

DATE: October 13, 2022

TO: Senate

FROM: Dr. Dwight Deugo, Vice-Provost and Associate Vice-President (Academic), and Chair,
Senate Quality Assurance and Planning Committee

RE: Final Assessment Reports and Executive Summaries

The purpose of this memorandum is to request that Senate approve the Final Assessment Reports and Executive Summaries arising from cyclical program reviews. The request to Senate is based on recommendations from the Senate Quality Assurance and Planning Committee (SQAPC).

The Final Assessment Reports and Executive Summaries are provided pursuant to article 5.4.1. of the provincial Quality Assurance Framework and article 7.2.24 of Carleton's Institutional Quality Assurance Process (IQAP). Article 7.2.24.3 of Carleton's IQAP (passed by Senate in November 2021 and ratified by the Ontario Universities Council on Quality Assurance in April 2022) stipulates that, in approving Final Assessment Reports and Executive Summaries 'the role of SQAPC and Senate is to ensure that due process has been followed and that the conclusions and recommendations contained in the Final Assessment Report and Executive Summary are reasonable in terms of the documentation on which they are based.'

In making their recommendations to Senate and fulfilling their responsibilities under the IQAP, members of SQAPC were provided with all the appendices listed on page 2 of the Final Assessment Reports and Executive Summaries. These appendices constitute the basis for reviewing the process that was followed and assessing the appropriateness of the outcomes.

These appendices are not therefore included with the documentation for Senate. They can, however, be made available to Senators should they so wish.

Any major modifications described in the Implementation Plans, contained within the Final Assessment Reports, are subject to approval by the Senate Committee on Curriculum, Admission, and Studies Policy, the Senate Quality Assurance and Planning Committee (SQAPC) and Senate as outlined in articles 7.4.1 and 5.1 of Carleton's IQAP.

Once approved by Senate, the Final Assessment Reports, Executive Summaries and Implementation Plans will be forwarded to the Ontario Universities' Council on Quality Assurance and reported to Carleton's Board of Governors for information. The Executive Summaries and Implementation Plans will be posted on the website of Carleton University's Office of the Vice-Provost and Associate Vice-President (Academic), as required by the provincial Quality Assurance Framework and Carleton's IQAP.

Omnibus Motion

In order to expedite business with the multiple Final Assessment Reports and Executive Summaries that are subject to Senate approval at this meeting, the following omnibus motion will be moved.

Senators may wish to identify any of the following 5 Final Assessment Reports and Executive Summaries that they feel warrant individual discussion, that will then not be covered by the omnibus motion. Independent motions as set out below will nonetheless be written into the Senate minutes for those Final Assessment Reports and Executive Summaries that Senators agree can be covered by the omnibus motion.

THAT Senate approve the Final Assessment Reports and Executive Summaries arising from the Cyclical Reviews of the programs.

Final Assessment Reports and Executive Summaries

1. Undergraduate and Graduate Programs in English

SQAPC approval: September 22, 2022

SQAPC Motion:

THAT SQAPC recommends to SENATE the approval of the Final Assessment Report and Executive Summary arising from the cyclical program review of the Undergraduate and Graduate programs in English.

Senate Motion October 21, 2022:

THAT Senate approve the Final Assessment Report and Executive Summary arising from the Cyclical Review of the Undergraduate and Graduate programs in English.

2. Joint Graduate Programs in Chemistry

SQAPC approval: September 8, 2022

SQAPC Motion:

THAT SQAPC recommends to SENATE the approval of the Final Assessment Report and Executive Summary arising from the cyclical program review of the Graduate programs in Chemistry.

Senate Motion October 21, 2022:

THAT Senate approve the Final Assessment Report and Executive Summary arising from the Cyclical Review of the Graduate programs in Chemistry.

3. Undergraduate programs in Electrical Engineering

SQAPC approval: October 13, 2022

SQAPC Motion:

THAT SQAPC recommends to SENATE the approval of the Final Assessment Report and Executive Summary arising from the cyclical program review of the Undergraduate programs in Electrical Engineering.

Senate Motion October 21, 2022:

THAT Senate approve the Final Assessment Report and Executive Summary arising from the Cyclical Review of the Undergraduate programs in Electrical Engineering.

4. Undergraduate programs in Civil Engineering, Environmental Engineering and Architectural Conservation and Sustainability Engineering

SQAPC approval: October 13, 2022

SQAPC Motion:

THAT SQAPC recommends to SENATE the approval of the Final Assessment Report and Executive Summary arising from the cyclical program review of the Undergraduate programs in Civil Engineering, Environmental Engineering and Architectural Conservation and Sustainability Engineering.

Senate Motion October 21, 2022:

THAT Senate approve the Final Assessment Report and Executive Summary arising from the Cyclical Review of the Undergraduate programs in Civil Engineering, Environmental Engineering, and Architectural Conservation and Sustainability Engineering.

5. Undergraduate programs in Mechanical Engineering, Aerospace Engineering and Biomedical and Mechanical Engineering

SQAPC approval: October 13, 2022

SQAPC Motion:

THAT SQAPC recommends to SENATE the approval of the Final Assessment Report and Executive Summary arising from the cyclical program review of the Undergraduate programs in Mechanical Engineering, Aerospace Engineering and Biomedical and Mechanical Engineering.

Senate Motion October 21, 2022:

THAT Senate approve the Final Assessment Report and Executive Summary arising from the Cyclical Review of the Undergraduate programs in Mechanical Engineering, Aerospace Engineering and Biomedical and Mechanical Engineering.

**CARLETON UNIVERSITY COMMITTEE ON
QUALITY ASSURANCE**
**Cyclical Review of the graduate and undergraduate programs
in English**
Executive Summary and Final Assessment Report

This Executive Summary and Final Assessment Report of the cyclical review of Carleton's graduate and undergraduate programs in English are provided pursuant to the provincial Quality Assurance Framework and Carleton's Institutional Quality Assurance Process (IQAP).

EXECUTIVE SUMMARY

The graduate and undergraduate programs in English reside in the Department of English Language and Literature, a unit administered by the Faculty of Arts and Social Sciences.

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 Chair of the Department of English Language and Literature, the Dean of the Faculty of Arts and Social Sciences and the Dean of the Faculty of Graduate and Postdoctoral Affairs in a response to the External Reviewers' report and Implementation on Plan that was submitted to SQAPC on September 8th, 2022.

FINAL ASSESSMENT REPORT

Introduction

The graduate and undergraduate programs in English reside in the Department of English Language and Literature, a unit administered by the Faculty of Arts and Social Sciences. 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 February 14, 15, and 16, 2022, was conducted by Dr. Janice Stewart, University of British Columbia and Dr. Patricia Rigg, Acadia University. The site visit involved formal meetings with the Provost, the Vice-Provost and Associate Vice-President (Academic), the Dean of the Faculty of Arts and Social Sciences, the Dean of the Faculty of Graduate and Postdoctoral Affairs, and the Chair of the Department of English Language and Literature. The review committee also met with faculty members, staff, and undergraduate and graduate students.

The External Reviewers' report, submitted on February 25, 2022 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 four documents:

- The Self-study developed by members of the Department of English Language and Literature (Appendix A)
- The Report of the External Review Committee (Appendix B).
- The response and implementation plan from the Chair of the Department of English Language and Literature (Appendix C)
- The Response from the Dean of the Faculty of Arts and Social Sciences and the Dean of the Faculty of Graduate and Postdoctoral Affairs (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 Chair of the Department of English Language and Literature and agreed to by the Dean of the Faculty of Arts and Social Sciences, and the Dean of the Faculty of Graduate and Postdoctoral Affairs, 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

General

The External Reviewers' Report states that "The English Department at Carleton University is a dynamic, exciting unit with thirty faculty members who deliver high-quality programs. The English Department's self-study prepared for this review offers extensive descriptions of current circumstances and perceived challenges, and it outlines exciting innovation in program streams that include creative writing, drama, book binding, typesetting and printing" (p. 1).

Faculty

Speaking with regard to faculty, the external reviewers' stated:

"The quality of research and scholarly activities carried out by the English Department is impressive. There are a number of faculty members with tri-council funding that has been consistent over the last decade, and other members have worked successfully with small internal grants that have led to books published by major presses and essays in highly ranked academic journals. By any measure, the English Department is a highly productive faculty cohort" (p.4).

Students

The external reviewers noted that "Undergraduate students who responded to the National Survey of Student Engagement in their first and final years of 2020 reported satisfaction with their development of skills identified as ideal program learning outcomes—thinking critically and writing clearly and effectively" (p. 2) and "the graduate students with whom we spoke are highly motivated and welcome the opportunity to work at a level that prepares them for an academic career" (p.3).

Curriculum

The external reviewers noted that "The Department of English has drawn on the teaching and research strengths of its faculty to design courses that reflect current domestic and international affairs and that are innovative and, in the case of individual courses discussed below, quite unique. As the Self-Study points out, programs in English do indeed contribute to Carleton's larger mission related to diversity and decolonization" (p. 1).

Opportunities for program improvement and enhancement

The External Reviewers' Report made 6 recommendations for improvement:

1. That the University consider the long-term effect on all the English programs of no recent hires Assistant Professor level. (Weakness)
2. That the Department carry out its plan to submit a proposal for the next round of competition for a hire in Creative Writing and one of several other areas left vulnerable by retired or deceased faculty. (Weakness)
3. That graduate students are able to take a balanced course of combined seminars and graduate dedicated seminars. (Concern)
4. That the University consider making more bursaries for international students more widely available to the Arts. (Opportunity)

5. That some priority be given to requests for paint and other minor renovations of the graduate seminar room and other graduate spaces. (Opportunity)
6. That support be offered by the University to help with recruitment of new graduate and undergraduate students. (Opportunity)

The Outcome of the Review

As a consequence of the review, the graduate and undergraduate programs in English are 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 Department of English Language and Literatures, the Dean of the Faculty of Arts and Social Sciences, and the Dean of the Faculty of Graduate and Postdoctoral Affairs in a response to the External Reviewers' report and Implementation Plan that was considered by SQAPC on September 8th, 2022. The Department agreed unconditionally to recommendations #1, 2, 3, 4 and 6 and did not agree to recommendation #5.

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(s) and Faculty Dean(s), and forwarded to SQAPC for its review by January 30th, 2025.

The Next Cyclical Review

The next cyclical review of the graduate and undergraduate programs in English will be conducted during the 2028-29 academic year.

English Language and Literature
Unit Response to External Reviewers' Report & Implementation Plan
Programs Being Reviewed: Undergraduate and Graduate Programs

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

Introduction & General Comments

Please include any general comments regarding the External Reviewers' Report.

The English Department was pleased to receive such a thorough and positive review of its programs. This report was shared with faculty and staff in the department and we look forward to implementing the relatively modest changes noted by the reviewers. The unit response and implementation plan have been developed in consultation with ODFASS.

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: Undergraduate and Graduate Programs in English

Prepared by (name/position/unit): Jan Schroeder, Chair, Department of English Language and Literature

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. That the University consider the long-term effect on all the English programs of no recent hires Assistant Professor level. (Weakness)	Agreed to unconditionally. The department has seen several retirements and other losses of faculty members and has not had a new tenure-track hire since 2017.	We will resubmit our hiring proposal in Creative Writing and adjacent areas as invited by the Dean.	Department	Fall 2022 or earliest opportunity	N
2. That the Department carry out its plan to submit a proposal for the next round of competition for a hire in Creative Writing and one of several other areas left vulnerable by retired or deceased faculty. (Weakness)	Agreed to unconditionally. We submitted a faculty recruitment proposal in 2021 and we will do so again at the next opportunity.	We will resubmit our hiring proposal in Creative Writing and adjacent areas as invited by the Dean.	Department	Fall 2022 or earliest opportunity	N
3. That graduate students are able to take a balanced course of combined seminars and graduate dedicated seminars. (Concern)	Agreed to unconditionally. We need to strike a balance between our range of course offerings and the number of dedicated graduate seminars. Recruitment requires us to offer a range of courses, but the realities of staffing and enrolments limit that range.	This will be a topic of discussion at our upcoming faculty retreat and will be factored into upcoming course assignments. The Chair may undertake to reduce the number of "piggybacked" courses if possible, or to increase the proportion of graduate to undergraduate seats in such courses.	Department	Retreat: May 2022 Course assignments: Fall 2022	N

4. That the University consider making more bursaries for international students more widely available to the Arts. (Opportunity)	Agreed to unconditionally. Tuition for international students in Ontario is more affordable than in the past, but international students still face many financial barriers.	The grad director will continue to seek out humanities-specific funding opportunities for international students in collaboration with FGPA.	FGPA	Ongoing	N
5. That some priority be given to requests for paint and other minor renovations of the graduate seminar room and other graduate spaces. (Opportunity)	Not agreed to. There has been a miscommunication here. Graduate student offices were refreshed before the pandemic. We are in the process of renovating our old admin office to make room for a new seminar space for our FYSMS and graduate seminars.	We are seeking bid estimates from FMP towards the renovation of our old admin office.	Department	Summer-Fall 2022	N
6. That support be offered by the University to help with recruitment of new graduate and undergraduate students. (Opportunity)	Agreed to unconditionally.	English is committed to working with ODFASS on new recruitment strategies and has dedicated financial and faculty resources to recruitment in its last budget and will continue to do so.	Department, ODFASS, and Carleton Recruitment and Admission Services	Ongoing	N

**CARLETON UNIVERSITY COMMITTEE ON
QUALITY ASSURANCE
Cyclical Review of the graduate programs
in Chemistry
Executive Summary and Final Assessment Report**

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

EXECUTIVE SUMMARY

The graduate programs in Chemistry reside in the Department of Chemistry, a unit administered by the Ottawa-Carleton Chemistry Institute (OCCI).

