FINAL ASSESSMENT REPORT
Executive Summary
May 2017
Master of Applied Science, Master of Engineering, and Doctor of Philosophy in Electrical and Computer Engineering
Program Review
Dean: Dr. Hossam Kishawy, Interim Dean
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 academic year 2015-2016 a program review was scheduled for the Master of Applied Science, Master of Engineering, and Doctor of Philosophy in Electrical and Computer 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: Dr. Miriam Capretz (Western University), Dr. Catherine Gebotys (University of Waterloo), and Dr. Fei Yuan (Ryerson University)

Site Visit: 4-5 July 2016

The MASc program is research-oriented and provides solid preparation for a Doctoral degree. The program entails a combination of course-based learning and a thesis that involves original research. The MEng program is a professional Master's program for upgrading and expanding technical skills and knowledge. It has an emphasis on course-based learning, which can be accompanied by a major project. The PhD program leads to the highest academic degree, for a career such as a researcher in advanced technology development or university professor. It involves a combination of academic coursework and a dissertation, which requires a significant detailed body of original research that leads to innovative new research outcomes.

The MASc and MEng programs in Electrical and Computer Engineering allow a student to study in all major areas associated with electrical, computer and software systems engineering. These areas include electronics, intelligent systems, communications, control, biomedical, power electronics, power generation, software engineering, mobile systems and embedded software systems. These disciplines are expected to be in high demand by employers.

In addition, students in the PhD program can specialize in one of the following three fields: Communications and Signal Processing, Control Systems, or Software Systems. Alternatively, a student can choose to cover many facets of the broad discipline of electrical, computer and software engineering. Topics can vary widely and may include communications, networking, intelligent control systems, robotics, computer vision, health informatics, mobile systems, power systems and smart power grids.

Significant Strengths of the Program

- Strategic location of UOIT allows it to take advantage of local industrial companies
- High-caliber and dedicated faculty and high-quality research facilities.
- A large number of courses make extensive use of published scientific papers as the primary sources
- Excellent Library resources

Opportunities for Program Improvement and Enhancement

- Consider offering a small set of fundamental core graduate courses in each specialization area to open up resources for additional courses to increase breadth and depth
- Low number of scholarships available for international students
- Lack of explicit mapping of learning outcomes to course objectives and learning activities

The External Review

Drs. Capretz, Gebotys, and Yuan visited UOIT on July 4 and 5, 2016. The two day site visit included interviews with several individuals and groups, including the Deans, Associate Dean, Chair and Program Director, Vice-President RI&I, FEAS faculty and staff, staff from supporting departments, and a selection of graduate students from each program.

The review included a tour of current facilities, including visits to the Automotive Centre of Excellence (ACE), the Energy Research Centre (ERC), the Integrated Research and Training Facility (IRTF) and the Ontario Power Generation (OPG) Engineering building facilities and research spaces for graduate students.

The reviewers felt contented with both breadth and depth of views provided during the meetings and that the interviews captured a variety of voices. Further, the reviewers felt confident that plentiful opportunity was given to the interviewees to voice their concerns about the quality and the challenges faced by the graduate programs in Electrical and Computer Engineering.

Summary of Reviewer Recommendations and Faculty Responses

Recommendation 1

Students expressed concern over not being able to find sufficient graduate courses in their areas of interest, despite a good number of students in the same area.

a. Plans to increase the number of graduate courses, by giving faculty members an equal opportunity to teach a graduate course would be a move in the right direction to an average of one graduate course per faculty member.

b. Addition of regularly offered mandatory core courses (per specialization area) may be helpful to address the issues and improve the quality of the graduate programs.

c. Allowing PDFs to teach senior undergraduate courses and 3 future new hires in ECE should also help to increase the graduate course offerings in ECE.

d. Workshops that are mandatory for PhD students and optional for MASc students could also be available for MEng students. This would provide additional course options for MEng students and broaden their nontechnical skills.

Response

a) See also response to Recommendation 13 below, which will increase the number of courses offered annually. The requirement of having 5 students registered in a course will also be administered with more flexibility in the future to allow for more course offerings.

b) The Faculty is in the process of identifying core courses in each field and course needs will be reviewed constantly. Feedback from faculty members will be taken into consideration. Core courses will be taught annually or biennially.

c) PDFs are currently allowed to teach undergraduate courses when necessary.

d) MEng students are allowed to attend workshops. However they are not counted as a course for MEng students, which can be further looked into.

Recommendation 2

Additional resources from the central administration would be helpful to fund PhD students in their 13th term especially in cases where supervisors have run out of available funding. In addition, cash advances should be provided for student travel to reduce financial stress. Average time for completion of the PhD program should be monitored carefully.

Response

The university will review this recommendation. There is currently a travel scholarship in place with the Office of Graduate Studies, which will help to alleviate travel issues for students to some extent. The Faculty is actively monitoring students' progress in the PhD program, making sure that progress reports are filed in time and candidacy exams take place within reasonable timeframe. Additionally, for TA assignment, among pool C students, the Faculty is striving for providing TAships to PhD students who are in their 13th term and beyond, to help them financially. These students usually have extensive TA experience and are well qualified.

Recommendation 3

3) Fostering ECE co-supervision within UOIT should be encouraged among faculties. Removing faculty from graduate faculty lists may alienate this collaboration, so it may be more useful to not define a graduate faculty list at all. Many institutions do not use graduate faculty lists but instead use an internal list of department faculty who can sole supervise PhD students.

