



# MASc Program Guidelines

## Overview

The Master of Applied Science (MASc) is a graduate-level study program that includes a research investigation and the writing of a thesis. Requirements for the MASc include satisfactory completion of 30 credits of coursework, original research under the supervision of a faculty member, and a thesis. The thesis is assigned 12 credits and is counted as part of the coursework requirement. A typical completion time for the MASc is 24 months and all students must complete the program within 5 years.

All MASc students are considered full-time students (<http://www.grad.ubc.ca/current-students/student-status-classification>).

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## Supervision

### Research Supervisor(s)

At the time of admission to the program, the student will be offered a position with a research supervisor who is interested in supervising the student’s research project. The supervisor's essential tasks are to provide academic guidance directed toward the completion of an MAsC thesis of suitable quality, and to assist with the financial planning associated with the program. The primary supervisor is typically a full-time, regular faculty member in the Department of Mechanical Engineering holding the rank of assistant professor, associate professor or professor, and be a member of the Faculty of Graduate and Postdoctoral Studies.

A Mech emeritus faculty member may be appointed as the primary supervisor, contingent on approval by the Faculty of Applied Science and their continued membership in the Faculty of Graduate and Postdoctoral Studies. In this case, an eligible research-track faculty member from the appropriate research group should be appointed as co-supervisor. It is the duty of the co-supervisor to ensure that both the emeritus faculty member and the graduate student are familiar with the current policies, practices and expectations of the Department.

Should an associate member be appointed as primary supervisor, an eligible tenure-track faculty member from an appropriate research area in the Department is appointed as co-supervisor. It is the duty of the co-supervisor to ensure that both the associate member and the graduate student are familiar with the current policies, practices, and expectations of the Department.

Full-time, regular UBC faculty members outside of the Department of Mechanical Engineering, as well as faculty holding the rank of associate member, honorary affiliate, or adjunct professor, may co-supervise a student along with a full-time regular Mech faculty member as primary supervisor.

For any non-G+PS member to act in a supervisory role, **a request for approval must first be submitted to the Faculty of Graduate and Postdoctoral Studies** and include a copy of the individual’s curriculum vitae and a memo of support from the Graduate Advisor.

In cases of absence from the campus of a month or more, the research supervisor should appoint an acting supervisor for each of their MAsC students.



### Student-Supervisor Expectations

Ongoing discussion about expectations between the student and the supervisor/co-supervisors is encouraged which can foster open communication and prevent misunderstandings that might otherwise arise. In order to facilitate an initial conversation, students are expected to review the *Graduate Student/Supervisor Expectations Form* with their supervisor and submit a signed copy to [students@mech.ubc.ca](mailto:students@mech.ubc.ca) within one month of starting the program.

| Program Start | Submission Deadline |
|---------------|---------------------|
| September     | October 1           |
| January       | February 1          |

### Supervisory Committee

The program of each student is overseen by a committee comprised of the primary supervisor (and co-supervisor, if applicable) who normally acts as chairman of the committee, plus at least one additional committee member.

Committee members may include regular faculty members, senior instructors, honorary faculty, adjunct faculty, off-campus professionals, as well as faculty members from other universities.

### MASc Supervisory Committee Approval Form

The *MASc Supervisory Committee Approval Form* should be completed and submitted to the Mech Student Services office ([students@mech.ubc.ca](mailto:students@mech.ubc.ca)) within 12 months of starting the program.

Should there be any changes made to the supervisory (primary or co-supervisor) roles after admission to the program or any changes to the supervisory committee composition at any point in the program, a new approval form must be submitted indicating the change.

Note that for any non-G+PS member to be added into a supervisory role, additional approval by the Faculty of Graduate & Postdoctoral Studies will be required **prior** to the member starting their supervisory role.

### Coursework

Completion of at least 30 credits, of which the thesis counts for 12 credits, is required for the MASc program and must meet the below requirements and constraints:

- Technical graduate courses (500-level)
  - At least 9 credits must be selected from courses offered by MECH or other STEM programs, as approved by the supervisor.
- Professional courses
  - Completion of at least 2 credits selected from MECH 556, MECH 557, MECH 558, MECH 559



- Seminar course:
  - If required by their research group, students must attend and present at a seminar series course (worth 1 credit) prior to graduation. If not required by their research group, 1 credit of professional or technical coursework should be substituted, as approved by the supervisor.
- Undergraduate credits:
  - Students may count up to 6 credits of senior undergraduate coursework (300 or 400-level) toward their program.
- Special Topics or Emerging Topics courses:
  - Students may take up to 6 credits throughout their program.
- Directed Studies in Mechanical Engineering courses (MECH 575 or MECH 591):
  - Students may take up to 3 credits throughout their program.