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 of the Department of Chemistry, the Dean of the Faculty of Science and the Dean of the Faculty of Graduate and Postdoctoral Affairs in a response to the External Reviewers' report and Implementation on Plan that was submitted to SQAPC on September 8th, 2022.

FINAL ASSESSMENT REPORT

Introduction

The graduate programs in Chemistry reside in the Department of Chemistry, a unit administered by the Ottawa-Carleton Chemistry Institute (OCCI). 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 August 16-18 2021, was conducted by Dr. Lekha Sleno, Université du Québec à Montréal and Dr. Alan Doucette, Dalhousie University. The site visit involved formal meetings with the Vice-Provost and Associate Vice-President (Academic), the Dean of the Faculty of Science, the Dean of the Faculty of Graduate and Postdoctoral Affairs, and the Chair of the Department of Chemistry. The review committee also met with the Graduate Chair, faculty members, staff, and undergraduate and graduate students.

The External Reviewers' report, submitted on October 10th, 2021 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 Department of Chemistry (Appendix A)
- The Report of the External Review Committee (Appendix B).
- The response and implementation plan from the Director of the Department of Chemistry (Appendix C)
- The Response from the Dean of the Faculty of Science (Appendix D).
- The internal discussant's recommendation report (Appendix E).

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

This Final Assessment Report contains the Implementation Plan (Appendix C) developed by the Chair of the Department of Chemistry Studies and agreed to by the Dean of the Faculty of Arts and Social Sciences, and the Dean of the Faculty of Graduate and Postdoctoral Affairs, 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

General

The External Reviewers' Report states that "Carleton's institutional mission embodies the promotion of research and teaching excellence, both to its current and future students, as well as to external academics and the greater community. From the submitted documentation, as well as our virtual meetings, it is evidently clear that Carleton's Chemistry Department comprises faculty, staff, and students who have achieved excellence in research and teaching." (p. 3).

Opportunities for program improvement and enhancement

The External Reviewers' Report made 12 recommendations for improvement:

1. Update the communication of your program offerings, student expectations and Assessments (Opportunity).
2. Increase faculty and student seminar opportunities (Concern).
3. Increase external promotion & recruitment efforts (Weakness).
4. Community/ alumni engagements (Opportunity).
5. Relationship with the Joint Institute with University of Ottawa (Weakness).
6. Reconsider the Optional Courses offered (Concern).
7. Streamlining and standardizing seminar courses for grad students (Opportunity).
8. Implementation of regular TAC meetings on a yearly basis for all graduate students (Opportunity).
9. Appropriate Graduate Student Space (Concern).
10. Grad Handbook revision (Opportunity).
11. Support Staff limitations (Weakness).
12. Revise Admissions Requirements, specifically for international students (Concern).

The Outcome of the Review

As a consequence of the review, the graduate programs in Chemistry 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 of the Department of Chemistry, the Dean of the Faculty of Science, and the Dean of the Faculty of Graduate and Postdoctoral Affairs in a response to the External Reviewers' report and Implementation Plan that was considered by SQAPC on September 8th, 2022. The Department agreed unconditionally to recommendations #1, 2, 4, 6, 7, 8 and 10, and agreed to recommendations #3, 9 and 11 if resources permit. They also agreed to recommendations #12 in principle. They did not agree to #5.

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(s) and Faculty Dean(s), and forwarded to SQAPC for its review by June 1, 2023.

The Next Cyclical Review

The next cyclical review of the graduate programs in Chemistry will be conducted during the 2023-24 academic year.

Chemistry
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

Please include any general comments regarding the External Reviewers' Report.

The Chemistry Department was pleased to receive the Reviewers' very positive External Reviewers' report. This report was shared with our faculty and staff, and we are committed to the continual improvement of our programs to enhance the student, staff, and faculty experience. Significant feedback was received from several faculty members. A. Ianoul and R.C. Burk prepared this response. 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(s).

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.

UNIT RESPONSE AND IMPLEMENTATION PLAN

Programs Being Reviewed: Chemistry Joint Graduate Programs

Prepared by (name/position/unit):

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)
<p>1. (Opportunity) Update the communication of your program offerings, student expectations and assessments.</p> <p>Currently, the graduate handbook, departmental website, and TAC assessment forms provide students with relevant information. New graduate orientation sessions are also provided. However, in all cases, the department could make additional efforts to expand their presentations. For example, TAC assessments do not provide space for formal feedback to students (such as a graded scale in different categories for ‘above/ below/ meets expectations – more on the TAC assessment is revisited below). New graduates could be greeted through a ‘grad welcome week’ with a combination of formal and informal/ social meetings. Formal presentations of class offerings, and their benefits in different areas of research could showcase the variety of classes. Peer-to-peer grad mentoring initiatives would also be a consideration.</p>	<p>Agreed to unconditionally</p>	<ol style="list-style-type: none"> 1. Update graduate handbook 2. Develop TAC forms 3. Grad welcome week - will look into 	<p>Graduate Committee</p>	<p>In progress</p>	<p>N</p>

<p>2. (Concern) Increase faculty and student seminar opportunities</p> <p>Participation in regular seminars is a vital aspect of exposing students to different areas of chemistry. It is also critical to the promotion of the department's strengths and to raising awareness of other opportunities that exist beyond Carleton's walls. At minimum, allowing students to participate in a weekly seminar from external faculty would be expected. Seminars that focus on topics beyond straight academic research are also encouraged, be they alumni/industry visits, training workshops, or otherwise. All faculty should have a direct involvement in student seminars. Committee members can grade student seminars, but there should be an expectation that the broader faculty attend these sessions. The distinct seminar programs from various programs (food, biochemistry, environmental toxicology) should be centralized into a cohesive seminar program, with the expectation that all students attend.</p>	<p><i>Agreed to unconditionally</i></p>	<ol style="list-style-type: none"> 1. <i>Update CHEM 5801/ 5804 seminar course</i> 2. <i>Introduced calendar changes to address differences in credits for seminars in different specializations</i> 3. <i>Centralize planning of seminars in various programs</i> 	<p><i>Graduate, Research, Planning/Priorities Committee;</i></p>	<p><i>In progress</i></p>	<p><i>Y</i></p>
<p>3. (Weakness) Increase external promotion & recruitment efforts</p> <p>The promotion of Carleton's Chemistry Department should be a continuous and constant priority of all Faculty members. With an expectation of a growing department needing to recruit new students, Carleton cannot rely solely on internal students to fill these new positions. Faculty (and senior graduate students) should reach out to schools across Canada, essentially inviting themselves to give seminars, as part of</p>	<p><i>Agreed to if additional resources permit</i></p> <p><i>Expenses related to room rental, travel, printing could be involved</i></p>	<ol style="list-style-type: none"> 1. <i>Organize university recruitment (virtual) tour for potential graduate students</i> 2. <i>Identify if the EDI focus should be representative of Carleton University, the city or the province or the national level.</i> 3. <i>Identify the EDI groups</i> 4. <i>Develop recruitment strategies to target the identified groups</i> 	<p><i>Research, Graduate, EDI committees</i></p>	<p><i>In progress, 1-2 years</i></p>	<p><i>N</i></p>

<p>formal “recruitment tours”. The annual Carleton-Ottawa poster fair could evolve into one involving a larger cohort of universities. This could present new opportunities to bring students (grad and undergrad) to your department and showcase your strengths. Conference participation can include Department-approved messaging on recruitment and research opportunities. Most important, the Department should target the recruitment of EDI groups wherever possible. A Departmental EDI committee could look further into these opportunities.</p>				
<p>4. (Opportunity) Community/ alumni engagements</p> <p>Students will always be interested in future career opportunities. Providing mechanisms to showcase the talents of existing students to local government/ industry would be appropriate. Engaging with alumni presents a powerful opportunity for promoting these skills. If not already done, maintaining a database of former graduates, would serve as a resource for the future. An annual alumnus ‘career night’ even would be beneficial to graduate and undergraduate students. Alumni can also assist in the training of soft skills (safety training, communication, SOPs, note taking, QA/QC). Making alumni part of the department’s formal seminar program would also be an excellent way to allow an exchange of ideas. Business training and commercialization could also involve</p>	<p><i>Agreed to unconditionally</i></p>	<ol style="list-style-type: none"> 1. <i>Update website to showcase potential future career options, demonstrate success stories</i> 2. <i>Create/update a data base of graduates</i> 3. <i>Make alumnus career night event annual</i> 	<p><i>Graduate, Priorities/planning, Research committees</i></p>	<p><i>In progress</i></p>

<p>alumni. Collaboration with local industry could involve MITACS or other federally sponsored funding opportunities. Students should not only be encouraged to participate but the department should be actively involved in assisting students with these types of short-term placements.</p>				
<p>5. (Weakness). Joint Institute with University of Ottawa</p> <p>The existence of the Joint Institute of graduate studies in chemistry between Carleton and University of Ottawa, which has historical importance, has less significance in the current state of both universities' graduate programs. While there are several positives, we question the net benefit of the Joint Institute. As a prominent example, the administrative duties are adding cumbersome tasks which slow the evolution of the respective programs. The primary perceived advantage of the Joint Institute, which was pointed out to us, was the increased diversity of graduate course offerings for students across both universities. However, this could easily remain without all other aspects of the Joint Institute existing in its current form. Many graduate students at universities across Canada are already given the opportunity to follow courses from other departments and universities with relative ease, and therefore we suggest that this becomes the main link between the two programs at Carleton and Ottawa. The need to have one member of the PhD thesis advisory committee for each student from U Ottawa can also be seen as</p>	<p><i>Not agreed to:</i></p> <p><i>While joint OCCI indeed results in administrative challenges, benefits of the institute outweigh the drawbacks. This includes access to courses, especially lab-based courses, on both campuses; TAC membership, seminar attendance, Comprehensive examination committee memberships, support to newly hired faculty members.</i></p>	<p><i>1. Work on improving communication to minimize administrative load.</i></p>	<p><i>Graduate, Research, Priorities/Planning committees</i></p>	<p><i>In progress, 1-2 years</i></p>

<p>limiting. Allowing Ottawa Faculty to optionally serve as members of a grad committee would be a favorable <u>evolution</u> of this requirement. However, we believe there is sufficient expertise within the Chemistry Department at Carleton to form the thesis advisory committee.</p>					
<p>6. (Concern). Optional courses offered</p> <p>The list of course offerings for graduate students at Carleton appears extremely broad. However, from this list, we learned that large portion of these classes have not been taught for several years. We strongly recommend that course offerings should be streamlined, removing any from list that have not been offered in the past 5 years, or otherwise have no intent to be offered in the next 2 years. Any remaining classes in the list should be offered on a rotation basis, ideally at a minimum of every two years, such that all students would have access to each available class over their graduate career. Laboratory based courses are highly appreciated by grad students to familiarize themselves with some cutting-edge techniques not within their specific expertise. An example of this is a team-teaching model with 4-5 professors each teaching a small section on a specialized technique, with some demonstration/lab component. This also has an added effect of increasing the visibility of each research group within the grad student community.</p> <p>Another possibility would be to create a new class consisting of a modular lab where grads spend a short period working within different</p>	<p><i>Agreed to unconditionally</i></p>	<ol style="list-style-type: none"> 1. <i>Work on “cleaning up” the list of offered courses</i> 2. <i>Offer new, modular graduate courses</i> 	<p><i>Graduate committee, Priorities and Planning, New faculty members</i></p>	<p><i>In progress</i></p>	<p><i>Y</i></p>

<p>research labs. Such a course could involve direct training <u>by</u> the respective graduate students of that lab. Students could select a minimum number of modules, be provided key publications from that area, and participate in a seminar. With senior grad students teaching other grad students, one could perceive this class as replacing a current seminar course.</p>				
<p>7. (Opportunity) Seminar courses for grad students</p> <p>Streamlining of requirements between specializations (food science, environmental/toxicology, biochemistry and general chemistry stream) would increase flexibility and reduce confusion. The different seminar requirements should be equal (number of credits) across all areas of specialization in Chemistry. We find it unusual that an MSc or PhD degree in “Chemistry” with specialization in a given area (eg. food science) would require a different number of seminars and course credits than in any other specialization. Standardizing these requirements would simplify the administration and communication of course requirements and give students greater flexibility. Within the curriculum, we recognize the potential benefits of students with research focus in one area being allowed, and even encouraged, to take courses in other areas. This added flexibility would also alleviate the perception of students suggesting that there is a shortage of available classes in their discipline.</p>	<p><i>Agreed to unconditionally</i></p>	<p><i>1. Make changes to grad calendar</i></p>	<p><i>Graduate, Priorities and Planning Committees</i></p>	<p><i>In progress</i></p>

