Engineering and Processing, Solid-body Mechanics and Mechanical Design and Thermal Engineering. Since 2009, in addition to the regular research programs, MME has also offered a Nanotechnology graduate program (MAsc and PhD) with courses available from different engineering departments and the faculty of Science.

This MME Graduate Handbook includes important information on our graduate programs, our faculty and university services, and the current M.Sc., Ph.D., MEng and GDip degree requirements for MME graduate students. The handbook is revised each year and is available to all new graduate students. Please read the handbook as soon as possible because it will likely answer many of your questions. Instructors and staff will expect you to be familiar with the handbook and will refer to it repeatedly as you proceed through the program.

Please note that the handbook is an informational supplement for our students and is not a replacement for the University of Waterloo Graduate Calendar. The Graduate Calendar dictates the formal policies concerning registration, fees, grading, degree requirements, etc. The Graduate Calendar can be found on the Graduate Studies & Postdoctoral Affairs Office (GSPA) website.

Through our graduate orientation session, we will provide information to make your transition to graduate school and the University of Waterloo as smooth as possible. You are strongly encouraged to attend the campus-wide orientation for all University of Waterloo graduate students.

We are proud of the hundreds of MME graduate students who have earned degrees and now apply their talents and knowledge in a wide array of fields and places throughout the world. Our faculty, staff, and students have been nationally and globally recognized for their accomplishments in teaching, research and service. Congratulations on becoming part of such a proud tradition of academic achievement.

I look forward to meeting you online and in person during your stay with us in MME. My colleagues and I hope we can make your graduate studies a rewarding and successful experience. Congratulations on your admission and best wishes for your success during your time with us.

Cecile Devaud, Ph.D.

Professor and Associate Chair for Graduate Studies

Staff Support Contacts

- **Karen Schooley**
 - Graduate Administrator MAsc/MEng programs
 - mmascadvisor@uwaterloo.ca or mmengadvisor@uwaterloo.ca
 - Ext. 43385

- **Jian Zhou**
 - Graduate Administrator PhD program
 - mphdadvisor@uwaterloo.ca
 - Ext. 42019

- **Tanya Yoworski**
 - Graduate Financial Coordinator
 - mme-grad-funding@uwaterloo.ca
 - Ext. 43625

- **Mat Walton**
 - Graduate Admissions and Recruitment Administrator
 - mme-grad-admissions@uwaterloo.ca
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- **Tina Cochrane**
 - Space Coordinator
 - mme-space@uwaterloo.ca
 - x 43328

- **Cecile Devaud**
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Important Information for New Students

Academic calendar dates and deadlines

[The Calendar of Events and Academic Deadlines](#), summarizes the important dates for each term. Information about holidays, convocations and study breaks is also included. Information on payment instructions and graduate student fees can be found on the [Finance website](#)

Student offices and key permits

Graduate students may be given a desk or office space. To receive a student office or key permit, please email the Space Coordinator mme-space@uwaterloo.ca

You must complete the Graduate Safety [Training](#) before a key is issued.

Mailboxes

The graduate mailbox is located in **E3-2111C**. Depending on the busyness of the week, the Department Assistant tries to deliver the mail at least once a week if not more. Mail is divided into columns based on the first initial of the last name and within each column there is a mail slot for each month mail is delivered. Due to the sheer volume of mail delivered to the department, it cannot be guaranteed that the mail for each month will be alphabetized, so please look thoroughly. It is suggested to check the mailroom once a week to ensure that no important and time-sensitive documents like invoices are missed. The code for the room can be provided by the student's Graduate Advisor upon request. Any mail that has not been collected will be disposed of in the New Year.

Note: Personal mail is **not** to be sent/ordered to the university. These items should be delivered to the individual's personal address.

Note: The majority of packages delivered to the university will be delivered to the **E5-3001** mailroom. Upon arrival, the Department Assistant will send out an email notifying the recipient the item has arrived. This will be the location for pick-up. They **will not** be delivered to the mailroom. Packages should be picked up in a timely manner. Individuals should make sure that a name is clearly marked on the shipping information when ordering an item to the university.

Sample address for packages:

University of Waterloo
Attn: FIRST NAME, LAST NAME
200 University Ave W
BUILDING-ROOM #
Waterloo, ON
N2L 3G1

Forms

All Graduate engineering forms can be found here:
<https://uwaterloo.ca/forms/graduate-studies/>

Payroll procedures

If you are receiving a Teaching Assistantship, you must complete a number of forms (e.g., federal and provincial tax worksheets, direct deposit, etc.) before you will be paid. If you complete this process before the cut-off date, you will be eligible for the first pay period at the end of September/January/May. Your pay will be deposited directly into your bank account on the last Friday of each month. Please contact the [Graduate Funding Coordinator](#) if you have any questions. You will receive an onboarding email from HR, which will contain the information that is required of you to submit. This must be completed in a timely manner in order to receive your pay.

For more information, please see Workday website '[User Guide for New Employees](#)'.

Direct deposit information: <https://uwaterloo.ca/quest/help/students/how-do-i/view-or-update-my-banking-information>

Registration and Tuition Payment Procedures

1. Hard copy fee bills are not mailed to you from Finance. Your up-to-date account information is available on [QUEST](#). Enrolment and fee arrangement information is available on the [Finance website](#). In addition, the [Graduate Studies Office website](#) contains contact links to information for the following:
 - i. [Calendar of Events and Academic Deadlines](#)
 - ii. [Finance Office – Student Accounts](#)
 - iii. [Human Resources – Payroll](#)
 - iv. [WatCard Office](#)
 - v. [International Student Office](#)
 - vi. [Graduate Student Association](#)
2. Once fees are paid you can concentrate on selecting your course(s) for the term. The deadline for this is six weeks after the start of classes. Remember, you will not receive credit for the courses if you are not officially registered in them by the deadline. New students must register for any courses outlined in their admission letter. Each student is expected to consult with his/her faculty advisor regarding course selection each term. If you need permission to enrol in a graduate course, please start attending classes right away so you don't fall behind while you're waiting for approval.
3. Familiarize yourself with the regulations in the current on-line graduate calendar and check anything you are unsure of with the Graduate Coordinator. ***By registering and paying fees, students assume responsibility for knowing the regulations and pertinent procedures as set forth in this handbook and the University of Waterloo Graduate Calendar.*** Ultimately, it is your responsibility to ensure that you have met coursework and other requirements to complete your degree. Your faculty advisor, the graduate officer (through review of your annual progress reports) and the Graduate Coordinator are all there to assist you in this process. Some of these regulations are listed below.

