



## Queen's University

### Final Assessment Report: Executive Summary

**Programs Reviewed:** Electrical Engineering B.Sc.E. (renamed B.A.Sc. as of June 2016)  
Computer Engineering B.Sc.E. (renamed B.A.Sc. as of June 2016)  
Electrical and Computer Engineering M.Eng., M.A.Sc., Ph.D.

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 program, 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 18 February 2016.
- 2) The review team visit took place on 21-22 March, 2016. The review team members were
  - i. Dr. David Capson, University of Victoria
  - ii. Dr. William Lynch, Concordia University
  - iii. Dr. Ram Murty, Queen's University, Department of Mathematics and Statistics
- 3) The visit included a tour of facilities and meetings with
  - i. Students (undergraduate and graduate)
  - ii. Faculty
  - iii. Staff
  - iv. Liaison librarian
  - v. Vice-Dean and Associate Deans, Faculty of Engineering and Applied Science
  - vi. Vice-Provost and Dean, School of Graduate Studies
  - vii. Vice-Provost (Teaching and Learning)

- 4) The review team reported on 18 April 2016. Responses to the review team report were provided by the Acting Head, Department of Electrical and Computer Engineering, 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 13 September 2016, and reported to the Provost on the programs' strengths, opportunities for enhancement and recommendations for improvement.

The following strengths were noted:

- Overall, the programs were found to be of high quality.
- Excellent learning experiences at undergraduate and graduate level.
- High level of graduate student satisfaction.
- Many recent innovations, including the mechatronics stream, design stream, 4+1 program, ECEi program, efforts to create on-line course materials, internship option for M.Eng. program, and progress report for PhD students.
- Highly qualified and research active faculty, many with international reputations.

The following opportunities for enhancement were noted:

- Encourage students to make greater use of support services across campus.
- The new M.Eng. with internship and ECEi stream are exciting opportunities.
- Improved laboratory space and infrastructure.
- Upcoming faculty hiring should increase the percentage of undergraduate courses taught by core faculty.
- Continue current efforts to recruit and retain women.

The academic programs in the Department of Electrical and Computer Engineering have been approved to continue.

Date of next review: To coincide with accreditation review by the Canadian Engineering Accreditation Board. No later than 2023-2024.

Prepared by Vice-Provost (Teaching and Learning)

6 December, 2016

# Queen's University

## Final Assessment Report and Implementation Plan for the Review of Programs in the Department of Electrical and Computer Engineering

### Summary of the Reviewers' Recommendations with Department and Deans' Responses

The reviewers made seven recommendations that they identified as areas requiring improvement, or opportunities for enhancement. These are listed below with a summary of the department and deans' responses.

The review team made comments and suggestions in fourteen other areas. The Department Head, Faculty Dean and Vice-Provost and Dean, School of Graduate Studies have considered and responded to these comments and suggestions. The comments and internal responses to them were considered by the Senate Cyclical Program Review Committee and incorporated into both the opportunities for enhancement, and implementation plan recommendations. The areas of note are outlined briefly below:

- learning outcomes (minor adjustments to outcomes around communication skills, use of instruments and simulation and digital representation of numbers)
- assessment of teaching and learning (improve UG student satisfaction with learning experience, and in the CE program, the ability to register in preferred courses)
- program resources (student underuse of support services, pressure on staff)
- equity and diversity (Aboriginal student representation)
- times to completion (UG students)
- lack of tracking of program graduates
- scheduling of graduate seminars, and
- involvement of post-doctoral fellows in teaching

### Areas highlighted by the review team as requiring improvement

1. **Female student recruitment** in the Department of Electrical and Computer Engineering (ECE) is significantly below that of the Faculty average (~30%). Female students may have a lower retention rate than male students. The department may wish to consider initiatives to improve its gender profile.

In its response, the department noted that:

- It is engaged in a number of initiatives to remedy this issue, including targeted efforts to hire more female faculty members.
- Current numbers show improvement in female student undergraduate (UG) population to 19.5%.
- Female graduate students made up 16.3% of population this year. This compares favourably to a sample of 6020 completed PhDs in Electrical Engineering (EE) and Computer Engineering (CE) examined by Statistics Canada. 11.5% of PhDs in the sample were completed by women.

The Dean, School of Graduate Studies (SGS), noted:

- The department responded to the concern about gender balance by reporting that currently 16.3% of their graduate population is female (in engineering programs across Ontario, 18% of graduate degrees are awarded to women; HEQCO, 2009).
- The department indicated that the 4+1 year option for completing the M.A.Sc. might aid in attracting women into graduate studies.
- Since the proportion of women in their undergraduate program has grown, this may well lead to greater representation at the graduate level.
- Marketing and communication strategies to attract more qualified women as well as domestic PhD applicants are important.
- The SGS can offer limited financial support for departmental strategic recruitment initiatives.

