

SENATE QUALITY ASSURANCE AND PLANNING COMMITTEE
Cyclical Review of the joint graduate programs
in Mechanical and Aerospace Engineering
Executive Summary and Final Assessment Report

This Executive Summary and Final Assessment Report of the cyclical review of Carleton University and the University of Ottawa's joint graduate programs in Mechanical and Aerospace Engineering are provided pursuant to the provincial Quality Assurance Framework and Carleton's Institutional Quality Assurance Process (IQAP).

EXECUTIVE SUMMARY

The joint graduate programs in Mechanical and Aerospace Engineering reside in the Ottawa-Carleton Institute for Mechanical and Aerospace Engineering, a unit administered by the Faculty of Engineering at each institution.

As a consequence of the review, the programs were categorized by Carleton University's Senate Quality Assurance and Planning Committee (SQAPC) as being of good quality. (Carleton's IQAP 7.2.13-7.2.14).

The External Reviewers' report offered a very positive assessment of the programs. Within the context of this positive assessment, the report nonetheless made a number of recommendations for the continuing enhancement of the programs. These recommendations were productively addressed by the Director & Associate Director of the Institute and the Deans of the Faculty of Engineering at each institution in responses to the External Reviewers' report and Implementation on Plan that was submitted to SQAPC on August 28, 2025.

FINAL ASSESSMENT REPORT

Introduction

The joint graduate programs in Mechanical and Aerospace Engineering reside in the Ottawa-Carleton Institute for Mechanical and Aerospace Engineering, a unit administered by the Faculty of Engineering at each institution. This review was conducted pursuant to the Quality Assurance Framework and Carleton's Institutional Quality Assurance Process (IQAP). As a consequence of the review, the programs were categorized by Carleton University's Senate Quality Assurance and Planning Committee (SQAPC) as being of good quality. (Carleton's IQAP 7.2.13-14).

The site visit, which took place on October 2-4, 2023, was conducted by Dr. Juan Antonio Carretero from the University of New Brunswick and Dr. Heckmat Alighanbari from Toronto Metropolitan University. The site visit involved formal meetings with:

- the Provost and Vice-President (Academic) (Carleton)
- the Vice-Provost, Academic Affairs (Ottawa)
- the Vice-Provost and Associate Vice-President (Academic) (Carleton)
- the Associate Vice-President, Quality Assurance (Carleton)
- the Director, Program Evaluation (Ottawa)
- the Deans of the Faculty
- the Chairs of the departments
- the Director and Associate Director of the joint institute
- Faculty
- Graduate Students
- Staff

The External Reviewers' report, submitted on March 1, 2024 offered a very positive assessment of the program.

This Final Assessment Report provides a summary of:

- Strengths of the programs
- Challenges faced by the programs
- Opportunities for program improvement and enhancement
- The Outcome of the Review
- The Implementation Plan

This report draws on five documents:

- The Self-study developed by members of the joint institute of Mechanical and Aerospace Engineering (Appendix A)
- The Report of the External Review Committee (Appendix B).
- The response and implementation plan from the joint institute (Appendix C)
- The Responses from the Deans of the Faculty of Engineering (Appendix D).

Appendix E contains brief biographies of the members of the External Review Committee.

This Final Assessment Report contains the Implementation Plan (Appendix C) developed by the Director & Associate Director of the Ottawa-Carleton Institute of Mechanical and Aerospace Engineering and agreed to by the Deans of the Faculty of Engineering for the implementation of recommendations for program enhancement identified as part of the cyclical program review process.

The Implementation Plan identifies who is responsible for implementing the agreed upon recommendations, as well as the timelines for implementation and reporting.

Strengths of the programs

The following strengths were taken directly from the External reviewers' report:

- “Associate chair for MEng (although many students do not seem to be aware).
- Good satisfaction for the level of the courses and the variety at uOttawa
- Faculty supervision was raised by all students as being very positive. Having the NRC and other labs, as well as co-supervisors from those institutions, is very positive for the students.
- Students are incredibly positive about the technical and administrative staff. They are deeply knowledgeable and supportive.
- The availability of experiential learning opportunities, given the ties to companies, the NRC, and other national labs
- Faculty members are happy with the improvement on their teaching loads.
- The design centre and other new facilities at uOttawa significantly boost the availability of equipment to all members as the facilities are available, for a small fee, to Carleton and uOttawa personnel and students”.