### Thesis & Seminar courses

All MASc students are required to register in the thesis course in both winter & summer terms. The student should select the section ID that corresponds with their research group.

- MECH 599B 001/971 - Applied Solid Mechanics
- MECH 599B 002/972 - Biomechanics and Biomedical Engineering
- MECH 599B 003/973 - Computational Engineering
- MECH 599B 004/974 - Energy and Environment
- MECH 599B 005/975 - Fluid Mechanics
- MECH 599B 006/976 - Manufacturing Automation and Robotics
- MECH 599B 007/977 - Mechatronics and Instrumentation
- MECH 599B 008/978 - Naval Architecture and Marine Engineering

The Research Seminar course is worth 1 credit on a pass/fail basis and is mandatory for students who belong to the below research groups. Students should register in the relevant section in each winter term (no seminar will be held over summer).

- Applied Solid Mechanics
- Biomechanics & Biomedical Engineering
- Energy & Environment
- Manufacturing Automation & Robotics
- Mechatronics & Instrumentation

### Academic Progress

The progress of all students is to be reviewed regularly by the graduate program and the Faculty of Graduate and Postdoctoral Studies. A student may be required to withdraw if progress has not been satisfactory as shown by coursework, progress on the thesis, or other requirements of the graduate program or the faculty.



The minimum passing grade in any course taken by a student enrolled in a master's program is 60%. However, only 6 credits of courses with grades in the 60-67% range may be counted towards a master's program. For all other courses, a minimum of 68% must be obtained.

Where a failing grade (below 60%) is obtained in a course, and on the recommendation of the graduate program and the approval of the Faculty of Graduate and Postdoctoral Studies, the student may repeat a course for higher standing or take an alternate course. If the graduate program does not make such a recommendation, or if the recommendation is not approved by the Faculty of Graduate and Postdoctoral Studies, the student will be required to withdraw. A student who obtains a grade of less than 68% in more than 6 credits will normally be required to withdraw for inadequate academic progress. The student will be informed of unsatisfactory academic progress in writing before any action regarding withdrawal is taken.

### Annual Progress Reports

All MASc students should make systematic and consistent progress in their research. Meetings with the supervisory committee are to be scheduled by the student annually. Students must submit an **Annual Research Progress Report by the applicable deadline below** to MECH Student Services ([students@mech.ubc.ca](mailto:students@mech.ubc.ca)), detailing the achievements of the previous year and the objectives for the next year. Students who are fellowship holders and already submit an Annual Progress report to G+PS do not need to submit a second report.

| Program Start | Submission Deadline |
|---------------|---------------------|
| September     | August 30           |
| January       | December 30         |

### The Thesis Defence

Before the final thesis defence, each student is expected to make the following arrangements:

1. Nominate the members of the Examination Committee by submitting a completed *MASc Thesis Defence Examination Committee Approval Form* to Mech Student Services ([students@mech.ubc.ca](mailto:students@mech.ubc.ca)) for approval by the Graduate Advisor **at least one month prior** to making defence arrangements.
2. Book an appropriate room for the exam, if required. Typical rooms booked for a defence are CEME 2202 or KAIS 5004. When booking a room, please ensure to provide the purpose of the booking and the supervisor's name & contact details. You will need approximately 2 hours to complete the whole exam process (please consult with your supervisor for exact timing).
  - To book CEME 2202, contact [reception@mech.ubc.ca](mailto:reception@mech.ubc.ca) or call 604-822-2781.
  - To book KAIS 5004, contact [administration@apsc.ubc.ca](mailto:administration@apsc.ubc.ca)
  - Equipment such as a projector can also be also booked by contacting [reception@mech.ubc.ca](mailto:reception@mech.ubc.ca) or calling 604-822-2781



