



Cyclical Program Review Final Assessment Report and Implementation Plan for the Academic Programs Offered by the Department of Chemical Engineering

Programs Reviewed: **BScE; MASc; MEng; PhD Chemical Engineering**
 BScE; MASc; PhD Engineering Chemistry
 MASc; PhD Biomedical Engineering

In accordance with Queen's University Quality Assurance Processes (QUQAP), this final assessment report provides a synthesis of the external evaluation, internal responses and assessment of the above programs. This report identifies the significant strengths of the programs, and opportunities for program improvement. It sets out and prioritizes the recommendations that have been selected for implementation.

An implementation plan is attached that identifies:

- who will be responsible for acting on and monitoring progress on the recommendations,
- any resource or governance implications resulting from the recommendations, and
- timelines for implementation of the recommendations.

Summary of Review

- 1) The department's self-study was reviewed by the Dean, Faculty of Engineering and Applied Science, Vice-Provost and Dean, School of Graduate Studies and Vice-Provost (Teaching and Learning). It was approved on 28 February 2018.
- 2) The review team visit took place on 12th – 13th April 2018. The review team members were:
 - i. Dr. William Cluett, Department of Chemical Engineering and Applied Chemistry, University of Toronto
 - ii. Dr. Carlos Filipe, Department of Chemical Engineering, McMaster University
 - iii. Dr. Alan Abelson, Department of Mathematical and Statistics, Queen's University
- 3) The visit included a tour of facilities and meetings with
 - i. Students (undergraduate and graduate)
 - ii. Faculty
 - iii. Librarian
 - iv. Staff
 - v. Department Head and Associate Head
 - vi. Dean and Associate Deans, Faculty of Engineering and Applied Science
 - vii. Vice-Provost and Dean and Associate Dean, School of Graduate Studies

viii. Deputy Provost

- 4) The review team reported on 6 May 2018. Responses to the review team report were provided by the Department Head, Dean, Faculty of Engineering and Applied Science and Vice-Provost and Dean, School of Graduate Studies.
- 5) The Senate Cyclical Program Review Committee considered all the documentation at its meeting on 27 September 2018, and reported to the Provost on the programs' strengths, opportunities for enhancement and recommendations for improvement.

The following strengths were noted:

- Excellent reputation across Canada
- Very high quality undergraduate programs spanning two disciplines with cross-disciplinary training
- Student bodies (undergraduate and graduate) diverse and very well integrated
- Undergraduate labs that are very well designed and well staffed to provide superb opportunities for problem solving and provide a positive learning environment
- High quality graduate students with excellent times to completions
- Outstanding faculty members who are at the forefront of the discipline; recent hires have improved the male/female ratio
- Exceptional departmental staff including the departmental administrator who is highly respected and liked by staff and students.

The following opportunities for enhancement were noted:

- Move towards more collaborative and multidisciplinary research groups as opposed to the current individual-based research approach
- Increase the number of doctoral students
- Regulate meetings with graduate students
- Develop professional masters' program(s)
- Play a role in the changing economic landscape by redefining the disciplines of Chemical Engineering and Engineering Chemistry

The academic programs in the Department of Chemical Engineering, Faculty of Engineering and Applied Science have been approved to continue.

Date of next review:

2025-2026

Prepared by Vice-Provost (Teaching and Learning)

15 October 2018



Implementation Plan

Recommendations	Proposed Follow-up	Responsibility for Leading Follow-up	Resource or Governance Implications	Timeline for Addressing Recommendation
1. Reviewers' drew attention to the department's self-study report, and the frequent mention of the need for a "culture shift" with respect to competing for research funding.	i. provide seed money from departmental discretionary funds to encourage and support large collaborative applications ii. increase administrative support for grant application preparation and the administration of successful grants iii. provide teaching relief for principle applicants preparing	Department head	Human resources and seed money to be provided by the department	i. Ongoing ii. Ongoing iii. Ongoing iv. Ongoing v. Complete initial discussion at November retreat

Recommendations	Proposed Follow-up	Responsibility for Leading Follow-up	Resource or Governance Implications	Timeline for Addressing Recommendation
	<p>large collaborative grant applications</p> <p>iv. internal sharing of best practices for grant applications</p> <p>v. discuss issue at November departmental retreat</p>			
<p>2. Reviewers recommend that all M.A.Sc. and Ph.D. students have regular (at least once a year) meetings with a supervisory committee that involves two formal elements: delivery of a presentation and submission of a written report.</p>	<p>i. actively enforce existing policy for all incoming PhD students</p> <p>ii. discuss proposal to initiate yearly meetings for all MASc candidates at June departmental and graduate student executive meetings</p>	<p>Department head</p>	<p>Human resources provided by department</p>	<p>i. Ongoing</p> <p>ii. Implemented by September 2019</p>