<p>8. (Opportunity) TAC meeting exams</p> <p>The implementation of regular TAC meetings on a yearly basis for all graduate students (MSc and PhD) has the benefit of providing critical feedback to each student during their studies. It also allows a correction of any areas of concern in a timely manner. We suggest that the evaluation from the committee during these TAC meetings be standardized, giving a written report with clear milestones and feedback to each student. These reports would also serve the committees for follow-up TAC meetings. Formal consequences could therefore be put in place if a rating of unsatisfactory in each category, such as productivity, scholarly, or attendance is given.</p>	<p><i>Agreed to unconditionally</i></p>	<p>1. <i>Develop TAC forms</i> 2. <i>Continue monitoring the performance of recently introduced TAC at PhD level, before introducing TAC at M Sc level.</i></p>	<p>Graduate Committee</p>	<p><i>In progress, 1-2 years</i></p>	<p>Y</p>
<p>9. (Concern) Appropriate graduate student space</p> <p>It was evident that the department and its building has a severe lack of graduate student space allocated outside the research labs. Especially in a Chemistry Department, where safety is always a top priority, office space free of the lab is imperative for students to work on writing articles, planning experiments, having space for a break from the lab and discussions between students. We understand that this space may be considered a luxury, but we strongly disagree. For all students, who spend a significant portion of their days, evenings, and weekends within the department, having appropriate space to properly optimize their workload is critical. Moreover, the mental health of students cannot be ignored;</p>	<p><i>Agreed to if additional resources permit. Decisions on additional space are made at the faculty/university levels.</i></p>	<p><i>Departmental space and infrastructure committee will gather information on the available space and will consult with the Departmental graduate and the Priorities and Planning committees on the current and future needs. This information will be brought to the Dean's office.</i></p>	<p><i>Graduate, Priorities and Planning, space and infrastructure committees</i></p>		

<p>imagine being unable to take a coffee break, or chat with colleagues because there is no safe space to do so. We recognize the challenges of implementing such a recommendation. Therefore, as a minimum starting point, establishing communal and flexible office space for all students to access should be easier to implement. Certainly, any future renovations or expansions of the department space should list graduate office space as their priority.</p>				
<p>10. (Opportunity) Grad Handbook revision</p> <p>A thorough revision of the grad handbook, clearly stating all requirements, learning outcomes and opportunities for students, would be beneficial to current and future. This is a vehicle for communication of policy and expectations, and an opportunity for students who need assistance. Having all pertinent information in one document would lessen the confusion among students of what is expected of them for the successful completion of their degrees, as well as all supporting information. Here are a few specific suggestions:</p> <p>A minimum number of TA hours should be defined as an essential requirement, especially considered that mentoring and teaching is an important skill to master for graduate students.</p> <p>The handbook does not define the committee structure for an MSc. Also, there is no information about the timeline for thesis submission ahead of a defense.</p> <p>The comprehensive 1 exam is essentially described as a grad seminar, rather than an exam</p>	<p><i>Agreed to unconditionally</i></p>	<ol style="list-style-type: none"> 1. <i>Will introduce changes suggested by the external reviewer to the graduate handbook</i> 2. <i>Will consider eliminating comp 1</i> 	<p><i>Graduate committee</i></p>	<p><i>In progress</i></p>

with specific knowledge to be tested. We question the value of the seminar-based exam beyond what is already taught through other required seminar courses. Potentially with the implementation of TAC meetings, the compl exam could be eliminated.

The description of the PhD defense is a 10 min presentation, followed by a question period. This is an extremely short time to summarize all the work that goes into a PhD. A reference to these rules and what is expected for the thesis and defense is likely in a separate document from the Faculty of Grad studies, however, pointing towards such documentation in the grad handbook is suggested.

In terms of financial assistance, grad students are offered TAships, research stipends from their supervisor (if no external scholarships) as well as a portion from grad studies. These numbers and minimums are not clearly laid out in the handbook. Better transparency would be beneficial.

The timeline of the PhD program is tabulated and suggests up to 6 years of study. The PhD program should be promoted as a four-year program, with considerations of extensions under certain conditions.

<p>11. (Weakness) Support Staff Limitations</p> <p>The department seems to be nearing a breaking point in terms of administrative and technical staff. This is a serious problem that should be considered of utmost importance for the health of the graduate program. The administration of the graduate program is under the responsibility of Chantelle Gravelle (graduate administrator), who is an invaluable asset to the Department and the program. Even though she has managed valiantly to this point, her workload will more than likely increase in the future as new research-focused faculty establish their groups. The expansion of new students from outside Carleton, including many international students, will bring added concerns and force an unsustainable situation. Adding staff to support the administrator is paramount. The head teaching lab technician (Elena Munteanu) is currently in charge of coordinating the TAships of all students, which represents a heavy workload. Could one or more senior grad students be hired in the critical summer months to assist with these assignments and associated training in a timely manner? Delayed assignment notification was expressed as a source of stress by the graduate students. Delegating some of the administrative work to senior TAs would also give them the opportunity to learn important skills such as scheduling and training.</p>	<p><i>Agreed to if additional resources permit</i></p> <p><i>Resources to hire a new staff member would be required to minimize the administrative workload.</i></p>	<ol style="list-style-type: none"> 1. <i>Changes to program description will be made, and posted on the web site, and graduate student handbook,</i> 2. <i>Supervisor handbook will be created</i> 3. <i>Information will be gathered regarding the needs of the department, i.e. the level of the position and the responsibilities (part time, full time, seasonal, administrative, technical, financial)</i> 4. <i>Based on the needs, consultation will be conducted with the Dean's office to request additional funds in the department budget.</i> 	<p><i>Graduate, Research, Priorities and Planning, committees, Chair, Dean</i></p>	<p><i>In progress</i></p>	<p><i>N</i></p>
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<p>12. (Concern). Admission Requirements</p> <p>One of the reasons why there are limited external and international students within the graduate program is likely the lack of clear admission requirements and promotion (through the departmental and grad program website) of the program to international students. If these requirements are clearly stated, the task of rating applicants would be more efficient. The grad administrator mentioned specifically that this is one of the tasks that currently occupies an exceptional amount of time. If the procedure of acceptance these students was streamlined, more external students would be admitted and thus increased the diversity of the student body within the program. Clear guidelines and promotion within the website will also provide added visibility of the program worldwide.</p> <p>As for the international bursaries for PhD level students, this is a great advantage for recruiting international PhD students, however, not offering the same opportunity at the MSc level would result in admitted PhD students directly instead of, more conservatively initially admitting them to the MSc program with the potential to fast-track into the PhD program after one-year. This causes many issues administratively if an international PhD student end up needing to finish with a MSc degree instead of the intended PhD. If the international fee waiver bursary could be implemented for all graduate students, this would alleviate these issues, and ensure the promotion into the PhD program is for clearly deserving</p>	<p><i>Agreed to in principle</i></p> <p><i>The issue has been recognized and will be looked at.</i></p>	<p><i>1. We will look at the admission standards in other comparable universities. We will update the website to clarify the admission requirements and the process.</i></p>	<p>Graduate Committee</p>	<p><i>In progress</i></p>	<p><i>N</i></p>
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students. Judging the potential of an international PhD applicant solely on paper is not an easy task.

**CARLETON UNIVERSITY COMMITTEE ON
QUALITY ASSURANCE
Cyclical Review of the undergraduate program
in Electrical Engineering
Executive Summary and Final Assessment Report**

This Executive Summary and Final Assessment Report of the cyclical review of Carleton's undergraduate program in Electrical Engineering in the Department of Electronics is provided pursuant to the provincial Quality Assurance Framework and Carleton's Institutional Quality Assurance Process (IQAP).

EXECUTIVE SUMMARY

The undergraduate program in Electrical Engineering resides in the Department of Electronics, a unit administered by the Faculty of Engineering and Design.

As a consequence of the review, the program was 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 program. Within the context of this positive assessment, the report nonetheless made a number of recommendations for the continuing enhancement of the program. These recommendations were productively addressed by the Chair of the Department of Electronics, and the Dean of the Faculty of Engineering and Design in a response to the External Reviewers' report and Implementation Plan that was submitted to SQAPC on October 13, 2022.

FINAL ASSESSMENT REPORT

Introduction

The undergraduate program in Electrical Engineering resides in the Department of Electronics, a unit administered by the Faculty of Engineering and Design. 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 program was 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 November 1, 2 and 3, 2021, was conducted by Dr. Ivan Fair, from the University of Alberta, and Dr. Andre Ivanov from the University of British Columbia. The site visit involved formal meetings with the Provost, the Vice-Provost and Associate Vice-President (Academic), the Dean of the Faculty of Engineering and Design, and the Chair of the Department of Electronics. The review committee also met with faculty members, staff, and undergraduate students.

The External Reviewers' report, was submitted on November 29, 2021. offered a very positive assessment of the program.

This Final Assessment Report provides a summary of:

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

This report draws on five documents:

- The Canadian Engineering Accreditation Board Self-study and Cyclical Program Review Volume I Supplement was developed by members of the Department of Electronics (Appendix A)
- The Report of the External Review Committee (Appendix B)
- The response and implementation plan from the Chair of the Department of Electronics (Appendix C)
- The Response from the Dean of the Faculty of Engineering and Design (Appendix D)
- The internal discussant's recommendation report (Appendix E)

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

This Final Assessment Report contains the Implementation Plan (Appendix C) developed by the Chair of the Department of Electronics and agreed to by the Dean of the Faculty of Engineering and Design, 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 program

General

“Electrical Engineering is a well-established, well-understood, and remains a generally in-demand program in Canada as well as internationally. Although there have been some fluctuations in the demand for EE programs over the years, EE remains one of the main, well-identified engineering programs recognized worldwide. With the advent of electronics embedded everywhere and in everything (i.e., the “internet of things” IoT) the relevance, importance, and demand for such program will continue to be strong and likely grow.”

Faculty

Speaking with regard to faculty, the external reviewers stated:

“The current Department Chair appears to be generally appreciated and generally supported by his faculty peers and staff; his calm demeanor was a quality highlighted by his fellow faculty members.”

“The Dean is committed to growing the faculty complement while holding undergraduate student enrolment steady; this is a timely initiative aimed at redressing the current unduly large student-to-faculty ratios in Electrical Engineering and other engineering programs at Carleton.”

Students

The external reviewers noted that “[t]he program involves a considerable amount of experiential learning; many of the courses offered include a laboratory component, and co-op opportunities for students are both encouraged and supported.”

“The program is structured such that most semesters expect students to register in five courses rather than what is often six courses at a number of other schools in Canada; assuming an appropriate workload in each course, this feature can result in a more manageable overall workload for Carleton’s EE students compared to those at other schools, thereby resulting in better overall knowledge retention and a better learning experience for the students.”

Curriculum

The external reviewers noted that:

“Recent curricular changes in Carleton’s EE program; in particular the introduction of courses pertinent to electric machines and power systems, and a mandatory course on automatic control (intelligent systems), have broadened the program from its previous

focus on electronics such that it is more “up with the times” and compares well with other EE programs in Canada and abroad.”

Opportunities for program improvement and enhancement

The External Reviewers’ Report made 24 recommendations for improvement:

1. We recommend that a succession plan be drawn up immediately regarding transitioning the current workload and responsibilities for technical support to new hires. To this end, we recommend that university-level Human Resources be consulted, as needed, in order ease this transition process and to assist the current technical support individual in reducing the extent of his activities and responsibilities. (weakness)
2. We recommend that funds currently allocated for faculty recruitment be reallocated to hire additional technical support staff. (opportunity)
3. Consider merging the Department of Electronics with the Department of Systems and Computer Engineering. (opportunity)
4. Consider reducing the number of ECE-related programs. (opportunity)
5. Institute a five-year standard length for the term of Department Chair. (opportunity)
6. Expect and support Department Chairs and other faculty members who show interest and potential in leadership to participate and complete the Carleton Leader Program. (opportunity)
7. Establish clear departmental aspirations (vision) along with tactical and strategic priorities (short and longer terms) for guiding collective and individual decisions and resource allocations. (opportunity)
8. Revisit the departmental administrative structure and leadership portfolios such that new models can be deployed and experimented with, noting that:
 - Associate Chairs specifically responsible for coordinating and supporting research initiatives have been instrumental at other institutions in advancing research activities and outcomes
 - Associate Chairs for outreach, external activities, entrepreneurship, innovation, and/or other strategic initiatives have proven helpful in other institutions for enabling and achieving departmental successes affecting and valued by multiple stakeholders, including students, faculty, and the community at large
 - High-energy/visionary/unconventional-thinking individuals with different views/ideas can have significant positive impact on departmental operations and outcomes (opportunity)
9. Increase faculty member engagement. (opportunity)
10. Raise departmental levels of enthusiasm/excitement. (opportunity)
11. Consider taking a larger and more engaged role in departmental external engagements and promotions. (opportunity)
12. Look externally for ideas for alternatives toward improving academic programs, program delivery, research activities, departmental business operations, student engagement, etc. (opportunity)
13. Engage the curriculum committee in the amalgamation and evolution of ECE programs at Carleton. (opportunity)

14. Give serious reconsideration to the manner in which the final year capstone course is organized and delivered. (opportunity)
15. . Review overall workload for students. (opportunity)
16. Develop mechanisms to support the regular and critical review of laboratory components to ensure they are truly engaging and instructive and not simply comprised of rote procedures for students to complete. (opportunity)
17. Re-examine the possibility of integrating low- cost test and measurement devices/platforms into the EE program for students to use outside of traditional labs and classrooms. (opportunity)
18. Encourage the revitalization of delivery/learning models even within a classical lecture based classroom model.
19. Develop feedback, self-assessment and improvement processes at the department level for courses and the manner in which they are offered.
20. Provide additional training for TAs.
21. Re-examine the basis on which admission to the Electrical Engineering program is offered.
22. Re-examine what is sufficient for a student to pass a course
23. Provide greater and more structured and formal support for extracurricular project clubs and activities which provide tremendous learning opportunities for students.
24. Create better lines of communication with student leaders.

