Ongoing Improvement Progress Report

Chemical and Biochemical Engineering, BESc / Faculty of Engineering

Program	Chemical and Biochemical Engineering, BESc	**Faculty / Affiliated University College**	Faculty of Engineering
Approval Dates of the Review	SUPR-U: March 24, 2021 SCAPA: April 7, 2021 Senate: April 16, 2021	**Year of the Next Review**	2028-2029
Link to the Programs Final Assessment Report (FAR)	https://www.uwo.ca/pvp/vpacademic/iqap/academic_programs/iqap_reports/faculty_of_engineering_undergrad/2020%20Chemical%20abd%20Biochemical%20Engineering%20Program%20Review.pdf **The dates for the next cyclical review stated on this Senate approved FAR is 2027-2028; this is incorrect, the next review for this program will take place in 2028-2029 as indicated in Western's program review schedule.*		
If applicable, submission of follow-up report(s)			

	Name	**Signature**	**Date**
Program Chair/Director	Amarjeet Bassi	ABassi	July 28 2024
Dean (or designate)	J. T. Wood		Sept 7, 2024

Progress Update on the Implementation Plan

Recommendation #1	**Proposed Action and Follow-up**	**Responsibility**	**Timeline**
Make key innovations and strengths of the program more Visible.	Engage a professional recruiter/communications/marketing team to shift the messaging from chemical engineering to process engineering, sustainable (bio)processes, and life cycle analysis.	Department	In progress
Recommendation Implemented ☐**X** Yes ☐ No ☐ Partially If no, or partially, is implementation on schedule with the timeline? ☐**X** Yes ☐ No			

Progress

What specific actions have been taken?

The department consulted Laurie Lockington-Wong and Dan Haves in the development of the revised departmental brochure. The updated recruitment brochure includes explicit statements on safety, sustainability, waste reduction, and environmental stewardship (p. 4). The overview of General Chemical Engineering highlights that the program "focuses on designing efficient, sustainable chemical processes and commercial applications that balance economic viability with environmental responsibility." The brochure further highlights a range of research initiatives demonstrating strong engagement with environmental sustainability, including the development of biodegradable plastics from cannabis waste, a carbon solutions program focused on reducing carbon emissions, and research on capturing atmospheric carbon to support biomass growth.

Recommendation #2	**Proposed Action and Follow-up**	**Responsibility**	**Timeline**
Increase exposure of the aspects of chemical engineering to first-year students.	Effectively highlight the Process Engineering, Life Cycle Analysis, and/or Sustainability aspects of the chemical engineering program in the first-year program as a module(s) where students can see and experience process engineering and systems thinking before selecting their discipline.	Department - first year planning group	Fall of 2025

Recommendation Implemented

☐**X** Yes ☐ No ☐ Partially

If no, or partially, is implementation on schedule with the timeline? ☐ **X**Yes ☐ No

Progress

What specific actions have been taken?

Sustainability is now being covered in first year design course ES 1050. This is essentially addressed through the following course components in the Fall semester:

Week 13 lecture (2 hours) – Researching to Identify the Problem: Introduction to the Sustainable Development Goals, along with identifying objectives and constraints related to the winter project in support of achieving these goals.

Week 17 lecture (2 hours)– Risks: Identification of environmental and sustainability hazards, including an in-class activity to identify potential sources of sustainability-related risks for each winter project.

Week 19 lab (2 hours)– Evaluating Ideas: Review of the importance of reflecting group values and identifying sustainability and ethical objectives and constraints, which are then used to evaluate alternative solutions using go/no-go screening and a Pugh matrix.

In the winter semester, first-year students complete a process engineering project in which students groups work on projects during the winter term (and the final two weeks of the fall term) with community clients, including Western University. This year projects related to process engineering in chemical and environmental engineering include: (i) treating wastewater for irrigation of sports fields, (ii) using wastewater as a source for an aquaponics system, including integration of solar panels, and (iii) recycling plastic into pelletized feedstock for 3D printing.

The course also reports on CEAB graduate attribute on Impact of Engineering on Society and the Environment, which demonstrates consideration of sustainable design in design criteria.

Next Steps (if applicable)

What actions remain? Is there further follow-up?

Currently, ES 1050 does not include Life Cycle Analysis (LCA) in its course content. However, Dr. Naomi Klinghoffer (CBE), in collaboration with Dr. Angela Mawdsley, is developing an LCA module on LCA to be incorporated into ES 1050. This will be implemented in the Fall of 2026. In addition, third-year Chemical Engineering students take a course on life cycle analysis (CBE 3316). The course addresses carbon and water footprint, material flows, decarbonization, life cycle assessment framework, circular economy, and social life cycle assessment.

