



# University of Toronto Quality Assurance Process (UTQAP) Cyclical Review: Final Assessment Report and Implementation Plan

<b>Program(s) Reviewed:</b>	Engineering Science, B.A.Sc. <i>Streams</i> <sup>1</sup> : <ul style="list-style-type: none"><li>• Aerospace Engineering</li><li>• Biomedical Systems Engineering</li><li>• Electrical and Computer Engineering</li><li>• Energy Systems Engineering</li><li>• Engineering Mathematics, Statistics and Finance</li><li>• Engineering Physics</li><li>• Infrastructure Engineering</li><li>• Nanoengineering</li><li>• Robotics Engineering</li></ul>
<b>Division/Unit in which program(s) is housed:</b>	Division of Engineering Science
<b>Commissioning Officer:</b>	Dean, Faculty of Applied Science and Engineering
<b>Reviewers (Name, Affiliation):</b>	<ol style="list-style-type: none"><li>1. Marc Dignam, Professor and Head, Department of Physics, Engineering Physics and Astronomy, Queen's University</li><li>2. David Wilkinson, Provost and Vice-President Academic and Professor, Department of Materials Science and Engineering, McMaster University</li><li>3. David Attwood, Professor in Residence Emeritus, Department of Electrical Engineering and Computer Sciences, University of California, Berkeley</li></ol>
<b>Date of review visit:</b>	November 23 – 24, 2015
<b>Date reported to AP&amp;P:</b>	March 30, 2016

<sup>1</sup> Engineering Science streams are referred to within the Faculty as “options”, and in the undergraduate calendar and on student transcripts as “majors”.

Unless otherwise noted, all bulleted comments apply to all programs reviewed.

## 1 Outcome

The Committee on Academic Policy and Programs (AP&P) concluded that the Decanal response adequately addressed the review recommendations.

## 2 Significant Program Strengths

- Flagship program that is challenging, rigorous and attractive to highly qualified students
- Program structure, with a broad base in engineering during the first two Foundation years, creates engineers with interdisciplinary understanding
- Excellent outcomes for graduates
- Supportive and enthusiastic leadership, associated faculty, and staff
- Valuable ties to alumni and the involvement of a strong Advisory Board have led to enhanced opportunities for student mentorship and employment

## 3 Opportunities for Program Enhancement

The reviewers recommended that the following be considered:

- Adding a hands-on design course to the third year to enable the continuous development of design skills and capability
- Engaging with the Department of Mathematics in the Faculty of Arts & Science to ensure ongoing support for the program
- Monitoring students' stress levels given the challenging nature of the program
- Reflecting on how recruitment strategies might be broadened to attract a distinctive incoming cohort beyond high grades as indicators of achievement
- Pursuing new philanthropic opportunities and continuing to strengthen ties with alumni to build on program strengths

## 4 Implementation Plan

The Dean undertook in consultation with the Division to support the following changes:

- Immediate Term (6 months)
  - Adding a hands-on design course to the third year to enable the continuous development of design skills and capability
    - The Division has incorporated more design into the third year by expanding the seminar series to introduce students to design safety practices and standards relevant to their stream.
    - The Division will search for opportunities to incorporate at least one significant design experience within an existing course in each stream.
  - Engaging with the Department of Mathematics in the Faculty of Arts & Science to ensure ongoing support for the program
    - The Division will benefit from the new Interdivisional Teaching Agreement. The Division will continue to engage in discussions with the Undergraduate Chair in Mathematics to ensure continuity and quality of instruction offered to students.
  - Monitoring students' stress levels given the challenging nature of the program

- In addition to support provided by two dedicated academic counselors, the Division has initiated a two-day boot camp to address study, life, and coping skills, while providing some key background in basic mathematics and engineering concepts. This boot camp will be enhanced further with a module on mental resiliency.
- The Division will review its first and second year curriculum to streamline delivery by more closely integrating material from different courses.
- Reflecting on how recruitment strategies might be broadened to attract a distinctive incoming cohort beyond high grades as indicators of achievement
  - The Division has participated in the Broad Based Admissions committee, which has resulted in applicants' submitting a real-time video and written response that are evaluated by a panel of trained volunteer alumni assessors. The Division will incorporate appropriate changes from this pilot in admissions processes going forward and will continue to look for other means of distinguishing promising candidates for Engineering Science.
- Pursuing new philanthropic opportunities and continuing to strengthen ties with alumni to build on program strengths
  - The Division has piloted the EngSciConnect online portal as a means of achieving more meaningful alumni engagement.
- Medium Term (1-2 years)
  - Adding a hands-on design course to the third year to enable the continuous development of design skills and capability
    - The Division will review the third year curriculum over the next two years with a view to incorporating more design into at least one key course in each stream.
  - Pursuing new philanthropic opportunities and continuing to strengthen ties with alumni to build on program strengths
    - The Division will continue to build out the EngSciConnect platform so that alumni are fully engaged with the unit's mission.
- Longer Term (3-5 years)
  - Pursuing new philanthropic opportunities and continuing to strengthen ties with alumni to build on program strengths
    - The Dean's Office and the Division will continue to promote both engagement and advancement during the next five years, with a view to obtaining significant support for program priorities.

The Dean's Office will follow up annually with the unit to assess progress.

## 5 Executive Summary

The reviewers identified the program's strengths as its position as a flagship program that is challenging, rigorous and attractive to highly qualified students; the program's structure, with a broad base in engineering during the first two Foundation years, that creates engineering graduates with interdisciplinary understanding; the excellent outcomes for graduates; supportive and enthusiastic leadership, associated faculty, and staff; and valuable ties to alumni and the involvement of a strong Advisory Board. The reviewers recommended that the following issues be addressed: adding a hands-on design course to the third year; engaging with the Department of Mathematics in the Faculty of Arts & Science to ensure ongoing support for

the program; monitoring students' stress levels given the challenging nature of the program; reflecting on how recruitment strategies might be broadened to attract a distinctive incoming cohort beyond high grades as indicators of achievement; and pursuing new philanthropic opportunities and continuing to strengthen ties with alumni to build on program strengths. The Division will review the third year curriculum over the next two years with a view to incorporating more design into at least one key course in each major. The Division has initiated a two-day boot camp to address study, life, and coping skills. A new admissions process is being piloted. The Division will continue to build out the EngSciConnect platform so that alumni are fully engaged with the unit's mission. The Committee on Academic Policy and Programs (AP&P) concluded that the Decanal response adequately addressed the review recommendations.