Notes: Students are normally expected to maintain continuous registration (in each of the three terms each year). Failure to register and pay fees each term will mean you will have to apply for readmission. Special permission is required from the Faculty Associate Dean and the Graduate Studies & Postdoctoral Affairs Office to change your registration status from full-time to part-time (or vice versa) or to go inactive, etc. If you do request inactive status, you must seek approval from your advisor, the Graduate Officer, and the Associate Dean. Requests for inactive status will not always be approved.

University Policies Regarding Courses

Course add/drop dates

- i. See GSPA pages on [course enrolment](#) and [course drop](#).

Incomplete Courses

- ii. See GSPA guidelines on [incomplete grade status \(INC\) and failure to complete \(FTC\)](#). A failing grade in any course will necessitate a review of the candidate's status by the Department, and may result in the requirement to withdraw from the program.
- iii. Please note that the Engineering passing grade is 65

Auditing courses

- i. At present, you are not able to add an AUDIT course to your Quest record. You must obtain permission from the course instructor and approval from the Graduate Officer via a course drop/add form. In addition to regular attendance in the course, the instructor has the discretion to require class participation, preparation, and sometimes completion, of assignments and/or examinations. If you find yourself in difficulty while auditing a course, you should arrange to drop the course from your schedule before the exam period. An NMR or DNW (did not write exam) cannot be given for an Audit course. Should you fail to receive an "AUD", the course will automatically be deleted from your transcript.

Taking courses at other Ontario universities

- iv. See the GSPA pages on [the Ontario Visiting Graduate Student plan \(OVGS\)](#).

Other Important Policies and Regulations

Degree time limits and extensions

- ☑ All requirements for the MASc, MEng and PhD. degrees in Mechanical and Mechatronics Engineering must normally be completed within the following time periods (beginning with the term of initial registration), as stipulated by the University Senate:
- MASc** - Full-time (FT): **6** terms (2 years); Part-time (PT): **15** terms (5 years).
MEng - Full-time (FT): **6** terms (2 years); Part-time (PT): **15** terms (5 years).
Doctorate - Full-time (FT) from master's' level: **12** terms (4 years); Part-time (PT): **21** terms (7 years).

Transitional students – time limits depend on their particular program requirements.

For computational purposes, a term of full-time enrolment is counted as 1.0, a term of part-time enrolment is counted as 0.5, and an inactive term is counted as 0.

Master's: Normally, full-time master's students complete most or all of their course work during the first two terms they are registered in the program (normally the Fall and Winter terms) and are encouraged to complete their thesis proposal by the third term (Spring term). Please note that these are recommendations only; timelines may vary due to the multi-disciplinary nature of our School. It is ultimately up to your supervisor to provide guidance on an appropriate timeline for your project.

Doctoral: Normally, full-time doctoral students should complete their coursework by the end of the third term. They should normally begin their comprehensive examinations during the third term and have their oral examination completed sometime in the 4th term (Note: the Graduate Calendar stipulates that the comprehensive examination requirement must be completed within seven academic terms after initial registration). Once a student has successfully completed their comprehensive examination they may continue onto the proposal writing and defense.

Student advising and monitoring of progress

All research students (MAsc, PhD) are assigned an academic or faculty "advisor" when they enter the program. Together, the student and their advisor plan out course selection and set targets for completion of coursework and other degree requirements. While the advisor often becomes the "supervisor" for the thesis, this is not always the case. When a student chooses to work with a different faculty member to supervise their thesis, this individual will also become their general academic advisor. A "Change of Supervisor" form must be completed if you change supervisors at any point during your program. Forms can be obtained by visiting the [GSPA website](#).

Students are expected to meet with their faculty advisors/supervisors on a regular basis. Your advisor should be regularly kept apprised of your progress and any problems arising (due to financial, health or other personal circumstances). The student and faculty advisor should also feel free to consult with the Graduate Officer on any of these matters.

The Graduate Student Activity Report (GSAR) is a progress report to be completed by the student every term and sent to their supervisor for comments and term rating. The GSAR is used to award students that published journals and conference papers the reported term.

Academic Integrity in Research and Scholarship

Engineering is committed to the highest standards of integrity in research and scholarship by faculty, students, and staff. As a post-secondary institution, the value of the degrees the university awards deserving students at the end of their studies is dependent on the legitimacy of the education these students earn. A degree is valueless without integrity.

Every new UW graduate student must complete an [online academic integrity module](#) in their first academic term. Regardless of the term when the new student starts he/she will be automatically enrolled in the academic integrity module in LEARN. The student then has eight weeks to review the module and successfully achieve 75% to pass an academic integrity quiz.

Students who do not achieve 75% will have to retake the quiz until they attain the minimum score. Students who do not comply within the 8 weeks will be contacted by the [Office of Academic Integrity](#) and advised to complete the module within 14 days. Students who do not complete the module will not be allowed to enrol in future courses until they have completed this mandatory credit.