The Outcome of the Review

As a consequence of the review, the undergraduate program in, Electrical Engineering was 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 Chair of the Department of Electronics, and the Dean of the Faculty of Engineering and Design in responses to the External Reviewers' report and Implementation Plan that was considered by SQAPC on October 13, 2022.

The Department:

- agreed unconditionally to recommendations #1, 2, 6, 20 and 24
- agreed to recommendations #5, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 18, 19 and 23 in principle
- the unit did not agree with recommendations # 3, 4, 17, 21 and 22

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(s) and Faculty Dean(s) and forwarded to SQAPC for its review by June 30, 2024.

The Next Cyclical Review

The cyclical program review (CPR) aligns with the Canadian Engineering Accreditation Board review of the undergraduate engineering programs. The Canadian Engineering Accreditation Board's review typically occurs within 1- 6 years; this time frame falls within the program's next CPR cycle. Based on this approach, the next CPR will be held by 2028/29.

Electronics
Unit Response to External Reviewers' Report & Implementation Plan
Programs Being Reviewed: Electrical Engineering

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

UNIT RESPONSE AND IMPLEMENTATION PLAN					
Programs Being Reviewed: Prepared by (name/position/unit):					
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 <i>Rationales are required for categories 2, 3 & 4</i>	Action Item	Owner	Timeline	Will the action described require calendar changes? (Y or N)
1. We recommend that a succession plan be drawn up immediately regarding transitioning the current workload and responsibilities for technical support to new hires. To this end, we recommend that university-level Human Resources be consulted, as needed, in order ease this transition process and to assist the current technical support individual in reducing the extent of his activities and responsibilities. (weakness)	<i>Agreed to unconditionally</i> <i>The Department of Electronics includes 7 continuing technical staff members. 2 staff members support the Microfabrication laboratory which serves senior undergraduate courses and graduate research. 2 staff members support the Department computer network and resources including undergraduate courses, graduate research, and administrative computing. 3 staff members support undergraduate hardware labs and some experimental research labs. While the technical roles are distinct there is sufficient overlap and faculty expertise to support a transition should a staff member leave. It is likely this recommendation regarding technical support was based on an ad-hoc interview with a single staff member who assumed considerable responsibility during the</i>	<i>Hiring technical staff and managing evolution of workload and responsibilities is ongoing.</i> <i>All continuing technical staff positions are filled from October 10, 2022.</i>	<i>Department Chair</i>	<i>September 2022</i>	<i>N</i>

	<i>COVID pivot to remote laboratory activity. There is ongoing coordination with HR regarding lab staffing and responsibilities.</i>				
2. We recommend that funds currently allocated for faculty recruitment be reallocated to hire additional technical support staff. (opportunity)	<i>Agreed to unconditionally</i>	<i>Hiring technical staff and defining responsibilities is ongoing</i>	<i>Department Chair and Faculty Dean</i>	<i>September 2022</i>	<i>N</i>
3. Consider merging the Department of Electronics with the Department of Systems and Computer Engineering. (opportunity)	<i>Not agreed</i> <i>This is a major structural change to the faculty with potential negative impact</i>				
4. Consider reducing the number of ECE-related programs. (opportunity)	<i>Not agreed</i> <i>Smaller programs enhance the sense of community in student cohorts and subsets of faculty members</i>				
5. Institute a five-year standard length for the term of Department Chair. (opportunity)	<i>Agreed in principle</i> <i>While a longer term can have benefits, flexibility can also be valuable. I thought Carleton used a standard 4 year term but 5 years could be discussed.</i>	<i>Discuss with Chairs and Directors</i>	<i>Faculty Dean</i>	<i>May 2022</i>	<i>N</i>

6. Expect and support Department Chairs and other faculty members who show interest and potential in leadership to participate and complete the Carleton Leader Program. (opportunity)	<i>Agreed unconditionally</i>	<i>I believe this is already done</i>	<i>Faculty Dean</i>	<i>May 2022</i>	<i>N</i>
7. Establish clear departmental aspirations (vision) along with tactical and strategic priorities (short and longer terms) for guiding collective and individual decisions and resource allocations. (opportunity)	<i>Agreed in principle</i>	<i>Document vision and priorities in annual academic and financial planning</i>	<i>Department Chair</i>	<i>February 2023</i>	<i>N</i>
8. Revisit the departmental administrative structure and leadership portfolios such that new models can be deployed and experimented with, noting that: <ul style="list-style-type: none"> ○ Associate Chairs specifically responsible for coordinating and supporting research initiatives have been instrumental at other institutions in advancing research activities and outcomes ○ Associate Chairs for outreach, external activities, entrepreneurship, innovation, and/or other strategic initiatives have proven helpful in other institutions for enabling and achieving departmental successes affecting and valued by multiple stakeholders, including students, faculty, and the community at large ○ High-energy/visionary/unconventional-thinking individuals with different views/ideas can have significant positive impact on departmental operations and outcomes (opportunity) 	<i>Agreed in principle</i> <i>These roles are currently administrative load assignments for faculty members</i>	<i>Discuss with Dean and Department Faculty Board</i>	<i>Department Chair</i>	<i>September 2022</i>	<i>N</i>

9. Increase faculty member engagement. (opportunity)	<i>Agreed in principle</i>	<i>Increase number of Department faculty meetings</i>	<i>Department Chair</i>	<i>September 2022</i>	<i>N</i>
10. Raise departmental levels of enthusiasm/excitement. (opportunity)	<i>Agreed in principle</i>	<i>Will try to be more aggressive in communicating and promoting opportunities to faculty?</i>	<i>Department Chair</i>	<i>September 2022</i>	<i>N</i>
11. Consider taking a larger and more engaged role in departmental external engagements and promotions. (opportunity)	<i>Agreed in principle</i> <i>Multiple faculty members are actively engaged in outreach through the University and technical society activities</i>	<i>Encourage faculty to look for additional opportunities to promote the EE program</i>	<i>Department Chair</i>	<i>September 2022</i>	<i>N</i>
12. Look externally for ideas for alternatives toward improving academic programs, program delivery, research activities, departmental business operations, student engagement, etc. (opportunity)	<i>Agreed in principle</i> <i>This is an ongoing activity but change is gradual</i>	<i>A topic for discussion at the Department faculty meetings (#9)?</i>	<i>Department Chair</i>	<i>September 2022</i>	<i>N</i>
13. Engage the curriculum committee in the amalgamation and evolution of ECE programs at Carleton. (opportunity)	<i>Agreed in principle.</i>	<i>Review of program overlap</i>	<i>Dept. Electronics Curriculum Committee</i>	<i>September 2022</i>	<i>Maybe?</i>
14. Give serious reconsideration to the manner in which the final year capstone course is organized and delivered. (opportunity)	<i>Agreed in principle</i> <i>Ongoing discussion</i>	<i>Review of capstone structure</i>	<i>Capstone committee</i>	<i>September 2022</i>	<i>N</i>

15. Review overall workload for students. (opportunity)	<i>Agreed in principle</i>	<i>Review program course load Solicit feedback from students to clarify concerns</i>	<i>Curriculum committee</i>	<i>September 2022</i>	<i>Maybe ?</i>
16. Develop mechanisms to support the regular and critical review of laboratory components to ensure they are truly engaging and instructive and not simply comprised of rote procedures for students to complete. (opportunity)	<i>Agreed in principle Ongoing process</i>	<i>Review laboratory components</i>	<i>Curriculum committee</i>	<i>September 2022</i>	<i>N</i>
17. Re-examine the possibility of integrating low-cost test and measurement devices/platforms into the EE program for students to use outside of traditional labs and classrooms. (opportunity)	<i>Not agreed We have developed equivalent in-person and remote access student experiences using professional quality test equipment. Take-home test and measurement is supported where appropriate</i>				
18. Encourage the revitalization of delivery/learning models even within a classical lecture based classroom model.	<i>Agreed in principle</i>	<i>Encourage course instructors to engage with TLS</i>	<i>Department Chair</i>	<i>August 2022</i>	<i>N</i>
19. Develop feedback, self-assessment and improvement processes at the department level for courses and the manner in which they are offered.	<i>Agreed in principle</i>	<i>Review student feedback from town hall in winter term Encourage faculty to engage Department teaching mentor</i>	<i>Department Chair, Curriculum committee</i>	<i>August 2022</i>	<i>N</i>

20. Provide additional training for TAs.	<i>Agreed unconditionally</i>	<i>Encourage course instructors to organize training</i>	<i>Department Chair</i>	<i>September 2022</i>	<i>N</i>
21. Re-examine the basis on which admission to the Electrical Engineering program is offered.	<i>Not agreed</i> <i>This is the territory of the Associate Dean Student Success and Registrar and will be difficult to change for a program of this size</i>				
22. Re-examine what is sufficient for a student to pass a course.	<i>Not agreed</i> <i>Challenging courses are already offered in different terms providing multiple opportunities to complete.</i>				
23. Provide greater and more structured and formal support for extracurricular project clubs and activities which provide tremendous learning opportunities for students.	<i>Agreed in principle</i>	<i>Encourage more faculty to sponsor student extracurricular activities</i>	<i>Department Chair</i>	<i>May 2022</i>	<i>N</i>
24. Create better lines of communication with student leaders.	<i>Agreed unconditionally</i> <i>Student representatives are already included in governance</i>	<i>Increase frequency of meetings and town halls</i>	<i>Department Chair</i>	<i>September 2022</i>	<i>N</i>

25. Create 5 and 6 year program maps.	<p><i>Agreed in principle</i></p> <p><i>Students falling off-pattern on 4 years may still be off-pattern on 5 or 6 year plans.</i></p>	<p><i>Investigate practical extended program maps</i></p>	<p><i>Curriculum Committee</i></p>	<p><i>September 2022</i></p>	<p><i>N</i></p>
26. Encourage faculty members to connect students with their research programs and relate/introduce research examples into the undergraduate program.	<p><i>Agreed unconditionally</i></p> <p><i>This is natural for active researchers</i></p>	<p><i>Promote to faculty</i></p>	<p><i>Department Chair</i></p>	<p><i>December 2022</i></p>	<p><i>N</i></p>
27. We recommend that the department contemplate activities that promote and support undergraduate research opportunities for its students.	<p><i>Agreed unconditionally</i></p> <p><i>See 26.</i></p>	<p><i>Promote to faculty (USRA, I-CUREUS)</i></p>	<p><i>Department Chair</i></p>	<p><i>December 2022</i></p>	<p><i>N</i></p>

**CARLETON UNIVERSITY COMMITTEE ON
QUALITY ASSURANCE**
Cyclical Review of the undergraduate programs
in Civil Engineering, Environmental Engineering and Architectural Conservation and
Sustainability
Executive Summary and Final Assessment Report

This Executive Summary and Final Assessment Report of the cyclical review of Carleton's undergraduate programs in **Civil Engineering, Environmental Engineering** and **Architectural Conservation and Sustainability** are provided pursuant to the provincial Quality Assurance Framework and Carleton's Institutional Quality Assurance Process (IQAP).

EXECUTIVE SUMMARY

The undergraduate programs in Civil Engineering, Environmental Engineering and Architectural Conservation and Sustainability reside in the Department of Civil and Environmental Engineering, a unit administered by the Faculty of Engineering and Design.

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 Department of Civil and Environmental Engineering and the Dean of the Faculty of Engineering and Design in response to the External Reviewers' report and Implementation Plan that was submitted to SQAPC on September 8, 2022.

FINAL ASSESSMENT REPORT

Introduction

The undergraduate programs in Civil Engineering, Environmental Engineering and Architectural Conservation and Sustainability reside in the Department of Civil and Environmental Engineering, a unit administered by the Faculty of Engineering and Design. 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 November 10, 11 and 12, 2021, was conducted by Dr. Terry Fonstad from the University of Saskatchewan and Dr. Samer Adeeb from the University of Alberta. The site visit involved formal meetings with the Provost, the Vice-Provost and Associate Vice-President (Academic), the Dean of the Faculty of Engineering and Design, and the Chair of the Department of Civil and Environmental Engineering. The review committee also met with faculty members, staff, and undergraduate students.

The External Reviewers' report, submitted on December 10, 2021, 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 Canadian Engineering Accreditation Board Self-study and Cyclical Program Review Volume I Supplement was developed by members of the Department of Civil and Environmental Engineering (Appendix A)
- The Report of the External Review Committee (Appendix B).
- The response and implementation plan from the Chair of the Department of Civil and Environmental Engineering (Appendix C)
- The Response from the Dean of the Faculty of Engineering and Design (Appendix D).
- The internal discussant's recommendation report (Appendix E).

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

This Final Assessment Report contains the Implementation Plan (Appendix C) developed by the Chair of the Department of Civil and Environmental Engineering and agreed to by the Dean of the Faculty of Engineering and Design, 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

General

The External Reviewers' Report states that the programs are "engaged and fully committed leadership:

- at the Department level as evident in the chair's commitment to enhancing the program based on the learning outcomes and graduate attributes through the establishment and chairing of the CEE-Graduate Attributes Committee (CEE-GAC))
- at the institutional level as evident in the supports provided for Engineering in general and remote teaching in particular. The reviewers noted that the Education Development Center supports teaching and is well utilized by the faculty members within the department."
- The department has a well-established process by CEE-GAC for the continual improvement."

