

## Two Year Progress Report

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### **Engineering Undergraduate Programs (Chemical, Civil, Computer, Electrical, Environmental, Geological, Management, Mechanical, Mechatronics, Nanotechnology, Software, Systems Design)**

May 2018, revised January 2020

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**Background:** The Faculty of Engineering employs an integrated approach for the Canadian Engineering Accreditation Board (CEAB) accreditation and undergraduate program review processes. The CEAB process is required as the primary external assessment of the program quality.

In the 2014 CEAB accreditation, nine of 12 programs (Chemical, Civil, Environmental, Management, Mechanical, Mechatronics, Nanotechnology, Software and Systems Design) received the maximum accreditation of six years to June 30, 2020. Three programs (Computer, Electrical, and Geological) received recommendations that resulted in requirement to follow-up to the CEAB after three years (2017). The following document provides a summary of the CEAB recommendations and resulting actions that the programs took to address the specific concerns.

For Computer, Electrical and Geological engineering, the CEAB identified the professional status of the professoriate as a weakness, for Electrical and Geological engineering programs, additional issues related to curriculum content required addressing, and for Geological engineering, the CEAB determined that student morale needs attention. With the exception of these issues, all three programs were positively appraised.

#### **Progress on Implementation Plan:**

#### **Recommendations:**

##### **Computer Engineering**

1. Increase the number of Accreditation Units (AU) in Engineering Design (ED) taught by faculty licensed to practice engineering in Canada. (Criterion 3.5.5)

**Status:** completed

#### **Details:**

- The program revised the assignment of teaching tasks to ensure that ED AUs taught by licensed faculty is well above threshold (Actual: 274 CEAB accreditation units (AU));

required: 225 CEAB AU).

### **Electrical Engineering**

2. Increase the teaching of statistics and numerical analysis. (Criterion 3.4.3.1)

**Status:** completed

**Details:**

- Created two new half weight, lab courses (ECE 204A Numerical Methods 1 and ECE 204B Numerical Methods 2) and then combined the two courses ECE204A/B into a full weight lecture-based course, 'ECE 204 Numerical Methods', which was introduced into the Electrical Engineering curriculum in the 2017-2018 academic calendar year.
- The course 'ECE 316 Probability and Random Processes' was revised to 'ECE316 Probability Theory and Statistics' with increased content of statistics

3. Increase the number of AUs in ED taught by licensed engineers. (Criterion 3.5.5)

**Status:** completed.

**Details:**

- The program revised the assignment of teaching tasks to ensure that ED AUs taught by licensed faculty is well above threshold (Actual: 233 CEAB accreditation units (AU); required: 225 CEAB AU).

### **Geological Engineering**

4. Increase the Engineering Design (ED) and Engineering Science (ES) content of the program. (Criterion 3.4.4).

**Status:** completed.

**Details:**

- The curriculum was revised to increase the ES and ED content (Actual: 932 accreditation units (AU); required: 900 AU) and was first implemented in September 2015. New courses were introduced, changes were made to the content of existing courses, and courses were inactivated in support of the proposed changes. The changes of courses containing ES and ED are outlined below.

### **First Year**

- Replaced PHYS 115 Mechanics with a new course CIVE 104 Mechanics 1 (0.25 weight) that retains key mechanics content from PHYS 115 and presents this content in a manner to emphasize understanding of civil engineering structures and applications.
- Renamed ENVE 127 as CIVE 105 Mechanics 2; increased its weight to 0.75 to accommodate new content on foundations and fluid statics.
- Revised the content of GENE123 Electrical Circuits and Instrumentation; addition of an instrumentation component and emphasis of the application of electrical engineering principles to instrumentation and data acquisition.

- Renamed CIVE 121 as Computational Methods.

### **Second Year**

- Renamed ENVE 214 as ENVE 280 Fluid Mechanics; decreased its weight to 0.5 by moving the fluid statics content to ENVE 127; modified the offering from 2B to 2A.
- Added CIVE 204 Solid Mechanics 1. Material related to structural analysis was needed as foundation material for CIVE 354 Geotechnical Engineering 2 in order to design subsurface structures.
- Moved and changed the status of EARTH 221 Geochemistry 1 from a core course in second year to a technical elective in third year.