Completing the online Academic Integrity module alone does NOT meet the necessary milestone requirement. The [Writing Centre](#) also provides resources to help you recognize and avoid plagiarism through one-on-one sessions and a workshop on paraphrasing and summarizing other people's work.

Mandatory Training

Graduate students, faculty and staff, are considered employees and must take safety courses to ensure proper training. [Mandatory training for graduate students](#)

Policies on Student Grievance and Academic Disciplines

Graduate student who has a question or complaint is advised to follow normal administrative channels: 1) the student's academic advisor/supervisor, and 2) the Graduate Officer. Do *not* go directly to the Department Chair/Director, the Associate Dean of Graduate Studies and/or Associate Provost of Graduate Studies. The Graduate Officer for the program will consult these individuals as required. Student appeal procedures are set out in the [Student Grievance Policy # 70](#).

If you have a grievance or question about an academic decision, you are strongly encouraged to first speak informally with the course instructor and/or graduate officer.

[Policy #71, Student Academic Discipline Policy](#), should also be referred to. Policy Guidelines of Graduate Student Support and other policy excerpts are listed in the document regarding [UW Policies, Procedures and Committees](#).

Financial Assistance

For a list of all available funding, scholarships, and awards to apply to, please see here:

<https://uwaterloo.ca/graduate-studies-postdoctoral-affairs/future-students/funding-graduate-school>

Description of Graduate Research Programs and Degree Requirements

Master of Applied Science (MASC) degree requirements

Thesis option: The MASC program emphasizes high level independent research by candidates. The topic of the thesis and the choice of courses are decided by the student and their supervisor(s). Each student's program is subject to the approval of the Associate Chair for Graduate Studies. Candidates will participate in a research program generally involving either theory or experimentation, or both.

[Graduate Academic Integrity Module \(Graduate AIM\)](#)

i. Courses

Students must complete 4 one-term (0.50 unit weight) graduate level courses (or courses acceptable for graduate credit). A maximum of 1 500-level course may be counted for credit.

Additional Faculty regulations concerning Master's degree requirements are:

- At least two-thirds of the courses used for credit in a candidate's program must be taken from the 600 and 700 series.
- No more than half of the courses used for credit may be taught by the candidate's supervisor.
- The candidate must obtain a pass in all courses credited to their program, with a minimum overall average of 70% (a grade of less than 65% in any course counts as a failure).
- At least half of the courses used for credit must normally be Faculty of Engineering courses.
- Link(s) to courses
 - [Mechanical Engineering \(ME\) courses](#)
 - [Graduate course search](#)

i. Graduate Safety Training

The Graduate Safety [Training](#) must be completed by the end of the student's second registered term.

Attend at least **eight** MME [Department research seminars](#)

i. Master's Seminar Milestone

ii. Master's Thesis

Candidates are requested to give advance notice of their intention to submit a thesis approximately three months prior to submission. Two assessors will then be appointed to aid each candidate's supervisor(s) in evaluating the thesis. Normally, the assessors will be members of the Mechanical and Mechatronics Engineering Department, one being external to the supervisor's research group.

iii. Degree completion procedures: <https://uwaterloo.ca/engineering/graduate-students/current-students/steps-graduate/masc-and-march-degree-completion>

i. Graduate Research Fields

Automation and Controls
Fluid Mechanics

Materials Engineering and Processing
Solid-Body Mechanics and Mechanical Design
Thermal Engineering

i. Nano program Degree Requirements

Thesis option: The MASc program emphasizes high level independent research by candidates. The topic of the thesis and the choice of courses are decided by the student and their supervisor(s). Each student's program is subject to the approval of the Associate Chair for Graduate Studies. Candidates will participate in a research program generally involving either theory or experimentation, or both.

[Graduate Academic Integrity Module \(Graduate AIM\)](#)

Courses

- Students must complete 4 one-term (0.50 unit weight) graduate level courses (or courses acceptable for graduate credit), including NANO 600 Introduction to Nanotechnology and 1 nanotechnology core course. A maximum of 1 500-level course may be counted for credit.

Nanotechnology core courses: <https://uwaterloo.ca/graduate-studies-academic-calendar/engineering/department-mechanical-and-mechatronics-engineering/master-applied-science-masc-mechanical-and-mechatronics-engineering-nanotechnology>

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 who have completed their Bachelor of Applied Science (BASc) degree in Nanotechnology Engineering at the University of Waterloo can not take NANO 600. Instead, they can choose 1 course from the list of nanotechnology core courses.

Technical elective courses:

- (a) Micro/nano Instruments and Devices

<https://uwaterloo.ca/graduate-studies-academic-calendar/engineering/department-mechanical-and-mechatronics-engineering/master-applied-science-masc-mechanical-and-mechatronics-engineering-nanotechnology>

- (b) Nanoelectronics Design and Fabrication

<https://uwaterloo.ca/graduate-studies-academic-calendar/engineering/department-mechanical-and-mechatronics-engineering/master-applied-science-masc-mechanical-and-mechatronics-engineering-nanotechnology>

- (c) Nano-biosystems

<https://uwaterloo.ca/graduate-studies-academic-calendar/engineering/department-mechanical-and-mechatronics-engineering/master-applied-science-masc-mechanical-and-mechatronics-engineering-nanotechnology>

[mechatronics-engineering/master-applied-science-masc-mechanical-and-mechatronics-engineering-nanotechnology](https://uwaterloo.ca/graduate-studies-academic-calendar/engineering/department-mechanical-and-mechatronics-engineering/master-applied-science-masc-mechanical-and-mechatronics-engineering-nanotechnology)

(d) Nanomaterials

<https://uwaterloo.ca/graduate-studies-academic-calendar/engineering/department-mechanical-and-mechatronics-engineering/master-applied-science-masc-mechanical-and-mechatronics-engineering-nanotechnology>

Additional Faculty regulations concerning Master's degree requirements are:

- At least two-thirds of the courses used for credit in a candidate's program must be taken from the 600 and 700 series.
- No more than half of the courses used for credit may be taught by the candidate's supervisor.
- The candidate must obtain a pass in all courses credited to their program, with a minimum overall average of 70% (a grade of less than 65% in any course counts as a failure).
- At least half of the courses used for credit must normally be Faculty of Engineering courses.