Faculty

Speaking with regard to faculty, the external reviewers also stated that the programs are engaged and have fully committed leadership "at the Faculty level as evident in the continual effort of increasing the number of faculty members in the CEE dept."

Students

The external reviewers "commend the department on the program in which the department provides 75% of the funding required to hire the top students for 8 weeks to gain research or industry experience."

Curriculum

The external reviewers stated: "the department offers three unique programs that focus on building preservation, structural engineering in heritage buildings and resilient infrastructure. The department has a dedicated highly qualified individual (Ph.D., PMP) to manage teaching and research labs across the department."

Opportunities for program improvement and enhancement

The External Reviewers' Report made 21 recommendations for improvement:

1. For each of the reviewed undergraduate program (Environmental, Civil, and ASCE), sufficient bona fide experiential and hands-on lab components should be designed and inserted in applicable course components to ensure students have the hands-on experience to succeed outside of a school setting.

2. The continual improvement process should include a method for gathering feedback from employers and recent graduates. The frequency of gathering feedback can be annual or every two years.
3. The department leadership team should prepare collegial teaching and space allocation policies to be approved by the department council that consider the variability in the teaching loads among faculty members and providing perspicuous guidelines for faculty members to access and utilize individual and shared lab spaces.
4. The department continual improvement process (CIP) is based on the measurement of graduate attributes in a subset of courses. A bona fide CIP process should consider all courses rather than a subset.
5. Two departmental committees are responsible for changes to the program and academic planning committee, and the CEE-GAC. As there are three different programs administered by the two committees, the department would benefit from assigning ‘directors’ especially to the two smaller programs (ASCE and ENVE) overlooking program amelioration efforts and student concerns.
6. There are mixed experiences of faculty members regarding the distribution and reporting of graduate attributes using the GASSS system. Some faculty members find the process well organized, while others reported large number of graduate attributes in single classes and many measures that are not useful.
7. There seems to be a slight disconnect between the central coop program and departmental or faculty level efforts to enhance coop students experience.
8. Students extracurricular design teams would benefit from increased support.
9. All three programs revolve around “building preservation, structural engineering in heritage buildings and resilient infrastructure”, students with other interests or opportunities need electives.
10. Students reported that learning outcomes are not universally used in courses. When used, they found them very helpful in structuring their learning. However, some professors simply list them in the course outline but do not link them to the actual content.
11. Environmental engineering program students are a bit lost when it comes to the focus of the program. Perhaps the introduction of program learning outcomes specific To the Carleton program would help the retention of students in that program. For example, students asked for more contact with the ENVE industry engineers to better understand opportunities where ENVE engineers graduating from the Carleton program fit into society.
12. ENVE4104 Environmental Planning and Impact Assessment and ENVE 4200 Climate Change and Engineering are in the 4th year. Students, particularly ENVE students, would benefit from these courses ahead of their 4th year capstone design experience.
13. Civil students expressed concern that most electives are all in the first term which limits access due to timetabling.
14. Large class sizes and large teaching loads for new faculty members is a hindrance to their research aspirations in their early career. In particular, new faculty members have to teach 3 undergraduate courses plus 1 graduate course. Similarly, senior faculty members need to teach 2 undergraduate courses plus 1 graduate course in addition to as high as 4 capstone design groups. This heavy teaching load has precipitated in students reporting a delayed response from their instructors to their various course inquiries.

15. Comment from student “they leave it to the TA and then the TA doesn’t want to do anything” (TA oversight?). This is again a reflection of the high enrolment.
16. 6 students per capstone group may be too many students to effectively give them all the design experience intended. This is again a reflection of the high enrolment.
17. The faculty is rapidly expanding the number of faculty members. This is an opportunity to decrease the class sizes enhancing the quality of delivery of the three programs.
18. With the rapid increase in research capabilities within the faculty, there is an opportunity to engage undergraduate students in the recent research advancements in the fields of research of the different researchers. The only mechanism available is through coop opportunities for the very top students. However, there needs to be other mechanisms allowing students at all academic levels to volunteer and perhaps actively participate in the faculty’s research activities.
19. A formal strategy to adopt/initiate teaching best practices gained from the experience induced by the recent remote delivery may provide an improvement in student learning.
20. Expand the focus of the programs/faculty past Ottawa”, even just in the strategic documents. The impression that one gets from reading the Faculty and University documentation is a focus on service to Ottawa.
21. Students indicated no emphasis on entrepreneurship; focus appears to be on getting a job (often a government job). There appears to be an opportunity to introduce leadership and entrepreneurship learning into the students’ educational experience.

The Outcome of the Review

As a consequence of the review, the **undergraduate programs in Civil Engineering, Environmental Engineering and Architectural Conservation and Sustainability** 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 Chair of the Department of Civil and Environmental Engineering, and the Dean of the Faculty of Engineering and Design in response to the External Reviewers’ report and Implementation Plan that was considered by SQAPC on September 8, 2022. The Department:

- agreed unconditionally to recommendations #10, 17, 19 and 20,
- agreed to recommendations #1, 2, 9 and 13 if resources permit.
- agreed to recommendations #3, 6, 7, 8, 11, 12, 14, and 21 in principle
- the unit did not agree to recommendations # 4, 5, 15, 16 and 18

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 June 30 2024.

The Next Cyclical Review

The cyclical program review (CPR) aligns with the Canadian Engineering Accreditation Board review of the undergraduate engineering programs. The Canadian Engineering Accreditation Board's review typically occurs within 1- 6 years; this time frame falls within the program's next CPR cycle. Based on this approach, the next CPR will be held by 2028/29.

Department of Civil and Environmental Engineering
Unit Response to External Reviewers' Report & Implementation Plan

Programs Being Reviewed: Architectural Conservation and Sustainability, Civil Engineering, and Environmental Engineering

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 Civil and Environmental Engineering (CEE) was pleased to receive the cyclic program review report dated November 16, 2021. The review assessed the quality of the three programs with respect to delivery methods, resources available to students and competence of faculty members. The review highlighted CEE Departmental strengths of program quality, engagement of the Faculty and Departmental leadership teams, and competency and conscientious approach of the faculty members. Other attributes, supporting a quality program, were identified that include a well-established continual improvement process, funding support for undergraduate students to acquire research and industry experience, qualified and effective administrative support staff, engagement by the Industry Advisory Group, and a dedicated and highly qualified manager for teaching and research labs. A summary of the report was shared with the CEE Department faculty and staff at the Departmental meeting on January 7, 2022. 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, Faculty of Engineering and Design.

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.

UNIT RESPONSE AND IMPLEMENTATION PLAN

Programs Being Reviewed: Civil

Prepared by (name/position/unit):

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. For each of the reviewed undergraduate program (Environmental, Civil, and ASCE), sufficient bona fide experiential and hands-on lab components should be designed and inserted in applicable course components to ensure students have the hands-on experience to succeed outside of a school setting. (Weakness)	2 – Agreed to if additional resources permit	<p><i>The Undergraduate Programs Committee (UPC) will work with the groups making up each program to analyze the current courses focusing on the experiential learning content in each program. Subject to this internal analysis of the experiential elements, the UPC will explore the conditions, requirements and constraints to support successful outcomes for developing experiential learning activities. Some of the issues include the available lab space, schedule, tools & equipment, and support staff. The expected learning outcomes and GAs will also need to be mapped.</i></p> <p><i>UPC will also hold consultations with the Department's Advisory Committee. It is expected that expansion of experiential learning activities will require additional lab space and staff. It is noted that work is underway to convert CB5301 into teaching lab. A request for one additional lab staff has already been made in the 2022-2023 budget submission to support current activities and more help may be needed if considerably more lab activities are developed.</i></p>	CEE Associate Chair Undergraduate Studies (ACUS) Academic (as the Chair of UPC); Department Chair; Dean, Faculty of Engineering and Design	2024-2025 Calendar Year	Y

<p>2. The continual improvement process should include a method for gathering feedback from employers and recent graduates. The frequency of gathering feedback can be annual or every two years. (Weakness)</p>	<p><i>2 – Agreed to if additional resources permit</i></p>	<p><i>The continual improvement (CI) process in CEE is closely tied to the other engineering programs. The Engineering Academic Planning Committee (APC) has recognized the need to collect feedback from current students, recent graduates, and employers. The co-op office collects feedback from employers. But we are not sure of the response rate and not all students are enrolled in the co-op program. So, conducting analysis (every year or every other year) based on feedback from co-op employers will likely be from a small data set. Data were collected in the past from current students and work is underway to collect more data from students (including graduating students) and co-op employers. Both the CEE Department Chair and ACUS-Academic are members in APC and will share this point with APC Chair (Associate Dean – Policy and Planning) and other members representing the other engineering departments for the identification, assessment and development of an efficient and effective system for engagement (mode and process for communications), and database management (survey mandate, confidentiality, security).</i></p>	<p><i>CEE Department Chair and ACUS-Academic; Associate FED Dean – Policy and Planning</i></p>	<p><i>2022-2023 Calendar Year</i></p>	<p><i>N</i></p>
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<p>3. The department leadership team should prepare collegial teaching and space allocation policies to be approved by the department council that consider the variability in the teaching loads among faculty members and providing perspicuous guidelines for faculty members to access and utilize individual and shared lab spaces. (Weakness)</p>	<p><i>3 – Agreed to in principle</i></p>	<p><i>The teaching load is governed by the collective agreement and the available faculty complement. Individual faculty members are asked to submit their teaching preferences every year and the Department Chair tries to meet these preferences as much as possible. Still, the Department offers a number of service (ECOR) courses for all students in engineering, and these courses tend to have higher enrolment. Over the last two years, the Department has added more sections in most large-enrolment courses to reduce enrollment in each course and reduce workload on those instructors. It is also recognized that some courses in some programs have lower enrolment than the Department average due to the size of these programs.</i></p> <p><i>The Department has a considerable shortage in research space, with majority of space accessible to all faculty member based on the current need. The Department has a Laboratory Users and Space Committee (LUSC) with membership from all different research groups in the Department to provide recommendations and suggest policies related to lab use and space utilization. The LUSC will work to assess actions, guidelines or policies that may support faculty members to access and utilize individual and shared lab spaces.</i></p>	<p><i>CEE Department Chair</i></p>	<p><i>N/A</i></p>	<p><i>N</i></p>
<p>4. The department continual improvement process (CIP) is based on the measurement of graduate attributes in a subset of courses. A bona fide CIP process should consider all courses rather than a subset. (Concern)</p>	<p><i>4- Not agreed to</i></p>	<p><i>We appreciate the feedback. However, the GA and CI process is developed according to the guidelines set by the Canadian Engineering Accreditation Board (CEAB) and many elements in the process are applicable for all engineering departments. The process has just been scrutinized in two separate accreditation visits in 2019 and will be reviewed in another visit in 2022. We also note that implementing this recommendation will increase workload on all instructors, which is an opposite outcome to the recommendation in point 6.</i></p>	<p><i>CEE LUSC Chair; CEE Department Chair</i></p>	<p><i>2022-2023 Calendar Year</i></p>	<p><i>N</i></p>

<p>5. Two departmental committees are responsible for changes to the program and academic planning committee, and the CEE-GAC. As there are three different programs administered by the two committees, the department would benefit from assigning 'directors' especially to the two smaller programs (ASCE and ENVE) overlooking program amelioration efforts and student concerns. (Concern)</p>	<p>4- Not agreed to</p>	<p><i>We appreciate the feedback. However, many of the courses are shared between multiple programs, and it will be impossible for example to separate decisions related to ACSE from CIVE. Therefore, the different programs are represented in the two main academic planning committees in the Department.</i></p>		<p>N/A</p>	<p>N</p>
<p>6. There are mixed experiences of faculty members regarding the distribution and reporting of graduate attributes using the GASSS system. Some faculty members find the process well organized, while others reported large number of graduate attributes in single classes and many measures that are not useful. (Concern)</p>	<p>3 – Agreed to in principle</p>	<p><i>We appreciate the feedback. We recognize that GASSS (the electronic system to collect GA data) is not the most friendly system. The Faculty's APC has long recognized this and has been trying to work with ITS to introduce bug fixes. The exercise of the GA mapping in all three programs has been completed few years ago with full consultation with the faculty at the time. Balancing the load of GA data collection in the different courses was one of the criteria considered. The faculty members are asked to submit comments on the process every year and the CEE-GAC reviews these comments for possible changes. It is also noted that APC did discuss GA mapping changes for a potential reduction of the number of indicators. However, a subset of the GAs is analyzed every year, and we wanted to keep the current mapping until we complete the full cycle. APC can revisit the list of indicators and the mapping to courses, in a future cycle.</i></p>	<p>CEE Faculty; CEE-GAC Chair; CEE Department Chair; Associate FED Dean – Policy and Planning</p>	<p>2024-2025 Calendar Year</p>	<p>N</p>
<p>7. There seems to be a slight disconnect between the central coop program and departmental or faculty level efforts to enhance coop students experience. (Concern)</p>	<p>3 – Agreed to in principle</p>	<p><i>We are not sure what is raised in this point. While the Department strives to enhance the student experience in general, co-op is managed centrally through the co-op office. The CEE ACUS-Student Engagement will work with the co-op office to develop a working plan to enhance students' co-op experience.</i></p>	<p>CEE ACUS-Student Engagement</p>	<p>2023-2024 Calendar Year</p>	<p>N</p>

