



FINAL ASSESSMENT REPORT

Executive Summary

March 2017

Master's and PhD Mechanical Engineering

Program Review

Dean: Dr. Hossam Kishawy (Interim)

Dean of Graduate Studies: Dr. Langis Roy

Under UOIT's Quality Assurance Framework, all degree programs are subject to a comprehensive review every eight years to ensure that they continue to meet provincial quality assurance requirements and to support their ongoing rigour and coherence.

On the completion of the program review, the self-study brief together with the reviewers' report and the assessment team's response are reviewed by the appropriate standing committee of Academic Council, and are subsequently reported to Academic Council, the Board of Governors and the Quality Council.

In 2015-2016, a program review was scheduled for the Master of Applied Science, Master of Engineering and Doctor of Philosophy in Mechanical Engineering. This is the first program review for this program and the internal assessment team is to be commended for undertaking this assignment in addition to an already challenging workload and within very tight deadlines. The following pages provide a summary of the outcomes and action plans resulting from the review, identifying the strengths of the program as well as the opportunities for program improvement and enhancement. A report from the program outlining the progress that has been made implementing the recommendations will also be put forward in eighteen months' time.

External Reviewers: Xianhuo Li (University of Waterloo), Rama Bhat (Concordia University), and Peter Allen (Dalhousie University)

Site Visit: September 19-20, 2016

The rapid growth and success of the undergraduate programs in FEAS, led to the launch of the Master's program in Mechanical Engineering in 2006 and PhD program in Mechanical engineering in 2008.

The graduate programs in FEAS were created to meet the UOIT's strategic research goals focusing on technology and engineering, and to meet the forecasted demands for increased graduates in Mechanical Engineering in Ontario. The location of UOIT makes it an excellent choice for bringing increased engineering graduates to the eastern half of the GTA and neighboring cities, towns, and municipalities.

Since its inception in 2006, the Mechanical Engineering graduate program has grown, with the number of graduate faculty steadily increasing. Currently there are 17 core graduate faculty members in the AMME Department and 37 graduate faculty members on the Mechanical graduate faculty list. The AMME Department has two Canada Research Chairs (Tier I: Advanced Manufacturing (advertised), Tier II: Robotics and Automation (to be advertised). The AMME Department also has a NSERC and General Motors Research Chair in Innovative Design.

Significant Strengths of the Program

- Program requirements and learning outcomes are appropriate and in alignment with UOIT's statement of graduate Degree Level Expectations and other Canadian Universities.
- Faculty members are well known globally in their areas of research and expertise, including two Canada Research Chairs, and an NSERC and General Motors Chair in Innovative Design;
- Class sizes are relatively small, allowing for more interaction between faculty members and students in both the classroom setting and in students' research activities
- Access to ACE, a world-class facility with state of the art equipment for automobile related research, testing and evaluations.
- Mechanical graduates find employment in various engineering consulting firms, industries, power-generating utilities and in a wide range of manufacturing, processing, research and development, and in transportation industries.

Opportunities for Program Improvement and Enhancement

- Current graduate courses listed are not all offered in a timely manner.
- A review of teaching assignments to allow faculty to teach a greater number of graduate courses and increase the number of graduate courses available to students.
- As the program continues to grow, review the potential of more technical support.
- The availability of research funding and grants for students within the program.

The External Review

Dr. Xianhuo Li, Dr. Rama Bhat, and Dr. Peter Allen visited the University of Ontario Institute of Technology (UOIT) campus on September 19-20, 2016. The reviewers toured research labs, the ACE building, the library and other facilities. Over the two days, they also had the opportunity to interact and ask questions of FEAS faculty, students, Graduate Studies administration and staff.

Summary of Reviewer Recommendations and Faculty Responses

Recommendation 1:

It was the general impression that the budget allocated to the Faculty did not change with the number of graduate students admitted. This does not generate enough incentive to get more students. Hence, a measure of transparency with clearly visible incentives in budget when more quality students are recruited would engender the needed enthusiasm in the faculty to enhance the graduate programs.

Response:

Both the FEAS and Graduate deans agree that such incentives are desirable and will seek opportunities to advocate for a long-term financial model providing the necessary resources for program growth and sustainability.

Recommendation 2:

The financial support provided to the graduate students is limited, and there is no coherent policy in providing scholarships, TAships, conference travel support to graduate students. Hence, the Faculty is encouraged to develop a graduate funding policy with the Faculty of Graduate Studies.

