



B.E.Sc. Electrical Engineering Final Assessment Report & Implementation Plan

Faculty / Affiliated University College	Faculty of Engineering
Degrees Offered	B.E.Sc. in Electrical Engineering, Combined B.E.Sc in Electrical Engineering and HBA; Combined B.E.Sc in Electrical Engineering and Law
Modules Reviewed	Electrical Engineering; Electrical Engineering - Biomedical Signals and Systems; Electrical Engineering - Power Systems Engineering; Electrical Engineering - Wireless Communication
External Consultants	Prof. Francois Bouffard, Electrical and Computer Engineering, McGill University, Montreal, Quebec Prof. Tim Davidson, Chair, Electrical and Computer Engineering, McMaster University, Hamilton, Ontario
Internal Reviewer	Susan Knabe, Associate Dean, Undergraduate, Faculty of Information and Media Studies
Date of Site Visit	November 26, 2018
Evaluation	Good Quality
Approval Dates	SUPR-U: May 15, 2019 SCAPA: May 29, 2019 Senate(For FYI): June 7, 2019
Year of Next Review	2026-27

In accordance with Western’s Institutional Quality Assurance Process (IQAP), the Final Assessment Report provides a summary of the cyclical review, internal responses and assessment and evaluation of the undergraduate modules delivered by the Department of Electrical and Computer Engineering. This report considers the following documents: the program’s self-study, the external consultants’ report and the responses from the Department and Faculty. The Final Assessment Report identifies the strengths of the program, opportunities for program enhancement and improvement and details and prioritizes the recommendations of the external consultants and prioritizes those recommendations that are selected for implementation.

The Implementation Plan details the recommendations from the Final Assessment Report that are selected for implementation, identifies who is responsible for approving and acting on the recommendations, any action or follow-up that is required and the timeline for completion.

The Final Assessment Report and Implementation Plan is sent for approval through SUPR-U, SCAPA, Senate and the Ontario Universities' Council on Quality Assurance and is made available on a publicly accessible location on Western's IQAP website. The Final Assessment Report and Implementation Plan is the only document resulting from the undergraduate cyclical review process that is made public, all other documents are confidential to the Program/Faculty and SUPR-U.

Executive Summary

The Electrical Engineering program is offered through the Department of Electrical and Computer Engineering (ECE) and is one of the oldest programs in Engineering at Western. It has been accredited by the Canadian Engineering Accreditation Board (CEAB) since 1965, and as of 2017-18, there were 192 students registered in Electrical Engineering, making it the largest program in the ECE suite of programs. The program was being reviewed for accreditation by the CEAB at the same time as the IQAP review, and the documents provided included and attempted to address both review and accreditation, with the CEAB document forming the bulk of the report. These self-study documents included: course descriptions, module information, teaching evaluations, library resources, student satisfaction survey data, institutional data related to course size, faculty and staff complement, and faculty CVs. On the day of the review, the reviewers met with the Vice Provost (Academic Programs), the Acting Department Chair individually, and had group meetings separately with faculty members, students, administrative staff and technical staff. The reviewers did not meet with either the Associate Dean or the Acting Dean (these meetings were planned, but did not happen due to a miscommunication).

The reviewers were, overall, positive about the programs being reviewed, and noted that program was a well-structured program, with clear progression, that was delivered by research active faculty members, concluding that students were "exposed to a program that will allow them to learn how to become good and adaptable thinkers, communicators, designers, and problem solvers." They also indicated that the program met many of the learning outcomes associated with the Western Degree Outcomes, though they observed that the ones that were most actively integrated were those related to Knowledge, Communication, and Critical Enquiry and Critical Thinking. They did express concern that the program offered a relatively large number of designated options which seemed to make switching between options difficult and, because of the relatively large number of required courses, put strain on an already stretched faculty complement.