8. Students extracurricular design teams would benefit from increased support. (Concern)	3 – Agreed to in principle	<p><i>Students' extracurricular activities are currently very well supported financially and through faculty involvement and supervision. Student teams are supported for annual travel to compete in the Great North Concrete Toboggan Race (GNCTR), Association of Preservation Technologies (APT), Troitsky Bridge Competition, and CSCE National Capstone Project Competition. Additional teams have been formed for the Timber Fever competition and the Concrete Canoe competition. All teams were contacted in March for their space needs to ensure that they have adequate working space for the extracurricular activities in the new Engineering Design Center that will be operational in 2022-2023. CEE has a dedicated committee to work with students and student groups to review requests for support. A CEE faculty member was just awarded the Jim Simpson Award by the Carleton Student Engineering Society upon the recommendation of the concrete canoe team for his support of the team activities. The Student Experience Committee will approach the students' groups to collect and review requests for support.</i></p>	Chair of CEE Student Experience Cmte; ACUS-Student Engagement; and Department Chair	2022-2023 Calendar Year	N
9. All three programs revolve around “building preservation, structural engineering in heritage buildings and resilient infrastructure”, students with other interests or opportunities need electives. (Concern)	2 – Agreed to if additional resources permit	<p><i>A review of the CEE program has been conducted in the 2020-21 Calendar year by the Undergraduate Programs Committee. The subcommittee was tasked to review and develop possible options for enhancement to the program for offering a wider range of electives by integrating a Pathway Options within the CIVE program. The ACUS-Academic will work with the UPC to assess possible changes to the ACSE, CIVE and ENVE programs. The primary resource constraints are accreditation requirements, faculty complement, and classroom and lab space.</i></p>	ACUS-Academic; Department Chair	2024-2025 Calendar Year	Y

10. Students reported that learning outcomes are not universally used in courses. When used, they found them very helpful in structuring their learning. However some professors simply list them in the course outline but do not link them to the actual content. (Concern)	1 – Agreed to unconditionally	<p><i>We acknowledge the importance of linking each course's learning outcomes to the course materials and the program's learning outcomes. Instructors will be reminded to link the learning outcomes of their courses to the materials covered. We recognize that the new Student Experience Questionnaire at Carleton will also help emphasize this point.</i></p>	ACUS-Academic; Department Chair	2022-2023 Calendar Year	N
11. Environmental engineering program students are a bit lost when it comes to the focus of the program. Perhaps the introduction of program learning outcomes specific To the Carleton program would help the retention of students in that program. For example students asked for more contact with the ENVE industry engineers to better understand opportunities where ENVE engineers graduating from the Carleton program fit into society. (Concern)	3 – Agreed to in principle	<p><i>We have recognized the side effects of having a large number of courses taken by environmental engineering students outside the Department in the first two years. It has been recognized that this is a significant issue potentially affecting the retention of the students. Starting 2019, ECOR 1055 has been introduced in first year for all engineering students to help students recognize the focus of their program, the potential career paths, and the links between their courses in early years and these career paths. ECOR 1055 also allows students in each program to meet each other on weekly basis, which may not be possible in the other courses in the first year. We recognize that the pandemic conditions have derailed this latter objective.</i></p> <p><i>CEE routinely organizes career nights (mostly focused on environmental engineering) where industry engineers talk to the students on the potential career paths.</i></p> <p><i>The Department will look into potential program changes to bring in focus of the program at an earlier stage.</i></p>	ACUS-Academic; Department Chair	2024-2025 Calendar Year	Y
12. ENVE4104 Environmental Planning and Impact Assessment and ENVE 4200 Climate Change and Engineering are in the 4th year. Students, particularly ENVE students, would benefit from these courses ahead of their 4th year capstone design experience. (Concern)	3 – Agreed to in principle	<p><i>As per the responses to Points 9 and 11, the Department will look into potential program changes to bring in focus of the program at an earlier stage.</i></p>	ACUS-Academic; Department Chair	2024-2025 Calendar Year	Y

13. Civil students expressed concern that most electives are all in the first term which limits access due to timetabling. (Concern)	2 – Agreed to if additional resources permit	See response to Point 9.	ACUS-Academic; Department Chair	2024-2025 Calendar Year	Y
14. Large class sizes and large teaching loads for new faculty members is a hindrance to their research aspirations in their early career. In particular, new faculty members have to teach 3 undergraduate courses plus 1 graduate course. Similarly, senior faculty members need to teach 2 undergraduate courses plus 1 graduate course in addition to as high as 4 capstone design groups. This heavy teaching load has precipitated in students reporting a delayed response from their instructors to their various course inquiries. (Concern)	3 – Agreed to in principle	<p>We appreciate the feedback. We note that the teaching load for new and senior faculty members is set by CUASA's collective agreement. The Department tries to help new faculty members whose teaching load in the first year is one-half reduced normal teaching load (i.e., 1.0 credit teaching load).</p> <p>With a number of new hires, the Department has recently split most large enrolment classes to 2 sections and increased the number of sections in other service ECOR courses. It is hoped that more faculty hiring in the future will allow further reduction in class size.</p> <p>Typically, faculty members supervise only 2 capstone projects (occasionally 3). Supervision of capstone projects requires PEng status as per the requirements of the Canadian Engineering Accreditation Board (CEAB). However, the Department is introducing in 2022-2023 co-supervision arrangements to allow new faculty members (without PEng status) to co-supervise capstone projects.</p>	Department Chair	Already ongoing	N
15. Comment from student “they leave it to the TA and then the TA doesn’t want to do anything” (TA oversight?). This is again a reflection of the high enrolment.	4 – Not agreed to	<p>It is not exactly clear what this comment is related to. It may be one complaint from one student related to a specific course, but this is definitely not an acceptable mode of delivery in the Department.</p> <p>The comment will be relayed to all faculty members and will be reminded of the duties of the course instructor and TA.</p>	Department Chair	2022-2023	N

16. 6 students per capstone group may be too many students to effectively give them all the design experience intended. This is again a reflection of the high enrolment. (Concern)	4 – Not agreed to	<p><i>Target group size in the capstone project is 4-6 students. The capstone project is an integration, over the student's academic tenure through the first 3 years of the program of the cumulative knowledge base, and experience where the skills, attributes and capabilities are utilized and demonstrated.</i></p> <p><i>Large design groups enhance the capstone experience through diversity, leadership and team building. The experience can be adequately managed to reflect realities within the practicing profession where project teams are typically comprised of large, multidisciplinary groups.</i></p>			
17. The faculty is rapidly expanding the number of faculty members. This is an opportunity to decrease the class sizes enhancing the quality of delivery of the three programs. (Opportunity)	1 – Agreed to unconditionally	See response to Point 14.	Department Chair	Already ongoing	N
18. With the rapid increase in research capabilities within the faculty, there is an opportunity to engage undergraduate students in the recent research advancements in the fields of research of the different researchers. The only mechanism available is through coop opportunities for the very top students. However, there needs to be other mechanisms allowing students at all academic levels to volunteer and perhaps actively participate in the faculty's research activities. (Opportunity)	4 – Not agreed to	<p><i>We appreciate the feedback but coop is not the only way to involve students in faculty research. There are many opportunities available to integrate undergraduate students within the research experience including CEE Internships for first year students, Carleton University Research Experience for Undergraduate Students (I-CUREUS), and NSERC USRAs.</i></p>			
19. A formal strategy to adopt/initiate teaching best practices gained from the experience induced by the recent remote delivery may provide an improvement in student learning. (Opportunity)	1 – Agreed to unconditionally	<p><i>The Engineering Academic Planning Committee (APC) has discussed the potential of alternative course delivery modes in engineering courses. With the constraints of accreditation requirements, APC is working on a plan to explore the opportunities and challenges with remote course delivery and the potential application in delivering engineering courses.</i></p>	APC	2023-2024 Calendar Year	N

20. Expand the focus of the programs/faculty past "Ottawa", even just in the strategic documents. The impression that one gets from reading the Faculty and University documentation is a focus on service to Ottawa. (Opportunity)	1 – Agreed to unconditionally	<p><i>The CEE programs have alumni spread all over Canada and the world. We appreciate the comment and will note it in future communications.</i></p>	CEE Faculty and Department Chair	Immediately	N
21. Students indicated no emphasis on entrepreneurship; focus appears to be on getting a job (often a government job). There appears to be an opportunity to introduce leadership and entrepreneurship learning into the students' educational experience. (Opportunity)	3 – Agreed to in principle	<p><i>We appreciate the feedback. The ACUS-Academic and UPC will note the feedback in the ongoing exercise to review the 3 undergraduate programs in CEE.</i></p> <p><i>It is worth noting that CEE students are regular participants in the PEO Ottawa Chapter's Annual Innovation Challenge, which focuses entirely on innovation and entrepreneurship.</i></p>	ACUS-Academic; Department Chair	2024-2025 Calendar Year	Y

**CARLETON UNIVERSITY COMMITTEE ON
QUALITY ASSURANCE**
Cyclical Review of the undergraduate programs
in Mechanical Engineering, Aerospace Engineering and Biomedical and Mechanical
Engineering
Executive Summary and Final Assessment Report

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

EXECUTIVE SUMMARY

The undergraduate programs in Mechanical Engineering, Aerospace Engineering and Biomedical and Mechanical Engineering reside in the Department of Mechanical and Aerospace Engineering, a unit administered by the Faculty of Engineering and Design.

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 Chair of the Department of Mechanical and Aerospace, and the Dean of the Faculty of Engineering and Design in responses to the External Reviewers' report and Implementation Plan that was submitted to SQAPC on June 23, 2022.

FINAL ASSESSMENT REPORT

Introduction

The undergraduate programs in Mechanical Engineering, Aerospace Engineering and Biomedical and Mechanical Engineering reside in the Department of Mechanical and Aerospace Engineering, a unit administered by the Faculty of Engineering and Design. 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 4, 5 and 6, 2021, was conducted by Dr. Philip Ferguson, from the University of Manitoba, and Dr. Fue-Sang Lien from the University of Waterloo. The site visit involved formal meetings with the Provost, the Vice-Provost and Associate Vice-President (Academic), the Dean of the Faculty of Engineering and Design, and the Chair of the Department of Mechanical and Aerospace Engineering. The review committee also met with faculty members, staff, and undergraduate students.

The External Reviewers' report, submitted on October 24, 2021, 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 Canadian Engineering Accreditation Board Self-study and Cyclical Program Review Volume I Supplement was developed by members of the Department of Mechanical and Aerospace Engineering. (Appendix A)
- The Report of the External Review Committee (Appendix B).
- The response and implementation plan from the Chair of the Department of Mechanical and Aerospace Engineering (Appendix C)
- The Response from the Dean of the Faculty of Engineering and Design (Appendix D).
- The internal discussant's recommendation report (Appendix E).

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

This Final Assessment Report contains the Implementation Plan (Appendix C) developed by the Department of Mechanical and Aerospace Engineering and agreed to by the Dean of the Faculty of Engineering and Design, 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

General

The External Reviewers' Report states that "the external reviewers noted a strong and impressive commitment to interdisciplinary studies across all programs, as evidenced by the recent establishment of the ECOR courses, and significant offerings from other departments. It was interesting that when asked to describe program innovations, the faculty did not highlight this commitment to interdisciplinary teaching because many have assumed it to be commonplace (although it is not). Professors in general provide significant accommodations for students in extenuating circumstances (however, almost all students noted that the faculty from mathematics seem to be the most accommodating)."

Faculty

Speaking with regard to faculty, the external reviewers' stated:

"The Department of Mechanical and Aerospace Engineering has a good mix of faculty members with different expertise and backgrounds to deliver courses (aligned with their research interests) effectively to all programs. Many of them are collaborating actively with local industry and government laboratories, such as Bombardier, Rolls-Royce Canada, National Research Council, Canadian Nuclear Laboratories, the Canadian Space Agency, Natural Resources Canada, Environment and Climate Change Canada, and the Department of National Defence. These collaborations greatly enhance the accomplishment of the Carleton specific Degree Level Expectations (DLE): experiential learning and the capstone project.'

Students

The external reviewers noted that "The students from the Department of Mechanical and Aerospace Engineering are emerging leaders in their field, armed with a strong theoretical and experiential training program. The students unanimously stated that they are proud to be Carleton students and are generally pleased with their program of study."

Curriculum

The external reviewers found the programs to be structured well, with good depth and breadth.

The External Reviewers' Report made 21 recommendations for improvement:

The Program

1. More Schedule Options:

The 4-year plan for students is inflexible and poses equity concerns for students experiencing difficulty both within their academic career and in their personal lives. Suggest providing a 5-year timetable in addition to the 4-year timetable for each program such that students could opt for a longer degree program with less coursework per term. This would also provide additional options for students that must retake courses.

2. Improved / More Visible Equity Programming:

While steps are clearly being taken by the Dean to provide better inclusion for female students, Indigenous students, and students of colour, there remains a distinct lack of equity programming designed to “level the playing field”. Through no fault of their own, some students may be coming from disadvantaged communities that are not capable of properly preparing them for their undergraduate education. Suggest investigating ways in which students from disadvantaged backgrounds could be “ramped up” during their first year (potentially during a “gap-filling year”) to improve student equity.