Response:

Improvements in this regard have already started to be implemented. For instance, starting in 2016-2017 the Dean's Graduate Scholarship has been extended from 2 years to 4 years at the PhD level. In addition, new FEAS scholarships and OGS matching scholarships have been introduced to increase the financial support available for graduate students. This initiative needs to be built up continually. Many faculty members are of opinion that the scholarship duration should be reflective of duration of enrollment.

Recommendation 3:

It was noted that there are no women faculty members in AMME. An absence of "role models" and "mentors" inhibits and discourages women coming into such engineering programs. It is recommended that every effort must be made in recruiting competent women faculty members into AMME.

Response:

The department recognizes this shortcoming and will reinforce its plan, in conjunction with the FEAS Dean, and make it a priority to hire qualified female faculty members. In fact, a hiring offer was made to a female CRC new faculty member in 2016 but unfortunately the offer was not accepted.

Recommendation 4:

In many instances, graduate students are given study spaces inside the laboratories where they work. While this arrangement is convenient, it is recommended that health and safety aspects of individual cases must be kept in mind.

Response:

The new SIRC building will open in fall 2017, providing additional office space for graduate students. The university and faculty have standing committees for Health & Safety. Regular visits are conducted and issues are dealt with promptly.

Recommendation 5:

A comprehensive policy should be developed by the FEAS and the Faculty of Graduate Studies regarding the laptop computers provided to graduate students involved in TA duties. In view of the special software package available in these laptops, intended for UG teaching purposes, TA graduate students use it for their research also. They are asked to return the laptops at the end of the Winter term, and this poses difficulty in transferring all the research related information for work during summer. This also creates a separate class of graduate students with the others not getting the benefit of the associated software. It is recommended that the FEAS make every attempt, such as using the "indirect cost of research" funds, the contract research overhead funds, or the graduate application fees, in order to provide the graduate students with the software needed for their research in general.

Response:

This relates to program practices and central IT support issues. In the context of the 2017-2018 integrated academic plan a university-wide solution is presently being pursued.

Recommendation 6:

The policy of each faculty members being required to teach only one graduate course limits the number and variety of graduate courses available to graduate students. The Faculty is encouraged to use discretion to make the system less rigid by allowing more graduate courses taught by faculty members.

Response:

There is no such policy; however, finite resources and graduate enrolments, along with undergraduate teaching needs, have resulted in limited graduate course offerings. This issue is linked to Recommendation (1) and will be addressed accordingly.

Recommendation 7:

Postdoctoral Fellows are not provided office spaces. PDFs contribute quite a lot to the faculty research, and they should be provided with quiet space to carry out their research more efficiently. It is recommended that they be provided with adequate office space.

Response:

The new SIRC building will open in fall 2017, providing additional office space for postdoctoral fellows.

Recommendation 8:

The graduate studies admissions staff can be rigid in applying the rules in individual cases, such as the requirement of English proficiency even to students transferring from other Canadian institutions to UOIT who has satisfied the English language proficiency requirements in the previous Canadian institution. It is recommended that the Faculty be given discretionary judgment in the student admissions.

Response:

The English language proficiency requirements are currently under review and an updated policy is expected in 2017. As well, admission processes will be reviewed as part of a larger effort to harmonize MEng admission requirements and MEng-to-MASc transfer criteria.

Recommendation 9

There is essentially no technical support staff for the graduate program. The existing technical staff is completely occupied with the undergraduate program, even though in principle they may assist graduate research projects if they are available. The AMME Department is currently in the process of recruiting and expanding from 17 to 27 faculty members, by 2018 or 2019. Simultaneously, only one additional technician is to be hired. The almost doubling of the number of faculty, coupled with no significant increase in technical support, will exacerbate an already unsatisfactory situation. It is recommended that some technicians be hired to assist with the graduate research.

Response:

FEAS technical support staff is currently available to help students (shared with ACE). As mentioned in response to Recommendation (1), both the FEAS and Graduate Deans are committed to advocating for the necessary resources for program growth and sustainability.

Plan of Action

The table below presents a timeline of the actions planned to address the recommendations from the external report.

Proposed Action	Timeline	Person/Area Responsible
Increase IT support as per 2017-2018 integrated academic plan	Ongoing	FEAS, IT Services, OGS, Provost
Additional course offerings	Immediate	FEAS
Revision of English language proficiency requirements and admission/transfer processes (particularly at master's level)	2017-2018	FEAS, OGS
Explore incentives for program growth	Fall 2017	FEAS, OGS, Provost
Reinforce a strategy to hire female faculty members into the program	Ongoing	AMME, FEAS, Provost

Due Date for 18-Month Follow-up on Plan of Action: May 2018

Date of Next Cyclical Review: 2023-2024