Recommendations	Proposed Follow-up	Responsibility for Leading Follow-up	Resource or Governance Implications	Timeline for Addressing Recommendation
3. Reviewers report that they were pleased to hear from the Dean about two new faculty positions planned for the unit. One of these positions would be at the intersection of engineering/medicine/clinical/mobility.	Hire new faculty member with expertise at the intersection of engineering and medicine. Consider second hire in the area of biochemical engineering/synthetic biology	Department head	Human resources provided by department	Complete second hiring process by 2020
4. Reviewers recommend that the university equalize tuition between international and domestic students. This measure has a modest financial impact on the university but will help to increase research capacity and enhance morale.	Recommendation not endorsed by the Provost and Vice-Principal (Academic). At this time, the university does not support equalizing tuition fees as it will have considerable financial impact on the university. With the guidance of the School of Graduate Studies, the department is encouraged to pursue other avenues of funding.			
5. Reviewers recommend that the unit consider relaxing its graduate course requirements to help reduce completion time. This will also allow the department to focus its energy on	Recommendation not endorsed by the Provost and Vice-Principal (Academic). Sufficient courses must be completed to ensure all graduates of the programs achieve the degree level expectations and associated program-specific learning outcomes as determined through assessments.			

Recommendations	Proposed Follow-up	Responsibility for Leading Follow-up	Resource or Governance Implications	Timeline for Addressing Recommendation
offering a smaller suite of graduate courses that can be offered every year.				
6. Reviewers recommend that the unit explore the idea of a professional master's degrees in key strategic areas with cognate departments to generate new sources of revenue. Different formats should be considered including on-line learning and intense short courses. An example would be the theme of "data analytics" that the unit would be well-positioned to lead.	Participate in the faculty-wide MEng professional master's program initiative	Department head	Human resources to be provided by the department	Ongoing
7. Reviewers recommend that the unit make efforts to increase the participation rate of undergraduate students in the internship program so that a greater proportion of students benefit from this form of experiential learning. Current participation is around 20% and the challenge is to	Implement strategies that will increase participation rates of undergraduate students in internship program. Leverage FEAS supports that help students with	Department head	Human resources to be provided by the department	Ongoing

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move this to the critical point of 40-50%.	summer jobs, co-ops and internships			
8. Chemical Engineering has recently enjoyed strong demand. Reviewers recommend that the unit play an active role in recruitment and outreach to make sure prospective students appreciate <u>both</u> undergraduate programs that the unit has to offer.	Continue current activities that inform prospective students of the opportunities in both Chemical Engineering and Engineering Chemistry	Department head	Human resources to be provided by department	Ongoing
9. Reviewers strongly recommend that the university and FEAS introduce more central undergraduate student support to respond to the increasing demand for student accommodations.	Continue work on increasing centralized support for students seeking accommodations	Dean, Faculty of Engineering and Applied Science	Human resources to be provided by FEAS	Ongoing
10. Reviewers recommend that new additional undergraduate courses not be added, or if they are, that an equivalent number of courses be removed. There is a potential for enrolment growth on the Engineering Chemistry side and as new courses are	Continue curriculum review of all undergraduate courses under the guidance of the Centre for Teaching and Learning	Department head	Human resources to be provided by department and CTL	By July 2019

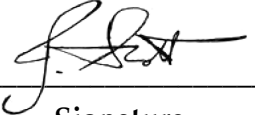
Recommendations	Proposed Follow-up	Responsibility for Leading Follow-up	Resource or Governance Implications	Timeline for Addressing Recommendation
added for that program, there should be commensurate reduction on the Chemical Engineering side.				
11. Reviewers mention that the unit has the opportunity to redefine the disciplines of chemical engineering and engineering chemistry given that it is well-positioned at the interface of engineering and science with a well-established collaboration with the chemistry department.	Continue to explore opportunities that will refine the disciplines of chemical engineering and engineering chemistry	Department head	Human resources to be provided by department	Ongoing

The Dean, Faculty of Engineering and Applied Science shall be responsible for monitoring the implementation plan. The details of progress made will be presented in writing to the Provost and Vice-Provost (Teaching and Learning) and filed in the Office of the Provost and Vice-Principal (Academic). Monitoring reports will be posted on the university web site.


Final Assessment Report & Implementation Plan

Approval Date – 15 October 2018

Vice-Provost (Teaching and Learning)


Signature

Vice-Provost and Dean, School of Graduate Studies


Signature

Dean, Faculty of Engineering and Applied Science



Signature

Final status of academic programs in the
Department of Chemical Engineering

Approved to Continue

Date of next program review

2025-2026 Academic Year