3. International Exchange Component of Coop

The University's Strategic Mission #2 is to “Serve Ottawa / Serve the world”. It is clear that the existing coop program, while only used by 30% of the students, serves the Ottawa area, there is little evidence that the Department of Mechanical and Aerospace Engineering is doing much to “serve the world” (a lofty goal, indeed). There are references to some international collaborations in the supplied documentation with the University of Toulouse, Nagoya University, and Tohoku University, but the nature of the collaboration seems unclear. Suggest exploring opportunities for Carleton to establish student exchange opportunities with one or two universities in foreign countries to augment the existing coop program in relation to experiential learning.

4. Prevalence of Asynchronous Teaching:

Through interviews, the external reviewers discovered that most courses offered in the Department of Mechanical and Aerospace Engineering, especially the early-year courses, are being offered asynchronously during online teaching. In some cases, students said that they did not even know what their professor looked like. In other cases, students noted that the posted lectures were not even from their instructor, but rather from professors at other Universities. In some other instances, a professor would post an asynchronous lecture and then make themselves available during the scheduled lecture time to answer questions, forcing students to have to spend twice the amount of time on the lecture if they wanted/needed to ask questions. Early year students need live facetime with their instructors to gain confidence and learn the appropriate material. Suggest a thorough review of acceptable online teaching formats, with an eye towards a goal of most first and second year courses (at a minimum)

being offered synchronously (live) with recording of the lecture posed online, even in online formats.

5. Consistency of E- Proctoring Exam Formats:

Students reported confusion and frustration with the lack of consistency in exam proctoring in the online format. Some courses required a specific time for online exams, while others provided a 24-hour window, enabling students in different time zones to choose a convenient time to take the exam. Suggest establishing department-wide guidelines for exam taking that is consistent across all courses.

Learning Outcome Assessment

6. Industrial Feedback on Learning Outcomes :

While the industrial advisory board is an excellent mechanism for seeking industrial feedback, recent graduates may provide additional insight into useful/transferrable skills for industry. Suggest establishing an annual survey of recent graduates currently working in industry, asking them for feedback on their level of preparedness owing to their Carleton training.

Resources

7. Teaching Assistant Management:

Teaching assistants appear to be struggling with their workload, particularly with online instruction (likely leading to the challenges with timely grading). Suggest increasing the TA assignments, potentially drawing upon unused funding for course improvement. Potentially create a 2-tier system for TAs (senior and junior TAs) to offload TA management responsibilities from the faculty.

8. Improved Teaching Assistant Assignments:

It appears to be the case that courses without a laboratory or project component do not have TA positions. This adds extensive workload to the teaching faculty. Suggest providing TA positions based on the class size. In addition, the process to assign TAs does not appear to be transparent. While most faculty stated that TA requests were granted, some were not aware that these requests were possible. Suggest creating a more well-defined process for assigning TAs.

9. Undergraduate Teaching Loading:

It is clear that the Dean is making great strides to improve the student to faculty ratio by freezing enrollment and dramatically increasing hiring. However, what is unclear is whether or not this will result in the desired effect of reducing the teaching load for faculty. Some of the people interviewed seemed to suggest that additional faculty will only result in smaller class sizes, but that most faculty will continue to teach four courses for each academic year. Three are one-term courses and the fourth is assignment as a Lead Engineer to one capstone design project. This will do little to remove the teaching burden. Further, some faculty noted that their course assignments frequently changed, forcing them to continually be learning new

courses to teach. This overload leads to an inability for faculty to work on research, and virtually no incentive to innovate in courses, because they are barely hanging on as it is. Suggest using additional faculty already budgeted for to reduce the average teaching load to three courses for each academic year as opposed to just shrinking the class sizes.

10. Improved Administration of Course Improvement Fund:

The Department of Mechanical and Aerospace Engineering receives \$300k per year, earmarked for undergraduate course / laboratory improvement. This fund does not support teaching assistants and the Capstone courses (those are covered from separate funds). The external reviewers discovered that this fund is almost never fully utilized, and some faculty do not know that it exists. Further, many faculty noted that even with unlimited money and space, they still cannot consider course enhancements because what they lack is time. Suggest using some of the \$300k allocation to hire a staff member who can assist faculty with course improvement. This could follow or even pair with the model set by the “Students as Academic Partners” program (where students provide help to improve courses). This new staff could also actively approach professors teaching “stale” courses, in need of invigoration, as opposed to relying on overloaded professors to take proactive action to innovate in their courses.

11. Potential Link Between Mental Health and Academic Dishonesty:

Reports from faculty and staff noted that while they feel well-prepared to handle mental health challenges from students, they are woefully not prepared or staffed to handle the dramatic increase in academic dishonesty cases. The external reviewers suspect that there is a strong link between mental health and the prevalence of academic dishonesty, although some of the faculty strongly and vocally dispute this link. The external reviewers suggest the Programs, Department, and Faculty explore proactive methods that promote mental health, without waiting for students to reach out when they feel overwhelmed. Perhaps some of the existing, underloaded mental health resources could be reaching out to students proactively to assess their situations and provide assistance before the students feel their only pathway to success is to cheat.

Students

12. Faster Grading:

Courses need to be structured such that students receive assessment results in a more timely manner. This is particularly true for the “ECOR” courses, where some modules are often only six weeks long.

13. Improved Attention to Misogynistic Student Behaviours:

In discussions with students, it emerged that while many students of colour feel welcome and included within the Carleton community, instances of obvious and blatant misogyny between students (not faculty) are still common. These instances include teaching assistants making romantic advances towards female students, and male group members degrading and minimizing fellow female students. Further, students who experience misogyny seem

confused about where / how to report it. Suggest improved / more widespread training and awareness of both the intolerance of misogyny within Carleton (perhaps in every course syllabus and discussed openly in at least the ECOR courses) and easier access to reporting mechanisms. In addition, TA training should not be optional, and should include sensitivity training.

14. Better Support for English as a Second Language (ESL) Students:

Students mentioned that those who struggle with English, at times feel disadvantaged, ignored, and excluded. Suggest highlighting existing ESL student support in courses (especially ECOR) and striving to promote greater inclusion in discussions through improved EDI training for faculty, staff, and students.

15. International Sabbatical Leave:

Encourage faculty to take their sabbatical leaves abroad to exchange their teaching / research experience with people from the hosting universities, government laboratories or companies to meet University's Strategic Mission #2: Serve Ottawa / Serve the world.

16. Sessional Teaching by Adjunct Professors with Industrial Experience:

Technical elective courses taught by adjunct professors from industry or government laboratories with relevant experience can improve experiential learning through case studies and applied research projects.

17. Interaction between Advisory Board and Faculty:

Interaction between Industrial Advisory Board and Departmental Faculty Board (FB) in the curriculum improvement process can be extended to all faculty on an annual schedule (e.g., in one of the department meetings including Q&A).

18. Better Student Feedback:

Provide clearer and more tangible mechanisms for students to provide feedback on their program, including, but not limited to, an opportunity for students to rate their teaching assistants.

19. Mandatory Course Evaluation:

It seems to be possible for professors to opt out of their course evaluation, leading to disenfranchised students and limiting the visibility into courses that need improvement. Suggest removing the opt-out option for course feedback (considering the class / sample size for faculty annual performance evaluation purposes).

20. CEAB Attributes as Only Trigger for Program Improvement:

The Department of Mechanical and Aerospace Engineering has a multi-layered continuous improvement plan that seeks input from many different sources, including industry, students, and faculty. However, upon interviewing the faculty, it emerged that the trigger for course

improvement seems to be limited to missed or inadequate CEAB attributes. Courses that meet the CEAB requirement of 70% compliance with the prescribed learning outcomes do not receive attention. The external reviewers feel that continuous program improvement should occur even on courses that are meeting the bar set by the CEAB. Suggest a periodic review of course material including assignments, projects, laboratories, and exams from all courses, even if they continue to meet the CEAB bar.

21. Additional Incentives for Course Innovation:

Existing teaching awards exist at the University and Faculty level, however, very few of the faculty see these awards as particularly incentivizing (unless they are pre-tenure, in which case a teaching award is useful to include in a teaching dossier). For most faculty, the \$5k salary bonus and \$10k grant to further innovate their course is not worth the lengthy application process for the award. Suggest shortening the application process to a simple nomination form, increasing the value, and potentially explore rewards that may incentivize faculty more, such as better parking, dinner vouchers for families, or weekend retreat packages for either the faculty's family or research group. These suggestions attempt to return "time" to the professor, potentially enabling them to reconnect with their families, and/or focus on their research programs.

The Outcome of the Review

As a consequence of the review, the **undergraduate programs in Mechanical Engineering, Aerospace Engineering and Biomedical and Mechanical 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 Department of Mechanical and Aerospace Engineering, and the Dean of the Faculty of Engineering and Design in response to the External Reviewers' report and Implementation Plan that was considered by SQAPC on June 23, 2022. The Department:

- agreed unconditionally to recommendations #11, 6, 12, 15, 16 and 21
- agreed to recommendations #3, 9, 10, 13 and 14 if resources permit.
- agreed to recommendations #2, 4, 5, 7, 18 and 19 in principle
- the unit did not agree with recommendations # 1, 8, 17 and 20

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(s) and Faculty Dean(s) and forwarded to SQAPC for its review by June 30, 2024.

The Next Cyclical Review

The cyclical program review (CPR) aligns with the Canadian Engineering Accreditation Board review of the undergraduate engineering programs. The Canadian Engineering Accreditation Board's review typically occurs within 1- 6 years; this time frame falls within the program's next CPR cycle. Based on this approach, the next CPR will be held by 2028/29.

Department of Mechanical and Aerospace Engineering
Unit Response to External Reviewers' Report & Implementation Plan

Programs Being Reviewed: Aerospace Engineering, Biomedical and Mechanical Engineering, Mechanical Engineering

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

Introduction & General Comments

Please include any general comments regarding the External Reviewers' Report.

The Department of Mechanical and Aerospace Engineering would like to thank the Reviewer's for the thorough assessment and thoughtful recommendations. The department was also pleased to know that the Reviewers had an "exceedingly positive" impression of the programs. This report was shared with our faculty and staff, and 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(s).

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.

UNIT RESPONSE AND IMPLEMENTATION PLAN

Programs Being Reviewed:

Prepared by (name/position/unit):

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. The four year plan for students is inflexible and poses equity concerns for students experiencing difficulty both with their academic career and in their personal lives. Suggest providing a five year timeline in addition to the four year timetable for each program such that students could opt for a longer degree program with less coursework per term. This would also provide additional options for students that must retake courses. (Opportunity)	4- Not agreed to	<i>Associate Chair (Undergraduate Student Affairs - Academic Advising) is already advising students with choices when a four-year timeline is no longer possible.</i>	N/A	N/A	N
2. While steps are clearly being taken by the Dean to provide better inclusion for female students, indigenous students, and students of colour, there remains a distinct lack of equity programming designed to level the playing field. Through no fault of their own some students may be coming from disadvantaged communities that are not capable of properly preparing them for their undergraduate education period suggest investigating ways in which students from disadvantaged backgrounds could be ramped up during their first year (potentially during a gap	3- Agreed to in principle	<i>Engage Associate Dean to implement EDI instruction during first-year ECOR course. Longer term, we will investigate creating an associate chair position for EDI. In exchange for teaching relief, this faculty member would create specific supports for minorities and underrepresented groups.</i>	Chair and Associate Chair	2022/2023	N

filling year) to improve student equity. (Opportunity)					
3. The University Strategic Mission #2 is to 'serve Ottawa/serve the world.' It is clear that the existing co-op program, while only used by 30% of students, serves the Ottawa area, there is little evidence that the department of mechanical and aerospace engineering is doing much to 'serve the world' (a lofty goal, indeed). There are references to some international collaborations in the supplied documentation with the University of Toulouse, Nagoya university, and Tohoku University, but the nature of the collaboration seems unclear. Suggest exploring opportunities for Carleton to establish student exchange opportunities with one or two universities in foreign countries to augment the existing co-op program in relation to experiential learning. (Opportunity)	2- <i>Agreed to if additional resources permit (describe resources)</i>	<p><i>Explore inside the department the possibility of creating steady interchange of students between sister departments in the world. For example, Prof. Xiao Huang has international research collaborations with the University of Toulouse that could be expanded towards undergraduate endeavors.</i></p> <p><i>Discuss with the University's administration (international office) regarding course equivalency, tuition fees, scholarships, and accommodations.</i></p>	Chair and Associate Chair	2022/2023	N
4. Through interviews, the external reviewers discovered that most courses offered in the Department of Mechanical and Aerospace engineering, especially the earlier courses, are being offered asynchronously during online teaching. In some cases students said that they did not even know what their professor looked like. In other cases students noted that the posted lectures were not even from their instructor, but rather from professors at other universities. In some instances of professor would pose to an asynchronous lecture and then made themselves available during the scheduled lecture time to answer questions, forcing	3- <i>Agreed to in principle</i>	<p><i>The department is striving to return to in-person course delivery during the winter/2022, but major decisions are made at the University level. Current guidelines indicate online teaching until February/2022.</i></p>	Chair	2022/2023	N