Additional Comments

If applicable

Recommendation #3	Proposed Action and Follow-up	Responsibility	Timeline
Enhance the current basic TA training program.	Consider workshops focused on: 1) how to grade consistently and efficiently, 2) how to do effective lab demonstrations that include safety as a culture of how we speak and act, 3) basic time-management, and 4) early interventions and identifying students at risk.	Associate Dean, Graduate Studies for the Faculty & CBE Grad Chair, with follow-up from the Dean	Fall 2021

Recommendation Implemented

☐ Yes **X** ☐ No ☐ Partially

If no, or partially, is implementation on schedule with the timeline? ☐ Yes ☐ No

Progress

The Faculty of Engineering, in partnership with the Centre for Teaching and Learning (CTL) at Western University, has developed three training modules for graduate teaching assistants (GTAs). One of these modules, *Teaching in an Intercultural Classroom*, is mandatory for all engineering TAs. Within CBE, a structured process is followed for appointing TAs to departmental courses. Instructors post specific requirements for each course, and graduate students apply based on the relevant academic background and skill sets. Instructors then interview applicants and select the candidate best suited for the course. At the start of each term, instructors hold an orientation session with their TAs to outline expectations and clarify roles and responsibilities. Similarly, teaching assistants assigned to undergraduate laboratory courses participate in an orientation session conducted by the laboratory supervisors.

In addition, they must complete mandatory safety training modules and receive hands-on instruction from the laboratory supervisor on the relevant equipment and experimental procedures.

Next Steps (if applicable)

What actions remain? Is there further follow-up?

There is currently no formal mechanism to enforce participation in the CTL courses. To address this the CBE Graduate Assistant, Marina Omelchenko will include information about CTL and Teaching Assistant Training Program (TATP) training opportunities in the mandatory orientation session for incoming graduate students. Upon completion of these training programs, the certificates can be included in their records in Pathfinder, a platform designed to support graduate students enrolled in multi-year, research-based programs.

Additional Comments

If applicable

Recommendation #4	**Proposed Action and Follow-up**	**Responsibility**	**Timeline**
Establish a Faculty-wide metrics framework for the graduate attribute assessment (GA) and continuous improvement process (CI).	Ensure this framework is consistent across all Faculty programs.	Department and Faculty with an external stakeholder group, a CBE Quality Assurance Committee, and student representatives	Implemented

Recommendation Implemented

☐ Yes **X** ☐ No ☐ Partially

If no, or partially, is implementation on schedule with the timeline? ☐ Yes ☐ No

Progress

The Chemical and Biochemical Engineering (CBE) program successfully completed its Canadian Engineering Accreditation Board (CEAB) accreditation review in November 2025. In preparation for this review, the Faculty of Engineering, Western implemented a standardized framework across all engineering programs for the collection and evaluation of the twelve CEAB graduate attributes: Knowledge Base, Problem Analysis, Investigation, Design, Use of Engineering Tools, Individual and Team Work, Communication Skills, Professionalism, Impact of Engineering on Society and the Environment, Ethics and Equity, Economics and Project Management, and Life-Long Learning.

The Faculty has also established a common set of indicators for each CEAB graduate attribute. Each indicator includes a detailed description and standardized performance criteria defined across four achievement levels: 4 (above expectations), 3 (meets expectations), 2 (below expectations), and 1 (unacceptable). This standardized approach ensures consistency in assessment across courses and programs. The Faculty additionally manages graduate attribute data collection for common first-year courses and coordinates related to internship experiences.

As part of its continuous improvement efforts, CBE established a Quality Assurance Committee (QAC) to oversee the collection and analysis of graduate attribute data. A comprehensive curriculum map was developed to ensure that each graduate attribute is assessed multiple times throughout the program, with evaluation points distributed across academic years. Since the formation of the current QAC in 2020, CBE has strengthened faculty engagement in continuous improvement processes and enhanced alignment between course learning outcomes and graduate attributes in both existing and future curriculum mapping initiatives.

The curriculum map illustrates the connections among learning activities, graduate attributes, and the semesters in which these activities occur. The QAC has reviewed and updated this map annually since the previous accreditation visit in 2022. Instructors teaching second-, third-, and fourth-year CBE courses use the curriculum map to guide the development of course outlines, assessment rubrics, and quantitative evaluation tools, including examinations, tests, quizzes, assignments, and laboratory reports. Graduate attribute data are systematically collected and analyzed by instructors to ensure reliable assessment outcomes that align with course learning objectives and the corresponding attribute indicators.

Next Steps (if applicable) *What actions remain? Is there further follow-up?* This is under continuous evaluation and improvement.

Note: The total number of expandable text boxes will be dependent on the number of prioritized recommendations appearing in the program's most recent Final Assessment Report (FAR).

Continuous Program Enhancement
What additional initiatives or changes has the program been working on in relation to continuous program improvement? CBE remains committed to continual progress through excellence in teaching, research, and community engagement. We consistently update our curriculum to reflect emerging technologies, industry needs, and evolving accreditation standards, ensuring that our graduates are well prepared for professional practice and advanced studies. Our faculty advance innovative research in areas such as sustainable processes, energy systems, advanced materials, water treatment, and biotechnology, contributing meaningful solutions to global challenges.