2. The percentage of **undergraduate teaching that is currently provided by adjunct faculty** is too high (approx. one-third to one-half).

The Faculty Dean noted that the Faculty had recognized the lack of faculty renewal. As of June 2016, hiring was underway for two tenure-track positions in CE. There are also plans to hire two non-renewable faculty positions to support research and graduate and undergraduate teaching.

### **Areas highlighted by the review team as opportunities for enhancement**

3. **Lack of requirement to include Power and Control course electives** in the Electrical and Computer Engineering undergrad program.

The department responded that some basic topics in these areas are covered in current courses. This recommendation is being considered by the ECE curriculum committee. One possible

solution is to add introductory courses in power (333) and control (443) to the program as core components.

4. **Replacement of Research Assistant (RA) funding with Teaching Assistant (TA) funding** when a TA assignment is taken on. The review team viewed this as a reverse incentive to perform well.

The department responded that minimum stipends have been increased to combat this, and the process of finding a new TA allocation model is being investigated.

The Dean, School of Graduate Studies, noted that the department responded to the concern about funding packages by initiating a study of their graduate student funding levels and allocation procedures, which is ongoing.

5. **Students made negative comments on expertise of Teaching Assistants (TAs).** They often prefer senior undergraduate TAs who are more knowledgeable.

6. **Reviewers noted issues with availability and scope of TA training**

7. Some concern on **quality of laboratories that support the UG programs.** Reviewers noted that \$375k has been provided to upgrade labs.

The faculty dean noted that the Faculty has invested over \$750,000 in renovations, committed \$375,000 for laboratory equipment in 2016/17 and \$100,000 over the next two years to support the ECEi program.



## Implementation Plan

Recommendations	Proposed Follow-up	Responsibility for Leading Follow-up	Resource or Governance Implications	Timeline for Addressing Recommendation	
<b>The Senate Cyclical Program Review Committee identified recommendations 1-3 below as first priority for implementation</b>					
1.	Complete review of how graduate funding packages are assembled. Ensure transparency in informing students about sources of funding.	Continue and conclude the work that is underway to address this issue.	Department Head	There may be resource implications.	Complete review with a view to having revised process for funding allocation in place by 2017-18 academic year.
2.	Review curriculum with particular attention to availability of courses, to ensure students can register in courses they need to complete their program in a timely manner.  Consider inclusion of core courses on power and control	Dedicate curriculum committee meetings to these topics.	Departmental curriculum committee	Faculty and staff time to engage with curriculum review and follow up actions.	Summer 2017

Recommendations	Proposed Follow-up	Responsibility for Leading Follow-up	Resource or Governance Implications	Timeline for Addressing Recommendation
in Electrical Engineering program.				
3. With the support of the Human Resources department, complete the review of departmental administrative and staffing structure that is already underway.	Continue and conclude the review that is already underway.  Ensure appropriate training and support for staff as they transition to new tasks.	Department Head	One option is an additional staff hire, which would have resource implications.	Spring 2018
4. Maintain and develop efforts to recruit more women into undergraduate and graduate programs.	Continue current initiatives, and consider new ones, to increase the proportion of female students.  Investigate marketing and communication strategies to attract more qualified women as well as domestic PhD applicants.	Department Head	There may be resource implications in increasing marketing efforts. The School of Graduate Studies can offer limited financial support for departmental strategic recruitment initiatives.	Fall 2017

Recommendations		Proposed Follow-up	Responsibility for Leading Follow-up	Resource or Governance Implications	Timeline for Addressing Recommendation
5.	Work to increase the percentage of undergraduate teaching provided by core faculty.	Ensure that current faculty hiring increases the percentage of undergraduate teaching provided by core faculty.	Department Head	There may be workload implications for core faculty members to be managed.	Ongoing over 2017-18 academic year
6.	Ensure all teaching assistants receive adequate training and supervision for this role.	Department to verify that all teaching assistants have received appropriate training.  Lead instructor for course to supervise course TAs.	Department Head, Graduate Coordinator	Human resource	Fall 2017
7.	Address concerns around quality of laboratories used for undergraduate teaching.	Ensure renovation work that is underway is completed satisfactorily.	Faculty Dean, Department Head.	Resources have already been invested to address this concern.	Spring 2018

**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**

**Vice-Provost (Teaching and Learning)**



**Vice-Provost and Dean, School of Graduate Studies**

  
Signature

**Dean, Faculty of Engineering and Applied Science**

  
Signature

**Final status of Electrical and Computer Engineering Programs**

**Approved to Continue**

**Date of next program review**

**Coincident with next CEAB accreditation review. No later than 2023/24 Academic Year**