Response

Co-supervision has always been encouraged. Considering the common practise university wide at UOIT, it is not feasible to give full graduate faculty status to faculty members outside of the Faculty. However, they are given associate graduate faculty status, which allows them to co-supervise students at any level.

Recommendation 4
Creation of clear guidelines and procedures to define the level of graduate supervision for faculty members in the graduate programs at UOIT is encouraged.

Response
There are definitions of the level of graduate supervision for faculty members in place, which will be better communicated with faculty members.

Recommendation 5
Expansion of the MEng program could bring several benefits to the graduate programs. The increased number of graduate students would allow the offerings of more graduate courses more regularly. Central administration should consider providing financial incentive to the Department to expand the MEng program. This would solve the issue of shortage of graduate courses and the financial incentive could hire sessional instructors and PDFs to teach.

Response
The Faculty will discuss the need for central financial support for this to be implemented and will look into measures to strengthen MEng program.

Recommendation 6
Lower MEng admission requirements on the overall academic standing and the minimum accumulative GPA in the last two full-time years of the undergraduate studies of applicants from B to B-.

Response
This will be discussed in the Department and Faculty levels. At the same time, the Faculty will set clear criteria for MEng-to-MASc transfer as suggested.

Recommendation 7
Establish clear criteria for MEng-to-MASc transfer should the suggested changes to the admission requirements of the MEng program be approved.

Response
Please see comments above.

Recommendation 8
Add a field of specialization in the PhD program in the area of Power Systems. The four fields of specialization for the PhD program can also be added to the MASc program. The introduction of fields of specialization requires the identification of mandatory core courses for each field of specialization that should be offered at least every other year.

Response
The Faculty is currently in the process of adding Power Systems in the PhD program and adding fields of specialization to MASc program, which will be in effect starting Sept. 2017, pending approval.

Recommendation 9
Explicit mapping of learning outcomes, according to the six categories of the provincial degree level expectations, to course objectives and learning activities would be helpful, especially for the MEng course-based program.

Response
Learning outcomes of all programs will be re-examined as suggested.

Recommendation 10
The program learning outcomes of the MEng, MASc, and PhD programs should be defined separately so as to not only reflect the distinct characteristics of these programs but also allow the programs to be developed and assessed more objectively.

Response
Learning outcomes of all programs will be re-examined as suggested.

Recommendation 11
Continued monitoring of feedback from students and faculty is important. Removal of the second seminar course in response to student feedback would also be encouraging for students. The Department may also choose to revise the course to include materials that most suit the need of PhD students in today's economics and career advancement.

Response
The Faculty is currently in the process of removing the 2nd seminar course, which will be in effect starting Sept. 2017 pending approval. Additional material is also being considered, such as research methodology, in the 1st seminar course.

Recommendation 12
The course outline of all graduate courses should be prepared using university's course outline template so that the contents and requirements of courses can be clearly communicated to students prior to the offering of courses. This will also allow the department to better control the quality of graduate courses.

Response
This practice is currently in place. It will be further reinforced.

Recommendation 13
Each research faculty member should be given an opportunity to teach one graduate course in faculty member's field of research per academic year.

Response
This recommendation will be phased in during 2017-2018 and fully implemented by 2018-2019. Each faculty member will be given the opportunity to identify a number of graduate courses to teach. These courses can be offered annually or in alternating years to increase the number of courses offered.

Recommendation 14
Take proactive measures to advertise the graduate programs domestically especially to undergraduate students of UOIT and those in Great Toronto Area so that more students will be aware of the exciting

research and development projects undertaken by faculty members. Proven practices such as a Summer Undergraduate Research Internship Program could be established.

Response
In addition to participating Office of Graduate Studies' promotion of graduate programs, the Faculty is looking into other methods to promote these programs. Summer Undergraduate Research Internship is a good suggestion. However, additional funding will be needed. Further improvements will be made to the FEAS graduate website to report news of faculty research, achievements, and awards to expand the visibility to students. Each faculty member and each research group/lab are encouraged to have their own website to promote research activities with more specific emphasis, and to promote research in certain areas with a number of professors actively involved. These efforts will help to increase visibility to undergraduate students.

Recommendation 15
Allocate more resources from the university to provide more scholarships and merit-based awards for international as well as domestic students.

Response
This will be discussed within the broader university context. FEAS has most recently additionally started the FEAS Graduate Scholarship, which will be given to outstanding FEAS graduate students nominated by their research supervisors.

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
Identify core courses in each field	Winter 2017	GPD in consultation with ECE faculty members
Add Power Systems in the PhD program and add fields of specialization to MASc program	Fall 2017	GPD in consultation with ECE faculty members in the power area
Review of admission requirements of MEng and criteria for MEng-to-MASc transfer	Fall 2017	GPD in consultation with ECE faculty members
Re-examine and clarify learning outcomes of all programs	Fall 2017	GPD in consultation with ECE faculty members
Remove the 2nd seminar course for PhD program and revise the 1st seminar course	Fall 2017	GPD
Increase IT support as per 2017-2018 integrated academic plan (IAP)	Ongoing as outlined in IAP	FEAS, IT Services, OGS, Provost
Additional course offerings	Immediate – Spring 2017	FEAS
Explore incentives for program growth	Fall 2017	FEAS, OGS, Provost

Due Date for 18-Month Follow-up on Plan of Action: February 2018
Date of Next Cyclical Review: 2023-2024