<p>students to have to spend twice the amount of time on the lecture if they wanted or needed to ask questions. Earlier students need live FaceTime with their instructors to gain confidence and learn the appropriate material. Suggesting a thorough review of acceptable online teaching formats, with an eye towards the goal of most first and second year courses (at a minimum) being offered synchronously (live) with recording of the lecture posted on line, even in online formats. (Weakness)</p>					
<p>5. Students reported confusion and frustration the lack of consistency in exam proctoring in the on line format. Some courses required specific time for online exams, while others provided a 24 hour window, enabling students in different time zones to choose a convenient time to take the exam. Suggest establishing department wide guidelines for exam taking that is consistent across all courses. (Weakness)</p>	<p><i>3- Agreed to in principle</i></p>	<p><i>Proctoring is decided at the University level. During the fall/2022, COMAS software was used smoothly with Big Blue Button for questions.</i></p>	<p><i>N/A</i></p>	<p><i>N/A</i></p>	<p><i>N</i></p>
<p>6. While the industrial Advisory Board is an excellent mechanism for seeking industrial feedback, recent graduates may provide additional insight into useful/transferable skills for industry. Suggest establishing an annual survey of recent graduates currently working in the industry, asking them for feedback on their level of preparedness owing to their Carleton training. (Opportunity)</p>	<p><i>1- Agreed to unconditionally</i></p>	<p><i>Engage Associate Dean to implement survey on a Faculty level.</i> <i>Study the possibility or performing the survey from the departmental level (obtain mailing list from Alumni president). Office staff to conduct the survey.</i></p>	<p><i>Chair</i></p>	<p><i>N/A</i></p>	<p><i>N</i></p>
<p>7. Teaching Assistants appear to be struggling with their workload, particularly with online instruction (likely leading to the challenges with timely grading). Suggest increasing that TA assignments, potentially drawing upon unused funding for course improvement. Potentially create a two- tier system for TAS bracket senior and junior TAS bracket to offload team management responsibilities from the faculty. (Opportunity)</p>	<p><i>3- Agreed to in principle</i></p>	<p><i>Senior TAs are already being used to offload management responsibilities from the faculty. When resources permit, TAs also help in course improvements.</i></p>	<p><i>N/A</i></p>	<p><i>2022/2023</i></p>	<p><i>N</i></p>

<p>8. It appears to be the case that courses without a laboratory or project component do not have TA positions. This adds extensive workload to the teaching faculty. Suggest providing TA positions based on the class size. In addition, the process to assign TAs does not appear to be transparent. While most faculty stated that TA requests were granted some were not aware that these requests were possible. Suggest creating a more well defined process for assigning TAs. (Concern)</p>	<p><i>4- Not agreed to</i></p>	<p><i>Make faculty aware that TA or $\frac{1}{2}$ TA positions can be assigned to a course upon request depending on necessity.</i></p> <p><i>Chair to add a section to the e-mail directed to faculty members when consulting about teaching assignments (yearly) that will also ask about TA requirements.</i></p> <p><i>TA assignment will be discussed during departmental meeting.</i></p>	<p><i>Chair</i></p>	<p><i>2022/2023</i></p>	<p><i>N</i></p>
<p>9. It is clear that the Dean is making great strides to improve the student to faculty ratio by freezing enrollment and dramatically increasing hiring. However what is unclear is whether or not this will result in the desired effect of reducing the teaching load for faculty. Some of the people interviewed seemed to suggest that additional faculty will only result in smaller classes, but that most faculty will continue to teach four courses for each academic year. Three are one term courses and the 4th is an assignment as lead engineer to one capstone design project. This will do little to remove the teaching burden. Further some faculty noted that their course Simons frequently changed, forcing them to continually be learning new courses to teach. This overload leads to an inability for faculty to work on research, and virtually no incentive to innovate in courses, because they are barely hanging on as it is. Suggest using additional faculty already budgeted for to reduce the average teaching load to three courses for each academic year as opposed to just shrinking the class sizes. (Concern)</p>	<p><i>- Agreed to if additional resources permit (describe resources)</i></p>	<p><i>Chair is already reducing the teaching load by providing teaching relief to:</i></p> <p><i>1) Capstone project managers (12 projects in the department)</i></p> <p><i>2) Large research grant holders (for the duration of the project)</i></p> <p><i>We are studying the possibility of providing teaching relief to:</i></p> <p><i>3) Faculty members willing to develop new undergraduate laboratories (with added TA support)</i></p> <p><i>4) New faculty members (extension from 1 to 3 years)</i></p> <p><i>5) Faculty members trying to regain discovery grants</i></p> <p><i>6) A faculty member to provide mentorship to minorities</i></p>	<p><i>Chair</i></p>	<p><i>2023-24</i></p>	<p><i>N</i></p>

<p>10. The Department of Mechanical and Aerospace engineering receives funds per year, earmarked for undergraduate course/laboratory improvement. This fund does not support teaching assessments at the capstone courses bracket those recovered from separate funds bracket. The external reviewers discovered that this fund is almost never fully utilized, and some faculty do not know that it exists. Further many faculty noted that even with the unlimited money and space, they still cannot consider course enhancements because what they lack is time period suggest using some of the fund allocation to hire a staff member who can assist faculty with course improvement.</p> <p>This could follow or even pair with the model set by the students academic partners program (where students provide help to improve courses). This new staff could also actively approach professors teaching stale courses, in need of invigoration, as opposed to relying on the overloaded professors to take proactive action to innovate in their courses.</p>	<p><i>2- Agreed to if additional resources permit (describe resources)</i></p>	<p><i>Chair to provide teaching relief, TA, and equipment funding to faculty members willing to develop or considerably revamp a new undergraduate laboratory.</i></p>	<p><i>Chair</i></p>	<p><i>2023/2024</i></p>	<p><i>N</i></p>
<p>11. Reports from faculty and staff noted that while they feel well prepared to handle mental health challenges from students, they are woefully not prepared or her staff to handle the dramatic increase in academic dishonesty cases. The external reviewers suspect there's a strong link between mental health and the prevalence of academic dishonesty, although some of the faculty strongly and vocally dispute this link. The external reviewers suggest that the programs, department, and faculty explore proactive methods that promote mental health, without waiting for students to reach out when they feel overwhelmed. Perhaps some of the existing, underloaded mental health resources could be reaching out to students proactively to assess their situations and provide assistance before</p>	<p><i>1- Agreed to unconditionally</i></p>	<p><i>Invite Health and Counselling Services to provide a small presentation for guidance during a departmental meeting in 2022.</i></p>	<p><i>Chair</i></p>	<p><i>2022</i></p>	<p><i>N</i></p>

the students feel their only pathway to success is to cheat. (Opportunity)					
12. Courses need to be structured such that students receive assessment results in a more timely manner. This is particularly true for the ECOR courses where some of the modules are often only six weeks long. (Concern)	<i>1- Agreed to unconditionally</i>	<i>All faculty members need to submit final marks in 10 days following the final exam. This is handled at the Faculty Level.</i> <i>Engage Associate Dean regarding ECOR assessment results.</i> <i>Remind faculty during departmental meetings about returning assessment results in a timely manner. Consider creating a coaching system for faculty members.</i>	<i>Chair and Associate Chair</i>	<i>2022</i>	<i>N</i>
13. In discussions with students, it emerged that many students of colour feel welcomed and included within the Carlton community, instances of obvious and blatant misogyny between students (not faculty) are still common. These instances include teaching assistants making romantic advances towards female students, and male group members degrading and minimizing fellow female students. Further students who experience misogyny seemed confused about where/how to report it. Suggest improved/more widespread training and awareness of both the intolerance of misogyny within Carleton (perhaps in every course syllabus and discussed openly and at least the ECOR courses) and easier access to reporting mechanisms. In addition TA training should not be optional and should include sensitivity training. (Concern)	<i>2- Agreed to if additional resources permit (describe resources)</i>	<i>Overlap with Item 2 in this list.</i> <i>Engage Associate Dean Jerome Talim to implement EDI instruction during first-year ECOR course.</i> <i>Investigate the possibility of providing teaching relief for a faculty, and hire TA facilitators (one for each program) to support minorities proactively.</i> <i>Include a sentence in the course outline for every course, regarding EDI and misogyny.</i> <i>Discuss with Jerome Talim regarding implementation on a Faculty level.</i>	<i>Chair and Associate Chair</i>	<i>2022</i>	<i>N</i>

<p>14. Students mentioned that those who struggle with English, at times feel disadvantaged, ignored and excluded. Suggest highlighting existing ESL student support in courses (especially ECOR) and striving to promote greater inclusion in discussions for improved EDI training for faculty, staff, and students. (Concern)</p>	<p><i>2- Agreed to if additional resources permit (describe resources)</i></p>	<p><i>Overlap with Items 2 and 13 in this list.</i></p> <p><i>Engage Associate Dean Jerome Talim to implement EDI instruction during first-year ECOR course.</i></p> <p><i>Investigate the possibility of providing teaching relief for a faculty, and hire TA facilitators (one for each program) to support minorities proactively.</i></p> <p><i>Include a sentence in the course outline for every course, regarding EDI and misogyny.</i></p> <p><i>Discuss with Jerome Talim regarding implementation on a Faculty level.</i></p>			
<p>15. Encourage faculty to take their sabbatical leaves abroad to exchange their teaching/research experience with people from the hosting universities, government laboratories or companies to meet the University Strategic Mission #2 'serve Ottawa/serve the world.' (Opportunity)</p>	<p><i>1- Agreed to unconditionally</i></p>	<p><i>Chair Ron Miller to encourage faculty to explore sabbaticals to meet the University Strategic Mission #2 'serve Ottawa/serve the world.'</i></p> <p><i>Note that the Dean's office has already created an incentive for this, in the form of a grant.</i></p>	<p><i>Chair</i></p>	<p><i>2022</i></p>	<p><i>N</i></p>
<p>16. Technical elective courses taught by adjunct professors from industry or government laboratories with relevant experience can improve experiential learning through case studies and applied research projects. (Opportunity)</p>	<p><i>1- Agreed to unconditionally</i></p>	<p><i>Chair Ron Miller is already assigning teaching loads to instructors from industry and government laboratories as the opportunities arise (for example, from the National Research Council).</i></p>	<p><i>Chair</i></p>	<p><i>2022</i></p>	<p><i>N</i></p>
<p>17. Interaction between industrial Advisory Board and departmental faculty board in the curriculum improvement process can be extended to all faculty on an annual schedule (eg: in one of the department meetings including Q&A.) (Opportunity)</p>	<p><i>4- Not agreed to</i></p>	<p><i>To make the annual meeting more productive, a smaller committee is engaging with the advisory board. The department is reaching the number of 50 faculty members, and so it would not be an effective meeting to engage the IAB with the entire faculty.</i></p>	<p><i>N/A</i></p>	<p><i>N/A</i></p>	<p><i>N</i></p>

<p>18. Provide clearer and more tangible mechanisms for students to provide feedback on their program, including, but not limited to, an opportunity for students to rate their teaching assistants. (Weakness)</p>	<p><i>3- Agreed to in principle</i></p>	<p><i>This item needs to be discussed at the University level. Surveys in general are strictly controlled.</i> <i>Study the possibility to conduct anonymous TA survey by office staff (Ms. Irene Helder).</i></p>	<p><i>Chair</i></p>	<p><i>2022/2023</i></p>	<p><i>N</i></p>
<p>19. It seems to be possible for professors to opt out of their course evaluation, leading to disenfranchised students and limiting the visibility into courses that need improvement. Suggest removing the opt out option for course feedback, (considering the class/sample size for faculty annual performance evaluation purposes.) (Weakness)</p>	<p><i>3- Agreed to in principle</i></p>	<p><i>The opt out option was still valid until the Fall/2021, but the decision to remove the option is handled at the University level.</i></p>	<p><i>N/A</i></p>	<p><i>N/A</i></p>	<p><i>N</i></p>
<p>20. The Department of Mechanical and Aerospace engineering has a multilayered continuous improvement plan that seeks input from many different sources including industry students and faculty. However upon interviewing the faculty, it emerged that the trigger for course improvement seems to be limited to missed or inadequate CEAB attributes. Courses that meet the CEAB requirement of 70% compliance with the prescribed learning outcomes do not receive attention. The external reviewers feel that continuous program improvement should occur even on courses that are meeting the bar set by the CEAB. Suggest a periodic review of course material including assignments, projects, laboratories, and exams from all courses, even if they continue to meet the ceeb bar. (Weakness)</p>	<p><i>4- Not agreed to</i></p>	<p><i>In addition to the CEAB attributes, curriculum and strand committees meet regularly to assess and propose course adjustment and delivery. There is also an annual retreat, thus giving another opportunity to discuss about course delivery.</i> <i>If resources permit, we will consider providing one teaching relief for every two years for chairing a curriculum committee.</i></p>	<p><i>Chair</i></p>	<p><i>2022/2023</i></p>	<p><i>N</i></p>

<p>21. Existing teaching awards exist at the university and faculty level, however very few of the faculty see these awards as particularly incentivizing (unless they are pre tenure in which case the teaching award is useful to include in teaching dossier) For most faculty salary bonus and grant to further innovate their course is not worth the lengthy application process for the award. Suggest shortening the application process to a simple nomination form, increasing the value, and potentially explore rewards that may incentivize faculty more such as better parking, dinner vouchers for families, or weekend retreat packages for either the faculty's family or research group. These suggestions attempt to return 'time' to the professor, potentially enabling them to reconnect with their families, and to focus on their research programs. (Weakness)</p>	<p><i>1- Agreed to unconditionally</i></p>	<p><i>Engage Provost and VP Academic and the Dean regarding changing the application process to a simple nomination. However, this is not within the department's purview to change.</i></p>	<p><i>Chair</i></p>	<p><i>2022</i></p>	<p><i>N</i></p>
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