### **Third Year**

- Removed ENVE 321 Environmental Modeling.
- Added one technical elective in 3A: students must choose one of: ARCH 277 Timber Design, Structures and Construction; CIVE 205 Solid Mechanics 2; EARTH 221 Geochemistry 1.
- Replaced CIVE 381 Hydraulics with CIVE 382 Hydrology and Open Channel Flow. This course combines the introductory material from CIVE 381 Hydraulics and from CIVE 486 Hydrology.
- Modified EARTH 438 Engineering Geology. Increased lab hours from 2 to 3 hours per week to provide time to introduce practical field exercises with engineering design implications.

### **Fourth Year**

- All third and fourth year CIVE, EARTH and ENVE courses that are accessible to the students based on pre-requisites are listed.

5. Increase the engineering design content of the GEO 400/401 course (Criterion 3.4.4.4)

**Status:** completed.

#### **Details:**

- Since Fall 2013, the engineering design content of the GEO 400/401 course has been increased by holding the course in conjunction with ENVE430/431 (Environmental Engineering program) which has engineering design content.

6. Increase the Engineering Science (ES) and Engineering Design (ED) taught by faculty licensed to practice engineering in Canada. (Criterion 3.5.5)

**Status:** completed.

#### **Details:**

- The program has assisted those faculty members teaching ES and ED to apply and receive their PEng license.
- The Civil and Environmental Engineering department responsible for delivering most of

the courses with ES and ED for the Geological Engineering program is requesting that all new faculty hires apply immediately for licensure and that they work towards satisfying the licensing requirements within five years of their appointment.

- The program revised the assignment of teaching tasks to ensure that ES and ED AUs taught by licensed faculty are well above threshold (Actual: 834 CEAB accreditation units (AU); required: 600 CEAB AU).
7. The morale of the students should be improved. The quality of the education experience may be adversely affected by the morale of the students. (Criterion 3.5.1.1)

**Status:** Complete.

**Details:**

- The morale of Geological Engineering students has improved immensely since 2014. As stated by the Director of Geological Engineering in January 2020, “The dark days are behind us.” The 2019 CEAB Accreditation visitors spoke specifically about the positive morale among the students. This dramatic improvement in morale is attributed to two main factors:
  - The program has improved communication between the program and the students:
    - The Director of Geological Engineering interacts with all the cohorts of students and follows them through their undergraduate career.
    - Formal 90-minute ‘town hall’ meetings are now held every term with all cohorts on campus. These town halls, chaired by the Director of Geological Engineering, have been running for about two years. At each meeting, students discuss what is going well and what needs addressing in their program.
  - Geological Engineering students have the option of taking EARTH 490 (Field Course) as an elective. This course features a major field trip (e.g., to Peru) and is a highlight of the curriculum.

**Explain any circumstances that have altered the original implementation plan:**

**Address any significant developments or initiatives that have arisen since the program review process, or that were not contemplated during the review:**

**Updated Implementation Plan:**

|    | Recommendations  | Proposed Actions   | Responsibility for Leading and Resourcing (if applicable) the Actions | Timeline for addressing Recommendations |
|----|--|--|---|---|
| 1. | <b><u>Computer Engineering</u></b><br>Increase the number of Accreditation Units (AU) in Engineering Design (ED) taught by faculty licensed to practice engineering in Canada. (Criterion 3.5.5) | The program revised the assignment of teaching tasks to ensure that ED AUs taught by licensed faculty is well above threshold (Actual: 274 CEAB accreditation units (AU)); required: 225 CEAB AU).   | <b>Electrical and Computer Engineering Department Chair</b>           | <b>Completed.</b>                       |
| 2. | <b><u>Electrical Engineering</u></b><br>Increase the teaching of statistics and numerical analysis. (Criterion 3.4.3.1)  | First created two new half weight, lab courses (ECE 204A Numerical Methods 1 and ECE 204B Numerical Methods 2) and then combined the two courses ECE204A/B into a full weight lecture-based course, 'ECE 204 Numerical Methods'.<br><br>The course 'ECE 316 Probability and Random Processes' was revised to 'ECE316 Probability Theory and Statistics' with increased content of statistics | <b>Electrical and Computer Engineering Department Chair.</b>          | <b>Completed</b>                        |
| 3. | <b><u>Electrical Engineering</u></b><br>Increase the number of AUs in ED taught by licensed engineers. (Criterion 3.5.5)   | The program revised the assignment of teaching tasks to ensure that ED AUs taught by licensed faculty is well above threshold (Actual: 233 CEAB AU; required: 225 CEAB AU).  | <b>Electrical and Computer Engineering Department Chair.</b>          | <b>Completed</b>                        |