○ Link(s) to courses

- [Mechanical Engineering \(ME\) courses](#)
- [Nanotechnology \(NANO\) courses](#)
- [Graduate course search](#)

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 1 research seminar. To receive credit, students are expected to [attend at least 8 seminars](#) other than their own before completing their program.

Master's Thesis

- Candidates are requested to give advance notice of their intention to submit a thesis approximately three months prior to submission. Two assessors will then be appointed to aid each candidate's supervisor(s) in evaluating the thesis. Normally, the assessors will be members of the Mechanical and Mechatronics Engineering Department, one being external to the supervisor's teaching/specialization group.

Fast track

The Accelerated Master's program allows undergraduate students at Waterloo to fast track a Master of Applied Science (MASc) degree at the University of Waterloo.

You will get to take up to two graduate level courses during your final year of undergraduate studies: one course in 4A and one in 4B or during your work term.

You will have the opportunity to undertake research during your final co-op term(s); such experience can be a foundation for your MASc work.

The general principles and structure of this program are described in the [Graduate Studies Calendar](#). The Accelerated Master's program is offered by all the engineering departments at Waterloo.

<https://uwaterloo.ca/engineering/accelerated-masters-program>

Master of Engineering (MEng) Degree Requirements

Coursework option

[Graduate Academic Integrity Module \(Graduate AIM\)](#)

Courses

- Students must complete 8 one-term (0.50 unit weight) graduate level courses (or courses acceptable for graduate credit).
- A maximum of 2 500-level courses may be counted for credit.
- At least 2 out of the 8 required courses must be taken from the following list of ME graduate core courses:
 - <https://uwaterloo.ca/graduate-studies-academic-calendar/engineering/department-mechanical-and-mechatronics-engineering/master-engineering-meng-mechanical-and-mechatronics-engineering>

MEng students completing 1 of the 2 Graduate Diploma (GDip) program options or the Graduate Specialization are allowed to use the mandatory courses from the GDips or Graduate Specialization to count toward 2 of the 8 core courses.

MEng students must attend at least 4 MME research seminars.

Additional Faculty regulations concerning Master's degree requirements are:

The candidate must obtain a pass in all courses credited to their program, with a minimum overall average of 70% (a grade of less than 65% in any course counts as a failure).

At least half of the courses used for credit must normally be Faculty of Engineering courses and the other half need to be Mechanical and Mechatronics Engineering courses.

Graduate diplomas

- Students must complete the degree requirements of the [general MEng program](#).
- Graduate Diploma in Fire Safety

- Four program options available: [Certificate](#) in Fire Safety, [MEng](#) Graduate Diploma in Fire Safety, [MASc](#) and [PhD](#)
- Choose a full-time, 12 to 16-month program or part-time studies
- Begin your program in January, May or September
- Courses delivered in an intensive, week-long course format with ample time to complete coursework afterwards
- Coursework and projects tailored to the needs of your industry with current issues and challenges continually addressed
- <https://uwaterloo.ca/fire-research-and-safety/fire-safety-program>

Graduate specialization

Green Energy

- 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 Mechanical and Mechatronics Engineering consist of a set of at least 4 graduate (0.50 weight) level 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 the Graduate Specialization are described below.
- To receive the Graduate Specialization in Green Energy, students must successfully complete 1 compulsory course and 3 elective courses:

Compulsory course:

ME 659 Energy and Environment

Elective courses (choose 3 from the following list):

ME 738 Special Topics in Materials: Hydrogen Storage Materials

ME 751 Fuel Cell Technology

ME 753 Solar Energy

ME 760 Special Topics in Thermal Engineering: Low Energy Building Systems

ME 760 Special Topics in Thermal Engineering: Building Energy Performance

ME 760 Special Topics in Thermal Engineering: Air Pollution and Greenhouse Gases

ME 760 Special Topics in Thermal Engineering: Wind Energy

Doctor of Philosophy (PhD) Degree Requirements

Thesis option

[Graduate Academic Integrity Module \(Graduate AIM\)](#)

Courses

Candidates must successfully complete at least 3 graduate courses at the 600 or 700 level (0.50 unit weight) with an overall average of 70% (no more than 1 of the courses used for credit towards the PhD degree may be taught by the candidate's supervisor). The actual program is decided by the student and the supervisor(s), subject to the approval of the Associate Chair for Graduate Studies

- Candidates admitted to the PhD program who do not possess a recent and relevant Master's degree or have transferred directly to the PhD program without a Master's degree, are required to complete a minimum of 7 courses, at least 5 of which must be at the 600 or 700 levels (0.50 unit weight).

i. Link(s) to courses

[Mechanical Engineering \(ME\) courses](#)

[Graduate course search](#)

i. Graduate Safety Milestone

The Graduate Safety Milestone must be completed by the end of the student's second registered term.

To enroll in this milestone, please contact your advisor.

This course is completed via LEARN.

i. PhD Comprehensive Examination

Students are required to meet the University-level PhD Comprehensive Examination minimum requirements outlined in the "[Minimum requirements for the PhD degree](#)" section of the Graduate Studies Academic Calendar (GSAC), with certain noted differences that are specific to the [Faculty of Engineering Comprehensive Examination minimum requirements](#):

- a. Comprehensive examination purpose: Consistent with University-level minimum requirements.
- b. 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 PhD program without a completed Master's degree.
- c. 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.
- d. Who Chairs an examination: Students must follow the Faculty of Engineering Chair guidelines whereby the Chair is normally selected from outside of the student's home department.
- e. Format / Content: Consistent with University-level minimum requirements but with additional information provided in the Faculty of Engineering Comprehensive Examination minimum requirements.
- f. Academic integrity: Consistent with University-level minimum requirements.