3. Send the below details to the Mech Student Services office ([students@mech.ubc.ca](mailto:students@mech.ubc.ca)), with a cc to your supervisor(s), **at least 2 weeks prior to the defence date**. An announcement of the defence details will be circulated to all department faculty and graduate students together with a copy of the thesis abstract.
  - Thesis title
  - Abstract (pdf)
  - Lay abstract (pdf)
    - This should be a brief summary of your research, written in a way that can be easily understood by those unfamiliar with your work. Ideally, please include an image that is representative of your thesis work.
  - Date, Time & Location
  - Names of your supervisor and examining committee members
4. Send a copy of your final thesis (PDF is preferred) to each member of the examination committee **at least ten days prior to the exam**. The submission should comply with specific formatting requirements as outlined by the Faculty of Graduate & Postdoctoral Studies (<https://www.grad.ubc.ca/current-students/dissertation-thesis-preparation/formatting-requirements>). The candidate should be available to send an additional copy to the Student Services office should other parties be interested in it.
5. Print off a copy of the *Master's Thesis Approval Form* (<https://www.grad.ubc.ca/forms/masters-thesis-approval>) and your Academic History (available on the SSC) and bring it with you to the defence. Following the defence, send the completed Approval Form to [students@mech.ubc.ca](mailto:students@mech.ubc.ca) for submission to G+PS.

## The Examination Committee

For consistency, the thesis defence examination committee should approximate the supervisory committee and have the following makeup:

- The primary supervisor.
- The co-supervisor, if applicable
  - Note: in the case that a student has a co-supervisor, only the primary **or** co-supervisor is required to attend the thesis defence.
- At least two additional members, subject to the following requirements:
  - May include senior instructors, honorary faculty, emeritus, adjunct faculty, off-campus professionals as well as faculty members from other universities.
  - At least one member must be from the Department of Mechanical Engineering within the student's research area.
  - None of these members may be a close friend or relative of the student or supervisor(s).
  - A member from the Department of Mechanical Engineering other than the primary or co-supervisor shall act as Examination Committee Chair.



## The Exam

The defence is open to any interested person, although the Chair may restrict the active participation of those not on the examination committee. The candidate will present a **summary** of his/her thesis to the examination committee at the final defence, for a time of 20-30 minutes, and will then respond to questioning from the members, and at the discretion of the Chair, from others present.

The members of the committee vote on whether to pass or fail a student according to the rubric above; the decision requires a simple majority. In the event of a 50-50 deadlock, the Examination Committee Chair casts the deciding vote.

## Virtual Defence Protocols

The student may choose to defend remotely via Zoom if this format is more appropriate or preferred. The defence should typically take place either in-person or virtually, however, a hybrid format may be considered in exceptional circumstances and requires the approval of the Graduate Advisor.

A virtual defence is when the student and all of the examining committee members join remotely via Zoom. The student and supervisor may choose to be in physical proximity for virtual defences, say in adjoining rooms. (Audio issues may occur if multiple people are joining a Zoom meeting on separate computers in the same physical space.)

The supervisor will normally set up the Zoom meeting. UNDER NO CIRCUMSTANCES should the Zoom meeting be created by the student.

Virtual Defence details should be sent to [students@mech.ubc.ca](mailto:students@mech.ubc.ca) 2 weeks in advance, the same as for in-person defences.

It is important to note that while the approved Zoom platform is capable of supporting a virtual defence with multiple participants, the quality of both the audio and visual components will depend on the quality of each participant's internet connection. We recommend connecting from a location with a reliable internet connection. UBC VPN may be turned off if it is slowing down the video connection. Zoom allows testing the connection prior to the defence, and all participants should take the opportunity to do so. As we cannot control the quality of each participant's internet connection, participants should be prepared for technical issues (e.g. poor audio or visual quality, dropped connections) and the chair should be prepared to uphold the responsibilities as outlined below.

All required participants, outlined below, are presumed to have agreed to participate in a virtual defence.

## Participants

Virtual defences should be attended by Examination Committee. The required participants are as follows:



- The Supervisor. In the case that a student has co-supervisors, only one supervisor is required to attend the examination.
- At least two additional examining members, subject to the following requirements:
  - At least one of these additional members must be from the Department of Mechanical Engineering.
  - None of these members may be a close friend or relative of the examined student or supervisor.
  - An examiner from Mechanical Engineering other than the Supervisor shall act as Examination Committee Chair.