|    |  |  |                                     |                   |
|----|--|--|-------------------------------------|-------------------|
| 4. | <b>Geological Engineering</b><br>Increase the Engineering Design (ED) and Engineering Science (ES) content of the program. (Criterion 3.4.4).                                      | The curriculum was revised to increase the ES and ED content (Actual: 932 AU; required: 900 AU) and was first implemented in September 2015. New courses were introduced, changes were made to the content of existing courses, and courses were inactivated in support of the proposed changes.   | <b>Geological Program Director.</b> | <b>Completed.</b> |
| 5. | <b>Geological Engineering</b><br>Increase the engineering design content of the GEO 400/401 course (Criterion 3.4.4.4)   | Since Fall 2013, the GEO 400/401 project course has been held in conjunction with the ENVE430/431 course (Environmental Engineering program), which has engineering design content.  | <b>Geological Program Director.</b> | <b>Completed.</b> |
| 6. | <b>Geological Engineering</b><br>Increase the Engineering Science (ES) and Engineering Design (ED) taught by faculty licensed to practice engineering in Canada. (Criterion 3.5.5) | <ul style="list-style-type: none"> <li>• The program has assisted those faculty members teaching ES and ED to apply and receive their PEng license.</li> <li>• The Civil and Environmental Engineering department responsible for delivering most of the courses with ES and ED for the Geological Engineering program is requesting that all new faculty hires apply immediately for licensure and that they work towards satisfying the licensing requirements within five years of their appointment.</li> <li>• The program revised the assignment of teaching tasks to ensure that ES and ED AUs taught by licensed faculty are well above threshold (Actual: 834 CEAB AU; Required: 600 CEAB AU).</li> </ul> | <b>Geological Program Director.</b> | <b>Completed.</b> |

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|----|---|--|--|--------------------------|
| 7. | <p><b>Geological Engineering</b></p> <p>The morale of the students should be improved. The quality of the education experience may be adversely affected by the morale of the students. (Criterion 3.5.1.1)</p> | <p>The program has improved Communication between the program and the students:</p> <ul style="list-style-type: none"> <li>• The Director of Geological Engineering meets with all cohorts of students regularly.</li> <li>• Formal 90-minute ‘town hall’ meetings are held every term with all cohorts on campus</li> </ul> <p>In addition, the field trip course EARTH490 is an elective bringing an exciting highlight to the curriculum.</p> | <p><b>Geological Program Director.</b></p> | <p><b>Completed.</b></p> |
|----|---|--|--|--------------------------|

The Department Chair/Director, in consultation with the Dean of the Faculty shall be responsible for monitoring the Implementation Plan.

Date of next program review: 2020-2021  
Date

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**Signatures of Approval:**

Sign here Vincent Gaudet Date Jan. 7, 2020  
Chair – Electrical Engineering Date

Sign here [Signature] Date Jan. 10, 2020  
Director – Geological Engineering Date

[Signature] Date JAN 7, 2020  
Faculty or Administrative Dean Date

[Signature] Date June 15, 2018  
Associate Vice-President, Academic Date  
(For undergraduate and augmented programs)

Associate Provost, Graduate Studies Date  
(For Graduate and augment programs)



## Checklist for SUC/SGRC Reviewer Feedback Quality Assurance Office

**Two-Year Progress Report: Engineering Undergraduate Programs**

**Name of Reviewer: Russ Tupling**

**Date: 1/13/2020**

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### Does the Two-Year Progress Report:

- |  |   |                             |
|--|---|-----------------------------|
| 1. Clearly describe progress achieved on the various action items in the implementation plan?  | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No |
| 2. Explain convincingly any circumstances that would have altered the original implementation plan?  | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No |
| 3. For items that are behind schedule, propose an amended implementation schedule that is reasonable and credible?   | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No |
| 4. Address significant developments or initiatives that have arisen since the program review process, or that were not contemplated by the program review process? | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No |

### General Comments

**The Engineering progress report was very straightforward and the Faculty programs did an excellent job at addressing all of the reviewers' recommendations. I only had a few minor comments/suggestions related to details on specific actions that were taken to improve student morale in Geological Engineering. These were addressed fully in the revised report.**