Opportunities for program improvement and enhancement

The External Reviewers' Report made 13 recommendations for improvement:

1. Graduation time (average seems to be in the order of 6 years p. 80). (concern)
2. Quality of the graduate courses at Carleton seems to be lacking for the courses being taught by stipend instructors. The students questioned the rigour. Some cancelled lectures. Courses in areas related to aeronautics are minimal. Given that one of the streams is aeronautical, one would expect to have more courses. (concern)
3. Look into their corresponding academic calendars to purge the calendar of courses that are no longer offered or note that courses are not offered in some time. (concern)
4. There does not seem to be a centralised recruitment effort at either institution, especially at the graduate level there is no recruitment. Not necessarily much support centrally. (opportunity)
5. More collaboration may be needed in areas related to safety training. That is, there is no centralised or shared training. There may be some efficiencies to gain there where applicable. (opportunity)
6. Variety of courses of courses at Carleton is lacking. Plan one or two years ahead of time on the courses. (opportunity)
7. Access to library resources from one institution or the other should not be limited to the terms where students are taking courses. (opportunity)
8. Improvements to TA positions:

- TA positions were not defined until the very last minute. Sometimes they are decided a week or less before classes start.
 - TA appointments should be closer to their area of expertise or more time for training.
 - TAs in the French stream in uOttawa are limited which often result on some TAs being overworked. (opportunity)
9. Students raised the lack of courses in: Computer vision, machine learning, and robotics. Although there are a few in the latter, the selection is limited. (opportunity)
 10. Equipment: Lack of robotics equipment, and some electronics/electrical equipment to borrow for research. They often need to go to the electrical department. (opportunity)
 11. TA hourly rates should follow increases as the minimum wage in Ontario increases. (opportunity)
 12. Explore a tighter relation between the two departments. More specifically:
 - Promote the co-supervision of graduate students by faculty from the two institutions. o
 - Regular meetings between the different institutes. Maybe based mostly on general areas of interest.
 - There should be better communication between the two institutions regarding the different seminar courses as well as external seminars. Scheduling as well as dissemination of external speaker seminars. (opportunity)
 13. As new faculty members are hired to either institution, they should be introduced to the joint programs. Onboarding of new faculty to the institute is lacking. As new faculty join, they need to better understand the great advantages the joint venture has. Otherwise, the link between the two may weaken over time. (opportunity)

The Outcome of the Review

As a consequence of the review, the joint graduate programs in Mechanical and Aerospace Engineering were categorized by Carleton University's Senate Quality Assurance and Planning Committee (SQAPC) as being of **GOOD QUALITY** (Carleton's IQAP 7.2.13-14).

The Implementation Plan

The recommendations that were put forward as a result of the review process were productively addressed by the Director & Associate Director of the Institute and the Deans of the Faculty of Engineering at each institution in responses to the External Reviewers' report and Implementation Plan that was considered by SQAPC on August 28, 2025. The Institute agreed unconditionally to recommendations #1, 2, 3 and 6, and agreed in principle to recommendations #4, 5, 7, 8, 9, 10, 11, 12 and 13.

It is to be noted that Carleton's IQAP provides for the monitoring of implementation plans. A monitoring report is to be submitted by the academic unit and Faculty Dean and forwarded to SQAPC for its review by September 1, 2026

The Next Cyclical Review

The next cyclical review of joint graduate programs in Mechanical and Aerospace Engineering will be conducted during the 2027-28 academic year.

**Mechanical and Aerospace Engineering
Unit Response to External Reviewers' Report & Implementation Plan
Programs Being Reviewed: Joint Graduate Programs**

Note: This document is forwarded to Senate, the Quality Council and posted on the Vice- Provost's external website.

Introduction & General Comments

The Department of Mechanical and Aerospace Engineering was pleased to receive the External Reviewers' report dated March 1, 2024. We are committed to the continual improvement of our programs to enhance the student, staff, and faculty experience. This document contains both a response to the External Reviewers' Report and an Implementation Plan (Section B) which have been created in consultation with the Dean.

For each recommendation **one** of the following responses must be selected:

Agreed to unconditionally: used when the unit agrees to and is able to take action on the recommendation without further consultation with any other parties internal or external to the unit.

Agreed to if additional resources permit: used when the unit agrees with the recommendation, however action can only be taken if additional resources are made available. Units must describe the resources needed to implement the recommendation and provide an explanation demonstrating how they plan to obtain those resources. In these cases, discussions with the Deans will normally be required and therefore identified as an action item.

Agreed to in principle: used when the unit agrees with the recommendation, however action is dependent on something other than resources. Units must describe these dependencies and determine what actions, if any, will be taken.