In addition to the University-level and Faculty-level PhD Comprehensive Examination minimum requirements, students in the PhD in Mechanical and Mechatronics Engineering program are also required to meet the following requirements:

The thesis topic is decided by the student and supervisor(s), in consultation with an Advisory Committee.

The Comprehensive Examination Committee, on the advice of the candidate's supervisor(s), should examine:

- The adequacy of the course of study being undertaken.
- The student's performance both in the coursework and in the research studies.
- The proposal for research program as presented by the student.
- The adequacy of the student's technical background in related areas of knowledge.
- The main decision to be reached is whether the candidate should proceed with the proposed study or change the emphasis in the research work. Advice about taking additional graduate courses may also be given.

i. PhD Thesis

This degree is awarded after candidates have satisfied the Examining Committee that their thesis is a substantial original contribution to knowledge and have also demonstrated a high degree of competence in areas of knowledge related to their specialization.

Regulations governing the submission and examination of the PhD thesis are found in the Minimum Requirements for the PhD Degree section of the Graduate Studies Academic Calendar.

The Examining Committee consists of the supervisor(s) and four other members nominated by the supervisor(s) and is approved by the Faculty Graduate Studies Office. One of the committee members is appointed from outside the University, another from outside the Department.

i. Nano program Degree Requirements

- i. [Graduate Academic Integrity Module \(Graduate AIM\)](#)
- ii. Courses

Candidates must successfully complete NANO 600 Introduction to Nanotechnology, 1 nanotechnology core course, and at least 1 more graduate course from the list of technical electives (0.50 unit weight) with an overall average of 70% (no more than 1 of the courses used for credit towards the PhD degree may be taught by the candidate's supervisor). The actual program is decided by the student and the supervisor(s), subject to the approval of the Associate Chair for Graduate Studies.

Students who are admitted with an appropriate honours bachelor's degree or who transfer directly from a master's program to the PhD program must complete a total of at least 7 courses (0.50 unit weight) including NANO 600 Introduction to Nanotechnology, 1 nanotechnology core course and 5 elective courses.

Nanotechnology core courses

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 MicroElectroMechanical Systems: Physics, Design & Fabrication

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 who have completed their Bachelor of Applied Science (BASc) or MAsC degree in Nanotechnology Engineering at the University of Waterloo cannot take NANO 600. Instead, they can choose 1 course from the list of nanotechnology core courses.

Link(s) to courses

- [Mechanical Engineering \(ME\) courses](#)
- [Nanotechnology \(NANO\) courses](#)
- [Graduate course search](#)

i. Graduate Safety Milestone

The Graduate Safety Milestone must be completed by the end of the student's second registered term.

i. PhD Research 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 1 research seminar. To receive credit, students are expected to attend at least 8 seminars other than their own before completing their program.

i. PhD Comprehensive Examination

Students are required to meet the University-level PhD Comprehensive Examination minimum requirements outlined in the "[Minimum requirements for the PhD degree](#)" section of the Graduate Studies Academic Calendar (GSAC), with certain noted differences that are specific to the [Faculty of Engineering Comprehensive Examination minimum requirements](#):

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- c. 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.

- d. Who Chairs an examination: Students must follow the Faculty of Engineering Chair guidelines whereby the Chair is normally selected from outside of the student's home department.
- e. Format / Content: Consistent with University-level minimum requirements but with additional information provided in the Faculty of Engineering Comprehensive Examination minimum requirements.
- f. Academic integrity: Consistent with University-level minimum requirements.

In addition to the University-level and Faculty-level PhD Comprehensive Examination minimum requirements, students in the PhD in Mechanical and Mechatronics Engineering - Nanotechnology program are also required to meet the following requirements:

- The thesis topic is decided by the student and supervisor(s), in consultation with an Advisory Committee.
- The Comprehensive Examination Committee, on the advice of the candidate's supervisor(s), should examine:
 - The adequacy of the course of study being undertaken.
 - The student's performance both in the coursework and in the research studies.
 - The proposal for research program as presented by the student.
 - The adequacy of the student's technical background in related areas of knowledge.
- The main decision to be reached is whether the candidate should proceed with the proposed study or change the emphasis in the research work. Advice about taking additional graduate courses may also be given.

i. PhD Thesis

This degree is awarded after candidates have satisfied the Examining Committee that their thesis is a substantial original contribution to knowledge and have also demonstrated a high degree of competence in areas of knowledge related to their specialization.

Regulations governing the submission and examination of the PhD thesis are found in the Minimum Requirements for the PhD Degree section of the Graduate Studies Academic Calendar.

The Examining Committee consists of the supervisor(s) and four other members nominated by the supervisor(s) and is approved by the Faculty Graduate Studies Office. One of the committee members is appointed from outside the University, another from outside the Department (often from Mathematics or Physics).

PhD Comprehensive Examination Guidelines

Comprehensive Examination milestone

- All PhD students at the University of Waterloo are required to successfully complete the PhD Comprehensive Exam milestone. A comprehensive exam serves multiple purposes, specifically to ensure that:
 - PhD students have the appropriate academic background – a foundation and breadth of knowledge in the field of study– to be successful in their PhD program;

- PhD students have the capacity to engage in scholarly communications – both oral and written – necessary to be successful in their PhD studies;
- PhD students have developed a novel research topic to be evaluated during their PhD studies.

In the Faculty of Engineering, the PhD Comprehensive Examination consists of an oral examination conducted at the University of Waterloo with the candidate and members of the Comprehensive Examining Committee present. The examination consists of the following two parts:

An examination of the research proposal that the candidate intends to develop into a successful PhD research thesis which is presented by the candidate in an oral presentation at the beginning of the comprehensive exam (max. 30 min.)

