

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

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

**EXECUTIVE SUMMARY**

The joint graduate programs in Environmental Engineering reside in the Ottawa -Carleton Institute of Environmental Engineering, a unit administered by the Department of Civil and Environmental Engineering in the Faculty of Engineering and Design at Carleton University, the Department of Civil Engineering and the Department of Chemical Engineering in the Faculty of Engineering at the University of Ottawa.

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 Ottawa -Carleton Institute of Environmental Engineering, the Dean of the School of Engineering and Design at Carleton University, and the Dean of the Faculty of Engineering at the University of Ottawa in responses to the External Reviewers' report and Implementation Plan that was submitted to SQAPC at Carleton University on January 26, 2023.

**Environmental Engineering**  
**Unit Response to External Reviewers' Report & Implementation Plan**  
**Programs Being Reviewed: Joint Graduate Programs (OCIENE)**

**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 Ottawa-Carleton Institute for Environmental Engineering was pleased to receive the External Reviewers' positive report. Page 1 of the report provides a strong endorsement of the "collaborative" nature of the Institute and the "high-quality training" provided by the Institute. The Reviewers acknowledged that "the institute is at the forefront of research in environmental engineering and attracts graduate students with different backgrounds" and viewed the recent renaming of the 5<sup>th</sup> breadth area and the additional courses as "an exciting addition to the program". The Reviewers identified one weakness, two concerns and an opportunity for the Institute. How these recommendations will be addressed is outlined in the Unit Response and Implementation Plan table that follows. The response to the External Reviewers' Report and the Implementation Plan represent the consensus view of the three departments participating in the Institute and have been shared with the Deans.

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:

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. Define a roadmap for each program, make the information readily available to students and optimize the progress tracking. (Weakness)	<i>Agreed to unconditionally</i>	<p><i>While the Institute defines the program requirements, the sister universities provide students with a roadmap via an annual orientation session and each university has its own student tracking system.</i></p> <p><i>The University of Ottawa provides a tailored roadmap to every OCIENE graduate student (MEng, MAsC and PhD students) in the form of a list of milestones related to the student's degree. These milestones are accessible to the students via the online Student Center website. The status of the milestones is updated on the website in real-time so that the students can evaluate their progress in their degree.</i></p> <p><i>In addition, the Graduate Studies Office of the Faculty of Engineering sends regular emails to graduate students in the program reminding them of milestones and upcoming deadlines for upcoming milestones. For example, email reminders</i></p>	<i>Institute Director and Associate Director at the respective universities</i>	<i>Handbook - Fall 2023 OCIENE-specific Orientation sessions Fall 2022</i>	<i>N</i>

		<p><i>with specific directions on how to register for and complete milestones are sent to all OCIENE graduate students for the completion of their Thesis Proposal and Comprehensive Exam (EVG 9998).</i></p> <p><i>In light of this identified weakness, the University of Ottawa will enhance communication to the OCIENE graduate students to enhance the use of the online Student Center website. In particular, a tailored orientation for OCIENE graduate students of the University of Ottawa will be created and provided to the graduate students every year starting Fall 2022. This presentation will occur following the general orientation presentation provided by the Graduate Studies Office of the Faculty of Engineering. This new presentation will emphasize the precise use of the Student Center website for students for OCIENE MEng, MAsc and PhD students, so that they immediately become engaged with the system. The proposed solution is founded on the successes observed by two other graduate programs in the Faculty of Engineering who recently created tailored orientation presentations for their graduate students.</i></p> <p><i>Carleton provides various in-person and on-line resources that provide guidance to students in terms of program requirements, milestones (graduate student audits), etc. However, this material is located in different locations. To improve the current</i></p>			
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		<p><i>situation and address the reviewers' recommendation, Carleton will introduce an OCIENE student handbook to bring all the relevant information together, to better define a roadmap for each program and to provide clear guidelines for tracking student progress. In addition, an OCIENE-specific orientation session will be introduced this Fall 2022.</i></p>			
<p>2. Articulate the MEng program as a separate professional program to minimize the impact of the MEng growth on access to courses to MASc and PhD candidates and on the content/format of the courses to accommodate heterogeneity of the group of students. (Concern)</p>	<p><i>Agreed to unconditionally</i></p>	<p><i>Both universities are in the progress of addressing this concern.</i></p> <p><i>The University of Ottawa has recently introduced general engineering courses (GNG coded courses) tailored for MEng graduate students in all Faculty of Engineering programs. MEng OCIENE graduate students are required to take a minimum of 20% of their course load (2 out of 10 course equivalents) and a maximum of 60% of their course load (6 out of 10 course equivalents) from GNG courses. These GNG courses include an MEng mandatory 3 credit course (one course equivalent) on professional skills and responsibilities. Optional MEng GNG courses include a 6 credit course (2 course equivalent) that is an industrial Internship project, which is organized by the faculty.</i></p> <p><i>The GNG courses have reduced the number of MEng graduate students attending OCIENE specific courses. In particular, the addition of the GNG courses has reduced the MEng student attendance of specified and advanced OCIENE courses that MASc and PhD students require for their research.</i></p>	<p><i>Action already initiated by the Vice-Dean, Graduate Studies at uOttawa and the Dean of FED at Carleton.</i></p>	<p><i>Calendar changes already implemented at uOttawa.</i></p> <p><i>New MEng program under review at Carleton.</i></p>	<p><i>N</i></p> <p><i>Not for OCIENE</i></p>