Not agreed to: used when the unit does not agree with the recommendation and therefore will not be taking further action. A rationale must be provided to indicate why the unit does not agree (no action should be associated with this response).

Calendar Changes

If any of the action items you intend to implement will result in calendar changes, please describe what those changes will be. To submit a formal calendar change, please do so using the Courseleaf system.

Hiring

Where an action item requires additional hiring (faculty or staff) the owner should at minimum include the Dean of the faculty and member of the unit.

UNIT RESPONSE AND IMPLEMENTATION PLAN

Programs Being Reviewed: Joint Graduate Programs in Mechanical and Aerospace Engineering

Prepared by J. Etele/Professor/Department of Mechanical and Aerospace Engineering/May 6, 2024

Modified by M. Nganbe (UofO) and A. Kabir (CU), June 2025.

External Reviewer Recommendation & Categorization	Unit Response (choose only one for each recommendation): 1- Agreed to unconditionally 2- Agreed to if additional resources permit (describe resources) 3- Agreed to in principle 4- Not agreed to Rationales are required for categories 2, 3 & 4	Action Item	Owner	Timeline	Will the action described require calendar changes? (Y or N)
1. Graduation time (average seems to be in the order of 6 years p. 80). (concern)	Agreed to unconditionally	<i>Administrative staff have been pro-actively informing both students and supervisors of the various milestones to completion that are approaching. This has increased the success of meeting these milestones and is expected to decrease times to graduation</i>	<i>Department Chair</i>	<i>Has already been occurring for the past 1.5 years and will continue</i>	no
2. Quality of the graduate courses at Carleton seems to be lacking for the courses being taught by stipend instructors. The students questioned the rigour. Some cancelled lectures. Courses in areas related to aeronautics are minimal. Given that one of the streams is aeronautical, one would expect to have more courses. (concern)	Agreed to unconditionally	<p><i>Faculty growth within the MAAE department at Carleton has been significant and now stands at 46. As such, very few graduate courses are offered by stipend lecturers. However, the growth has been over a wide variety of research areas and as such the breadth of graduate courses has increased accordingly.</i></p> <p><i>Regarding Aerospace courses specifically, a number of recent and proposed changes will rectify this including:</i></p> <ul style="list-style-type: none"> <i>- 2 recent hires are now fully integrated and ready to offer more specialized graduate courses.</i> <i>- discussions have started regarding restructuring the administration of the aerospace program to give it additional attention and resources.</i> 	<i>Dean/Chair</i>	<i>Stipend instructor hiring has already been reduced. New hires and restructuring over the next 6-12 months.</i>	yes
3. Look into their corresponding academic calendars to purge the calendar of courses that are no longer offered or note that courses are not offered in some time. (concern)	Agreed to unconditionally	<i>This process was undertaken over one year ago and courses not offered in the past 10 years have been removed from the calendar.</i>	<i>Department Chair</i>	<i>Already completed</i>	no
4. There does not seem to be a centralised recruitment effort at either institution, especially at the graduate level there is no	Agreed to in principle	<i>Recruitment at the graduate level is currently handled by supervisors themselves. MAE has enlisted the help of Study International to promote its graduate</i>	<i>Chair, Dean FGPA</i>	<i>underway</i>	no

recruitment. Not necessarily much support centrally. (opportunity)		<p><i>programs internationally. Should the Dean or University wish to provide additional resources to aid in this process, it would be accepted.</i></p> <p><i>In addition, UofO provides Graduate studies info presentations and makes conditional admission offers to their 4th year Undergraduate students with grade averages of 8.0 or higher. This helps the recruitment of local students.</i></p>			
5. More collaboration may be needed in areas related to safety training. That is, there is no centralised or shared training. There may be some efficiencies to gain there where applicable. (opportunity)	Agreed to in principle	<p><i>All graduate students at Carleton are currently informed of the various safety courses required to be a TA or work in a laboratory setting at the beginning of their first term.</i></p> <p><i>At UofO, safety training is centrally administered and managed by the Office of Health and Safety. Access to office desks or labs is only given after the required trainings are completed.</i></p>	Department Chair	Already completed	no
6. Variety of courses of courses at Carleton is lacking. Plan one or two years ahead of time on the courses. (opportunity)	Agreed to unconditionally	<p><i>Graduate courses are assigned in accordance with research expertise. With the recent growth in the breadth of research expertise of faculty, as well as planned future hires, the variety of courses on offer will naturally increase.</i></p>	Department Chair	6-12 months	no
7. Access to library resources from one institution or the other should not be limited to the terms where students are taking courses. (opportunity)	Agreed to in principle	<p><i>The department has no issue with this suggestion, but does not control library/registration processes.</i></p> <p><i>The joint institute board recommends that both Registrar Offices work together on automatically assigning student numbers of both Carleton and UofO to all Graduate students upon student registration. This would provide continuous access to both libraries during their entire studies.</i></p>	Master Librarian/Chief Registrar		no
8. Improvements to TA positions: <ul style="list-style-type: none"> o TA positions were not defined until the very last minute. Sometimes they are decided a week or less before classes start. o TA appointments should be closer to their area of expertise or more time for training. o TAs in the French stream in uOttawa are limited which often result on some TAs being overworked. (opportunity) 	Agreed to in principle	<p><i>Every effort is made to align TA interest and expertise to the course. However, TA positions are dictated by the undergraduate program and enrollment (currently with insufficient TA quotas), while positions have to be assigned according to the TA collective agreement.</i></p> <p><i>Moreover, all efforts are made to assign and define TA positions as early as possible. The challenge is with newly admitted Graduate students who sometimes register late and, therefore, early TA assignment is impossible. With respect to TAs in the French stream at Uottawa, it shall be noted that they accept their</i></p>	Department Chair	ongoing	no