An examination of the breadth of the candidate's knowledge of the academic field of the thesis and the adequacy of the candidate's background preparation to pursue the proposed research.

All students should review the guidelines surrounding [Academic Integrity and the Comprehensive Exam](#) prior to booking their examination.

Comprehensive Examination timing

Students admitted to the PhD program from a completed Master's degree (PhD2) must complete the Comprehensive Exam by the end of the fourth cumulative term of their PhD program.

Students admitted to the PhD program from an incomplete Master's degree or directly from a Bachelor's degree (PhD3) must complete the Comprehensive Exam by either four terms from the first term registered in the PhD program or in term seven from the beginning of your master's – whichever occurs first.

Students who have previously completed studies in another PhD program at the University of Waterloo or at another university, are required to successfully complete the comprehensive exam no later than their fourth term of studies in their current program or their seventh term of studies at the PhD level, whichever is longer.

Students who anticipate not meeting these requirements may seek an extension to the deadline to complete the comprehensive exam. The student is required to submit a petition providing evidence of extenuating circumstances to the student's Associate Dean, Graduate Studies

<https://staging.uwaterloo.ca/engineering/graduate-students/current-students/program-guidelines/phd-comprehensive-exam/phd-comprehensive-exam-extension>

Graduate research fields

Automation and Controls

Fluid Mechanics

Materials Engineering and Processing

Solid-Body Mechanics and Mechanical Design

Thermal Engineering

Fast track

- Exceptional MASc applicants may be considered for direct-entry to the PhD program from a bachelor's program. Applicants interested in being considered for a direct-entry PhD should include a statement to that effect in their Supplementary Information Form (SIF). Applicants who will be considered for direct-entry to the PhD program will be contacted by a representative from the Department within two months of the application deadline.

Policies on Thesis Committees, Proposals, Defences and Degree Completion

For more information on how to format your proposal and thesis, please see here:

<https://uwaterloo.ca/graduate-studies-postdoctoral-affairs/current-students/thesis>

Please see the following link on steps to completion:

<https://uwaterloo.ca/engineering/graduate-students/current-students/program-guidelines/steps-graduate/phd-degree-completion>

PhD Comprehensive Examination Guidelines

<https://uwaterloo.ca/engineering/graduate-students/current-students/program-guidelines/phd-comprehensive-exam>

PhD Dissertation

Advisory committee

Per Graduate Studies Academic [Calendar](#)

Thesis notification proposal

After PhD defense committee is approved by Engineering Graduate Studies Office, student is required to submit a copy of the thesis to EGO to be put on display for 25 business days before defense. (Details are on EGO [webpage](#) step 9 to 12)

Proposal Procedure

PhD comprehensive exam research proposal from EGO [webpage](#):

All PhD students must complete a research proposal which will consist of a **double-spaced report of no more than fifty (50) pages** including tables, diagrams, and references. The proposal will identify:

- The research problem
- Review the relevant literature
- Describe the tasks planned to solve the problem, and
- Propose a timetable for the completion of the project and defence of the PhD thesis.
- There are no formatting guidelines for the Research Proposal, however, students are welcome to follow the [thesis formatting guidelines](#) published by the GSPA.

With approval from your supervisor, you may wish to distribute background working papers to members of the Committee to provide further evidence of background preparation.

A copy of your proposal (paper or digital) will be given to each of your committee members at least 2 weeks before your Comprehensive Exam. The EGSO does not require a copy of your research proposal.

You will need to prepare an oral presentation for your thesis proposal which will be shared with your committee at the beginning of your comprehensive exam and should last no longer than 30 minutes.

Final defense Procedure

Steps to completion on EGO [webpage](#)

Absent committee member for final defense

Need to find a replacement and complete PhD committee member replacement [form](#) before comprehensive exam and defense

Financial Policies

Support for graduate students

- MME Teaching Assistant (TA)

For complete guide and more information on how to apply, please see here:

<https://uwaterloo.ca/mechanical-mechatronics-engineering/graduate-students/current-students/teaching-assistantship>

- Graduate Research Assistantships (RA)

For more information, please see here: <https://uwaterloo.ca/graduate-studies-postdoctoral-affairs/current-students/graduate-teaching-assistantships-ta-and-graduate-research>

- Graduate Research Scholarship (GRS)

The Graduate Research Scholarship is guaranteed for all research students (MASc and PhD) as outlined in their offers of admission.

Any questions regarding payment of the GRS can be directed to the Graduate Funding Coordinator mme-grad-funding@uwaterloo.ca

- Additional Scholarships

<https://www.canada.ca/en/services/finance/educationfunding/scholarships.html>

International student funding

- <https://uwaterloo.ca/graduate-studies-postdoctoral-affairs/current-students/international-student-funding>

Scholarship Competition Recourses

- <https://uwaterloo.ca/graduate-studies-postdoctoral-affairs/current-students/scholarship-competition-resources>

Undergrad course teaching

Doctoral students are encouraged to participate in teaching at least one undergraduate course at some time during their program of study. This will generally be a third or fourth year course in the student's area of research interest. While undergraduate teaching is negotiated between the student and Chair/Director, and is based on the undergraduate program needs as well as graduate student interest. You may wish to let the Graduate Officer and/or the Undergraduate Officer know if there are specific courses that you would like to teach. The graduate student's supervisor will often act as a mentor to assist with this first teaching experience. Assistance is also available through the Centre for Teaching Excellence (CTE).

Travel assistantships – [Graduate Student Dissemination Research Award](#)

Students are eligible to apply for the GSDRA are available for students presenting the results of research they conducted while at the University of Waterloo at professional or academic meetings. Students are normally expected on a first come first serve basis and only a handful of awards are available each term.