		<p><i>Hence, enabling the content of these specified courses to remain tailored to graduate students performing thesis-based degrees (MAsc and PhD).</i></p> <p><i>Introducing GNG courses in the OCIENE program at the University of Ottawa has alleviated the burden of MEng graduate students restricting access and impacting the content/format of graduate courses in the program. It is noted that the graduate program benefits from maintaining MEng students in the program. For example, numerous OCIENE MEng students are excellent students and a portion of this cohort have transitioned to thesis-based degrees in the program. As such, keeping the MEng degree in the OCIENE program at the University of Ottawa has provided an important pathway of recruitment of quality students into the MAsc and PhD degrees. Thus, MEng degree will be kept in the OCIENE program at the University of Ottawa.</i></p> <p><i>Carleton has proposed a MEng Engineering Practice program that will introduce a separate MEng program outside of the Institute. This will lead to fewer MEng students within the Institute and reduce the demand of MEng students on the graduate course offerings in the department. The Department of Civil and Environmental Engineering at Carleton will teach a number of Civil and Environmental Engineering courses in the proposed MEng Engineering Practice program, which would</i></p>			
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		<i>allow maintaining ties to potentially recruit research students from the program. Those students will then be transferred to the Environmental Engineering program within the institute.</i>			
3. Evaluate and manage the impact on space of the growth in the number of MEng, PhD and Faculty, especially in the context of return on campus after a significant growth during the pandemic. (Concern)	<i>Agreed to unconditionally</i>	<p><i>The Space Committees of each department and the Faculty of Engineering at the University of Ottawa oversee space allocation for research and graduate students. This committee ensures that all new OCIENE professors receive the space required for their research and also that all incoming OCIENE thesis-based graduate students receive office space. The allocated office space is often coordinated so that it is in close proximity to the student's research space.</i></p> <p><i>This is observed in the recent OCIENE professor hires. The University of Ottawa has hired four new OCIENE professors in the years just prior to the pandemic. These professors have been allocated laboratory space and office space for graduate students. Further, existing laboratory space has been renovated for the new hires to set up their research.</i></p> <p><i>In addition, a state-of-the-art water resources laboratory was built in 2019 in the new Science, Technology, Engineering and Mathematics (STEM) building at the University of Ottawa. This facility is currently available to accommodate current and future OCIENE professors and</i></p>	<i>Vice-Dean, Graduate Studies, and Dept Chair at uOttawa and the Dean of FED and Dept Chair at Carleton.</i>		<i>N</i>



		<p><i>graduate students. Further, a new microbiological environmental engineering laboratory was built in 2021 in the existing Colonel By Hall (CBY) engineering building at the University of Ottawa. This new laboratory is also available to accommodate current and future OCIENE professors and graduate students. Furthermore, a new Materials Laboratory has been created. This laboratory is available to recently hired OCIENE faculty (Drs. Foruzanmehr and Kavgic) and future OCIENE faculty conducting materials research.</i></p> <p><i>At Carleton, we recognize that research space is a considerable constraint, although it has been relatively less of a constraint in the Environmental Engineering program relative to others within the Faculty of Engineering and Design or the Department of Civil and Environmental Engineering. To address these concerns, a new building will open this year with additional faculty offices and plans are progressing for a new building with new offices and additional laboratory research space within the next 5 years. Note MEng students are not assigned an office but have access to study space across the campus and in the new proposed buildings.</i></p>			
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<p>4. Seize the opportunity to redefine and organize the areas in order to offer a unique training program including sustainability and climate change. (Opportunity)</p>	<p><i>Agreed to unconditionally</i></p>	<p><i>Both universities will continue to increase course offerings under the newly named 5<sup>th</sup> breadth area – EIA, Sustainability and Climate Change and increase the opportunity for training in sustainability and climate change. For example a new course from the University of Ottawa is being created for the Winter 2023 semester, where this course will be considered for addition to this breadth area. The new course is titled Renewable Energy and Resource Conservation.</i></p> <p><i>Carleton recently introduced a Collaborative Specialization in Climate Change (CSCC), which Master’s students in Environmental Engineering can complete as part of their program requirements.</i></p>	<p><i>Institute Director, Associate Director and Dept Chairs at the respective universities</i></p>	<p><i>ongoing</i></p>	<p><i>Y as new courses are added</i></p>
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