		<i>positions willingly and under no pressure. Therefore, we assume that they are fine with their workload.</i>			
9. Students raised the lack of courses in: Computer vision, machine learning, and robotics. Although there are a few in the latter, the selection is limited. (opportunity)	Agreed to in principle	<i>As previously discussed, graduate course offerings follow research expertise. If more faculty focus on this area, more graduate courses will become available related to these topics.</i> <i>At UofO, collaborations with other Departments also enable the creation of double coded courses that help complement our course offering. Moreover, students are allowed to take up to 2 courses outside the joint institute after approval by the Graduate Office.</i>	Department Chair	none	no
10. Equipment: Lack of robotics equipment, and some electronics/electrical equipment to borrow for research. They often need to go to the electrical department. (opportunity)	Agreed to in principle	<i>Resources are often shared between departments as a means of minimizing cost and promoting interdisciplinary research. Should the university wish to contribute money/resources/space to this area, the department would accept</i>	Dean	none	no
11. TA hourly rates should follow increases as the minimum wage in Ontario increases. (opportunity)	Agreed to in principle	<i>The department pays TAs according to their union negotiated contract.</i> <i>It shall be noted that the current TA hourly rates are far above the Ontario minimum wage.</i>	Dean FGPA	none	no
12. Explore a tighter relation between the two departments. More specifically: o Promote the co-supervision of graduate students by faculty from the two institutions. o Regular meetings between the different institutes. Maybe based mostly on general areas of interest. o There should be better communication between the two institutions regarding the different seminar courses as well as external seminars (opportunity). Scheduling as well as dissemination of external speaker seminars. (opportunity)	Agreed to Principle	<i>- Although the co-supervision of students is arranged between individual professors, the joint institute management board plans to promote it, particularly among new members.</i> <i>- Annual joint institute meetings and/or social events will be organized to promote the cohesion.</i> <i>- Currently, Graduate seminars organized at each Department are made accessible to Graduate students and Faculty members of the partner Department through a seminar link at their website. This already addresses the third concern of the reviewers.</i>	Department Chair	Ongoing	no
14. As new faculty members are hired to either institution, they should be introduced to the joint programs. Onboarding of new faculty to the institute is lacking. As new faculty join, they need to better understand the great advantages the joint venture has. Otherwise, the link between the two may weaken over time. (opportunity)	Agreed to Principle	<i>Chairs and Graduate Studies Vice-chairs or Coordinators will put emphasis on the onboarding of newly hired members, and providing them with information about the joint institute, its potential and advantages for themselves as researchers, and for the two Departments as a whole. The board also worked on addressing the challenge of finding joint institute examiners in the past 2 years. The bylaws were updated, and the requirement of a joint institute examiner was confined to only the PhD final thesis defence. Also, a system was proposed whereby the</i>	Department Chair	Ongoing	no

		<p><i>Graduate Vice-chairs or Coordinators took the responsibility to identify and nominate members within their respective Departments as joint institute examiner for individual PhD thesis defences at the partner Department in cases where the student's supervisor is unable to make this arrangement. Finally, the board will inform and motivate their respective Faculty members to accept joint institute examiner nominations before they come to the situation of being unable to find one for their own student, as this shall be understood as a reciprocal service within the joint institute.</i></p>			
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