There are three deadlines

<i>Fiscal Year</i>	<i>Application Term</i>	<i>Travel/Conference Dates</i>	<i>Competition Status</i>
23-24	Spring 2023	May 1, 2023 – Aug 31, 2023	Closed; no funds remaining
23-24	Fall 2023	Sept 1, 2023 – Dec 31, 2023	Open; funds remaining
23-24	Winter 2024	Jan 1, 2024 – Apr 30, 2024	Open; funds remaining

Only graduate students currently registered in a degree program at Waterloo and registered at the time of the travel are eligible. Priority will be given to Doctoral students who have not used the award twice and Master’s students who have not received this award previously.

Maternity, adoption and parental leave

Graduate students who wish to take maternity, adoption, or parental leave may register for an inactive (full leave) or part-time (partial leave). Inactive status must be approved by the Supervisor, Graduate Officer, and Associate Dean for Graduate Studies. The choice of registration status depends primarily on the amount of time you expect to be able to devote to your academic program during the leave and must be made in consultation with your supervisor and Graduate Officer. Where external agencies are involved, as with visa students or those holding external scholarships, you should consult these agencies before applying for part-time or inactive registration. If you are approved to register “inactive”, you pay no tuition fees; if you register part-time, you pay part-time tuition fees. In either case the degree time limit is extended appropriately.

Full-time graduate students are eligible to receive a Bursary during a full or partial maternity or adoption leave provided that they have been registered as full-time graduate students at UW for at least two academic terms prior to the start of the leave. Part-time graduate students are eligible to receive a Bursary during a full four-month maternity or adoption leave provided that they have been registered as full- or part-time graduate students at UW for at least two academic terms prior to the leave, and are receiving financial support (TA, RA, scholarship, or bursary) during the academic term preceding the leave. For forms, please visit the [GSPA Forms page](#), under Awards/Bursaries. Students are advised to consult the Parental Leave Advisor in the Graduate Studies & Postdoctoral Affairs Office at an early stage in planning for a maternity/adoption/parental leave. Please refer to the [University policies](#) for further information.

ENGWellness

Here in the Department of Mechanical and Mechatronics Engineering, our community matters! [ENGWellness](#) provides resources and support to our graduate students in Electrical and Computer Engineering (ECE) and Mechanical and Mechatronics Engineering (MME) departments.

Meet our MME Student Wellness Coordinator

- Sam Vandekerckhove
- **Hours:** 8:30AM - 4:30PM, Monday-Friday (can be flexible based on need)
- **Email:** ENGWellness@uwaterloo.ca or srvandek@uwaterloo.ca
- **Appointment:** 50 min timeslots (flexible), please email to arrange!
- **Remote Meeting Options:** Email, WebEx, Skype, Teams, Phone, etc.

MMEGA

[MMEGA](#) is the graduate student association for all MME graduate students. We represent MME grads at the graduate student association (GSA) level and at the MME department level where we seek the best interest of MME grad students. We also aim to promote interactions between all MME graduate students through a variety of event all year round (be on the lookout for them!).

Additional Information About UW

Covid-19 Protocols

For more up-to-date information regarding the COVID-19 protocols on campus, please visit this link: <https://uwaterloo.ca/graduate-studies-postdoctoral-affairs/covid-19-updates-graduate-students>

Access to building after hours

Currently MME has lab, classroom and office space in the following buildings across campus: **CPH, DC, DWE, E2, E3, E5, E7, EC4, ERC,** and **FRF**. We also have faculty members working in buildings such as QNC in addition to professors cross-appointed from other Engineering departments and faculties. The department does their best to group students from the same research group together in the same offices, close to their supervisor's lab(s), but this is not always guaranteed due to availability. Under current guidelines, office access is restricted to those students who have been added to and signed their supervisor's research safety plan. If no plan has been received, access is not permitted.

Living accommodations for graduate students

Please refer to the current [UW University of Waterloo Graduate Calendar, Housing & Residences](#) for complete details. UW has many different styles of residences; grad

students have options to live with their families in townhouses. UW also helps with providing information regarding [Off-Campus Housing](#).

GSA /Grad house

All graduate students are automatically members of The Graduate Student Association. The Grad House is situated in the centre of campus and serves lunches, alcoholic and non-alcoholic beverages at moderate prices. More information can be found at the [Graduate House website](#).

Libraries

There are a number of libraries on campus. The Dana Porter Arts Library, which is located in the centre of the campus, is the main library for arts humanities and social/behavioural sciences materials. The Davis Centre Library is located in the Davis Centre and contains materials related to mathematics, engineering, biological and health sciences, physical sciences, and so on. For manuals and other materials related to computer software and its application, the IST has a special CHIP service centre located on the bottom (1.st) floor of the Math and Computer Building. You may also view books, articles and other pieces of literature using the [online library](#)

The University is linked to the Ontario Inter-University Library System whereby it is possible to obtain a copy of a book or journal which is not available in our library within 48 hours. Inter-library loan (ILL) service reaches across North America. The Interlibrary Loan ([RACER](#)) system allows you to obtain items not available at the TUG libraries, including the UW Library. You may login to RACER to request books, journal articles, etc. not held in the TUG libraries.

Writing centre

The [Writing Centre](#) is an excellent resource to assist you in meeting the demands of academic and professional writing which is one key to success in your M.Sc. or Ph.D. program. They offer workshops, one-on-one appointments and a variety of other supports.

Parking on campus

You may park in any of the visitor parking lots and pay each time you enter. The current rate is between \$3.00 and \$6.00. You may pay by the term in selected lots (depending on the availability of space), in which case you need to contact the Parking Office in the Security Department which is located in the Commissary (COM), extension 33100. Visit the University of Waterloo [Parking website](#) for more information.