Significant Strengths of the Program

The following program strengths are identified in both the self-study and the External Consultants' Report

- common first year
- comprehensive laboratory experience across all 4 years of the program
- dual degree options with Law and Ivey School of Business
- high level of student satisfaction with the program
- outstanding new facilities

Summary of the Reviewers' Key Recommendations and Department/Faculty Responses

1. The reviewers suggested that the program be streamlined by reducing the number of options offered. The rationale for this is that the current program, with its many fixed options, is at odds with current practice at other Canadian engineering schools, and, more importantly, might put students at a disadvantage once they enter the workforce given the increasing overlap between engineering, software engineering and computer engineering. As well, the reviewers suggested that reducing the number of options or decreasing the number of discrete required courses in each (allowing more flexibility) will help ease some of the demands on teaching resources. The Department agrees with the overall recommendation and has already reduced the number of options by closing enrolment on several of the options (Power Systems, Communications, and Biomedical Signals and Systems). A further option was eliminated when the Biomedical Engineering concurrent degree came on stream this year.
2. The reviewers identified concerns with respect to the current faculty complement, noting that there is an ongoing FTE deficit which is exacerbated by sabbatical or research absences. The challenge is particularly acute in terms of ensuring that LD replacement teaching is adequate to support the accreditation requirements for the program. The Department concurs with this assessment, and while there does not seem to be any additional probationary hires planned for the unit, the program has undertaken both reducing the number of options (and thus required course offerings) taught and is looking into how electives shared across programs might facilitate the delivery of a robust program without an increase in Limited Duties instruction. It should be noted that the full extent of relief felt from reducing the program options may only be felt once the current cohort of students in these options graduates.
3. The reviewers identified three specific concerns raised by students during the meeting with them.
 - a. The first concern was that, despite overall strong reviews for the amount of laboratory access in the program, the students noted that the move to the new building has meant that "maker space" access for Y4 capstone projects was lost. This has since been rectified, with a temporary space set up in December 2018 and plans to assign a permanent space by Summer 2019.
 - b. The second concern was that students did not feel that there was adequate institutional support for obtaining internships, though it was difficult from the conversation to determine if they understood this to lie within the Faculty of Engineering or if it was something that was located in a larger Western context. The Department recognizes the importance of internships and industry partnerships in facilitating experiential learning and future employment opportunities, and has committed to work with career services (not sure if "career services" here are located in the Faculty or University) to streamline students' experiences with setting up internships. A related issue was the students' desire that there be increased opportunity for industry involvement in the capstone projects, something which the department indicated was also a priority.
 - c. The final concern raised by the students was that they felt that their software development training did not prepare them for the types of software-oriented jobs and internships they were seeing advertised. The Department response was that this would be addressed as part of a proposed curriculum review in Summer 2019.
4. The reviewers noted that EE should have in place, as part of CEAB, a process for continual program evaluation and improvement. While this is not entirely the remit of the IQAP review, the Department noted that the unit has developed this process, but it has not yet been through a full cycle.

Other Opportunities for Program Improvement and Enhancement

- Related to the student concerns, and one of the recommendations from the previous IQAP, which was to “improve communications between students and academic representatives of the program,” there still seems to be ongoing issues with the involvement of students in the program, both as recipients of communication and as participants in EE initiatives (curriculum, academic programming). While this might have been a function of the relatively small number of students the reviewers met with, or the relatively large program size, the lack of engagement between the program and the students is something that might benefit from more focused attention to ensure that the improvements put in place for the last review remain effective.

Implementation Plan

The Implementation Plan provides a summary of the recommendations that require action and/or follow-up. The Department Chair, in consultation with the Dean of the Faculty will be responsible for monitoring the Implementation Plan. The details of progress made will be presented in the Deans’ Annual Report and filed in the Office of the Vice-Provost (Academic).

Recommendation	Proposed Action and Follow-up
1. Program to be streamlined by reducing the number of options offered	Review existing options and discontinue admission where necessary
2. Identify cross program elective courses	Work with other units to determine which courses are suitable cross program electives
3. Need for Year 4 capstone lab space	Interim space designated in December 2018; permanent space to be designated in summer 2019
4. Facilitate student engagement with industry partners	Department to explore increased opportunities for partnerships
5. Review software training	Curriculum review, summer 2019