### Audience

Audiences are permitted to join the Zoom meeting for a Virtual Defence. Audience members are welcome to join individually, or to gather in a physical location and join the Zoom meeting with one account.

The Zoom URL should not be circulated to anyone but the committee, candidate and approved audience members; it should never be posted publicly.

### Responsibilities of the Chair

1. Represent the Department of Mechanical Engineering following the procedures set out in the MASc Program Guidelines.
2. Moderate the defence proceedings; ensure fairness.
3. Outline the potential technical issues that may occur, encourage patience and kindness towards each other, and describe the chair's responsibility to suspend the defence if there are technical difficulties that compromise the defence.
4. Ensure that any questions posed by committee members are addressed by the student during the question period.
5. Chair the in-camera discussion of the examining committee and convey the outcome to the student.
6. Ensure the student is removed (either disconnected or in a break-out room) for the entirety of the in-camera discussion.

**Important note:** the Chair has the authority to discontinue a remote connection at any time they judge that it is interfering with the proper conduct of the examination. If one or more participants drop from the connection or lose audio, the defence must be halted until the participant's connection or audio is restored. If the connection or audio cannot be restored after 30 minutes or if the total amount of time lost exceeds 60 minutes, the Chair must suspend the defence immediately and the defence will be rescheduled.





### Outcome: Pass

If the vote is to pass the student, then the committee also votes on which of the following is most appropriate:

1. **No revisions**
2. **Minor Revisions:** These may be stylistic changes and/or minor additions or clarification; the supervisor(s) withholds signature on the Master thesis approval form until all revisions are made. The student has **two weeks** from the date of the examination to submit revisions.
3. **Major Revisions:** The thesis requires substantive changes such as rewriting a chapter, reinterpretation of data, or additional minor research in order to attain acceptable standards of coherence and integrity in argument and presentation. The supervisor(s) and at least one other member of the examination committee withhold signatures on the Master thesis approval form until satisfied with the revisions. Major revisions normally must be completed within a maximum of **three months** from the date of the examination.

### Outcome: Fail

If the committee concludes that the thesis/defence is inadequate according to the rubric above, the committee shall turn to the question of whether the fatal shortcomings can be corrected within a six-month period.

- **Second defence:** If the committee believes that the thesis can be salvaged within 6 months, then the exam is adjourned and the committee agrees on a timeline for a second exam (not exceeding 6 months). The chair or supervisor will write the student a letter explaining the reasons for adjournment and the timeline of the second defence. The format of the second (reconvened) exam is the same as the first, except that the Graduate Advisor (or, in cases where the Graduate Advisor is the Supervisor, the Head or an Associate Head) must join the examining committee as an additional member and serve as Examining Committee Chair. The Graduate Advisor (or Head/Associate Head) will not vote except to break a 50-50 deadlock.
- **Program Termination:** If the committee concludes that the thesis/defence is inadequate and cannot be salvaged within 6 months, then a second exam will not be scheduled. The Graduate Advisor (or, in cases where the Graduate Advisor is the Supervisor, the Head or an Associate Head) will write the student a letter explaining the committee's conclusion, submit a copy of the letter to the Graduate Studies Office, and will immediately submit a recommendation to G+PS to terminate the student's program.



## Program Completion and Graduation

Your program cannot be closed and you will not be eligible to graduate until the thesis has been submitted and accepted into cIRcle and you have received an official email from the Faculty of Graduate Studies confirming final approval of your thesis.

Students are able to have their degrees awarded in either November or May of each year. Once the degree has been awarded by Senate, a notation will appear on the transcript and formal conferral will take place at the UBC Congregation Ceremony.

There are important steps you need to complete in order to officially graduate:

- Apply to graduate on the SSC.
- Make sure that your thesis, Master's Thesis Approval Form and Cover Sheet have been submitted to the Faculty of Graduate and Postdoctoral Studies.
- Make sure that all courses you have taken have a grade entered for them.
- Make sure your UBC financial account is settled.

Detailed information can be found on the Faculty of Graduate Studies website within the links below:

<http://www.grad.ubc.ca/current-students/final-dissertation-thesis-submission>

<http://www.grad.ubc.ca/current-students/graduation/program-completion>

<http://www.grad.ubc.ca/current-students/graduation>