Banking

Major banking organizations have branch offices located close to the University and the Canadian Imperial Bank of Commerce (CIBC) has a branch located on the lower level of the Student Life Centre. Assistantship and scholarship payments are deposited directly into your local account. Please check with the Payroll Department in the General Services Complex (GSC) to be sure that you have filled out the appropriate forms for [Direct Deposit](#).

Housing

As with most university cities, housing is at a premium. Therefore, the earlier you can arrange accommodation, the closer you will be to the University and the cheaper the rate. There is a Housing Office located in Village 1 (V1) which provides lists of apartments and rooms to rent. You should consult this source as soon as possible. Another good source of information is the current graduate students who, based on experience, may be familiar with upcoming vacancies. New to campus housing is Columbia Lake Village, designed specifically for graduate students. Visit the [Waterloo Residences website](#) for more information.

Centre for Career action

The Centre for Career Action provides assistance to students graduating with advanced degrees who are seeking employment. Types of employment and the organizations and agencies compatible with individual students' needs and abilities are discussed during personal interviews with career advisors. Group sessions for students are held on job-hunting techniques, resume writing and successful interviewing. Each year, several hundred employers are invited to conduct on-campus interviews for all graduating students. Post-graduate students may participate in interviews during the Fall and Winter terms. Visit the [Centre for Career Action website](#) for more information.

Bookstore

The Book Store, with three sales areas, is located in South Campus Hall. It provides for all of the student's textbook needs, more than 30,000 titles of non-required books, engineering, art and optometry supplies, stationery and crested merchandise. Normal Bookstore hours are 9:00 a.m. to 5:00 p.m., Monday through Friday. Extended hours as posted as required. For general information, call extension 32902. For more information, visit the University of Waterloo's [Bookstore website](#).

International student experience office

[The International Student Experience Office](#) (ISE) aids international students through its special programs and by providing information on many aspects of living in Canada: immigration regulations, community services, personal problems, legal problems, cultural adjustment, orientation to university life, and so on. Programs include Host Families, English conversation class, English tutoring, temporary housing, TOEFL preparation courses and United States visa service.

All students from outside Canada are invited to visit the International Student Office in the [Student Success Office](#) in South Campus Hall on the second floor. [International advising drop-ins](#) and [workshops](#) are also offered for students.

Healthcare

[Health Services](#) are provided for all students at UW. Registered students can receive medical care, nursing care and counselling services at Health and Safety. A roster of family doctors attends Health and Safety each day to see students. A Health and Safety physician is on 24-hour call seven days a week for students.

Health Insurance: Physicians' fees at Health and Safety as well as laboratory work and X-rays are paid for by the Ontario Health Insurance Plan (OHIP). For detailed information on OHIP, students can obtain a free booklet, "The Ontario Health Insurance Plan General Guide", at the Clinic. OHIP application forms are also available at the Clinic. Students from other Canadian provinces and foreign students should check with Health and Safety staff regarding their coverage.

With the exception of visa students, all full-time students are covered by a Student Supplementary Health Insurance Plan. Premiums are shown in the Schedule of Fees. Dependent (family) coverage can be obtained by payment of an additional premium. A pamphlet detailing this plan is available at Health and Safety, the Registrar's Office, Financial Services, or the Federation of Students' Office.

Visa students, no longer covered under the Supplementary Health Insurance Plan since June 30, 1994, should enrol for the UHIP or University Health Insurance Plan. This plan can cover either the student alone, one dependent or more than one dependent at different costs. To apply for dependent coverage, the student must apply for coverage within 30 days of arriving in Canada. After this time the student must seek coverage from another private insurer or be responsible for their own medical costs. [The Graduate Studies & Postdoctoral Affairs Office](#) cautions that medical costs are very high, for example, one day in the hospital can cost as much as \$2,000.00 in Canada. Information regarding this plan can be obtained from the Graduate Studies & Postdoctoral Affairs Office.

Mental Health Resources

[Counselling Services](#) are also available for urgent situations where drop in sessions are offered. In addition, [stress-reduction workshops](#) are offered to better prepare students to cope with stress of studies, personal lives, social lives, etc.

Centre for Teaching Excellence

The [Centre for Teaching Excellence \(CTE\)](#) fosters teaching and learning of the highest quality at Waterloo. They support the development of instruction by working collaboratively with departments and individuals at all career stages, and promote the importance of effective teaching and meaningful learning across the university.

Child Care

There are a variety of child care services available through four centres on campus. The Early Childhood Education Centre (ECEC) and Bright Starts Co-operative Early Learning Centre Inc. provide a variety of child care services on campus. Visit the [Human Resources website](#) for more information.

Policies on Bicycles in University Buildings

This statement makes clear that bicycles are not to be taken into or parked in campus buildings. The only exceptions are the storing of bicycles in areas specifically designated for this purpose located in the residence facilities and the UW Bike Centre in the Student Life Centre.

Departments administering buildings and UW Police are authorized to remove any bicycles found within campus buildings and not parked in outside bicycle racks.

This policy is not intended to discourage bicycle use but to ensure UW's compliance with fire and life safety requirements.

Post-Graduation Procedure

It is your responsibility to be aware of all academic deadlines for Convocation.

Below are the next steps you need to complete to graduate:

Review the deadlines on GSPA Academic Calendar for program completion deadline for convocation.

Check your unofficial transcripts to ensure all of your marks and milestones are reporting correctly.

Apply to Graduate on QUEST. a. Self Service-> Degree Progress/Graduation-> Apply for Graduation

1. You will be able to view your Graduation status in this tab.

Follow the UWSpace Guide and upload your thesis to UWSpace, this can take 3-5 business days. Please ensure you are within the Program Completion Deadline for Convocation for the term.

Ensure you return all keys and fobs by contacting: mme-space@uwaterloo.ca