



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

<b>Program(s):</b>	Computer Science, B.Sc., Hons: Specialist and Specialist Co-op, Major and Major Co-op, Minor Mathematics, B.Sc., Hons: Specialist and Specialist Co-op, Major and Major Co-op Mathematics and its Applications, B.Sc., Hons: Specialist and Specialist Co-op Quantitative Analysis, B.Sc., Hons: Specialist and Specialist Co-op Statistics, B.Sc., Hons: Major and Major Co-op, Minor
<b>Division/Unit:</b>	Department of Computer and Mathematical Sciences, UTSC
<b>Commissioning Officer:</b>	Vice Principal and Dean, UTSC
<b>Reviewers (Name, Affiliation):</b>	1. Dr. Joseph Halpern, Chair, Department of Computer Science, Cornell University 2. Dr. Helene Massam, Professor, Department of Mathematics and Statistics, York University 3. Dr. Haynes Miller, Associate Head, Department of Mathematics, MIT
<b>Date of review visit:</b>	November 10-12, 2011
<b>Date reported to AP&amp;P:</b>	April 3, 2012

## 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

- High level of faculty research activity
- Well thought out programs
- Faculty dedication to student learning

### 3 Opportunities for Program Improvement and Enhancement

The reviewers recommended that the following be considered:

- Increasing the emphasis on mathematical and scientific communication in all programs
- Increasing the number of upper-level courses available to students
- Allowing greater flexibility in course selection in the computer science program
- Creating one or more additional streams in the statistics program to respond to student demand and capitalize on the department's unique strengths
- Enhancing the co-op option and opportunities for student research and engagement outside the classroom

### 4 Implementation Plan

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

- Immediate Term (6 months)
  - Increasing the emphasis on mathematical and scientific communication
    - The Department clarified that the specialist programs in computer science already require a course that develops skills in mathematical and scientific communication by involving student essays and presentations; the required research project in the specialist program in quantitative analysis also already develops these skills
  - Allowing greater flexibility in course selection
    - The Department has made considerable changes to the specialist program in computer science to support greater flexibility, including a one FCE reduction in overall requirements, the introduction of a new course in artificial intelligence, the broadening of the scope of electives, and the streamlining of prerequisites
- Medium Term (1-2 years)
  - Increasing the emphasis on mathematical and scientific communication
    - The Department has created opportunities for faculty to share assessment methods that emphasize skills in mathematical and scientific communication to develop and encourage more widespread adoption of best practices
  - Increasing the number of upper-level courses
    - The Department has increased the number of D-level courses since 2007 (from 5 to 13); the Department added one more course in Fall 2012 and will add two more in Fall 2013
  - Creating one or more additional streams in the statistics program
    - The Department will refocus the specialist program in quantitative analysis emphasizing the finance stream, introduce a new specialist stream in statistical machine learning and data mining, and introduce a new minor in applied statistics targeting students in health studies programs, biological sciences, psychology and management
  - Enhancing the co-op option and opportunities for student research and engagement
    - The Department is exploring ways to increase participation in the mathematics co-op program in conjunction with the UTSC Co-op Office

- The Department has met to discuss ways to increase opportunities for research and engagement, including using Undergraduate Summer Research Awards and University of Toronto Excellence Awards to engage students, or launching a lecture series to introduce different research areas and ideas to undergraduates
- Longer Term (3-5 years)
  - Increasing the number of upper-level courses
    - The Dean will continue to work with the Department to find resources to increase of the number of upper-level courses

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

## 5 Executive Summary

The reviewers identified the programs' strengths as active faculty research; well thought out programs; and faculty dedication to student learning. The reviewers recommended that the following issues be addressed: mathematical and scientific communication, course selection, program structure, and co-op and research opportunities for students. The Department has created opportunities for faculty to share assessment methods that emphasize skills in mathematical and scientific communication to encourage more widespread adoption of best practices. Students in many of the specialist programs already take required courses that support the development of mathematical and scientific communication skills. The Department will continue to add upper-level courses in 2012 and 2013, and the Dean is working with the Department to find resources to support a further increase in the number of upper-level courses in the longer term. Changes to the computer science specialist program, effective Fall 2012, will enable greater flexibility in course selection. The Department will shortly be bringing forward several modifications to its programs (one new and one refocused specialist stream, and a new minor) to take advantage of its strengths in statistics. The Department is working with the UTSC Co-op Office to explore ways to expand co-op participation and is committed to finding ways to offer students more opportunities for engagement outside the classroom. The Committee on Academic Policy and Programs concluded that the Decanal response adequately addressed the reviewers' recommendations.