**FINAL ASSESSMENT REPORT**
**Institutional Quality Assurance Program (IQAP) Review**
**Civil Engineering**
**Undergraduate Program**

**Date of Review:** March 31 – April 1, 2016

*In accordance with the University Institutional Quality Assurance Process (IQAP), this final assessment report provides a synthesis of the external evaluation and the internal response and assessments of the undergraduate programs delivered by the* ***Department of Civil Engineering****. This report identifies the significant strengths of the programs, together with opportunities for program improvement and enhancement, and it sets out and prioritizes the recommendations that have been selected for implementation.*

*The report includes an Implementation Plan that identifies who will be responsible for approving the recommendations set out in the Final Assessment Report; who will be responsible for providing any resources entailed by those recommendations; any changes in organization, policy or governance that will be necessary to meet the recommendations and who will be responsible for acting on those recommendations; and timelines for acting on and monitoring the implementation of those recommendations.*

## Executive Summary of the Cyclical Program Review of the Undergraduate Civil Engineering Program

In accordance with the Institutional Quality Assurance Process (IQAP), the Department of Civil Engineering submitted a self-study in January 2016 to the Associate Vice-President, Faculty to initiate the cyclical program review of its undergraduate program. The approved self-study presented program descriptions, learning outcomes, and analyses of data provided by the Office of Institutional Research and Analysis. Appendices to the self-study contained all course outlines associated with the program and the CVs for each full-time member in the department.

One arm's length external reviewer from Ontario and one internal reviewer were endorsed by the Dean, Faculty of Engineering, and selected by the Associate Vice-President, Faculty. The review team reviewed the self-study documentation and then conducted a site visit to McMaster University on March 31 – April 1, 2016. The visit included interviews with the Provost and Vice-President (Academic); Associate, Faculty, Dean and Associate Dean of the Faculty of Engineering, Chair of the department and meetings with groups of current undergraduate students, full-time faculty and support staff.

The Chair of the department and the Dean of the Faculty of Engineering submitted responses to the Reviewers' Report (October 2016). Specific recommendations were discussed and clarifications and corrections were presented. Follow-up actions and timelines were included.

The Final Assessment Report was prepared by the Quality Assurance Committee to be submitted to Undergraduate Council, and Senate (December 2016).

**Strengths**

In their report (September 2016), the Review Team noted several strengths of the Civil Engineering program:

- High quality undergraduate program
- Forward looking, and innovative with an emphasis on experiential learning
- Program of high value, attracts high-achieving students
- Highly motivated and knowledgeable faculty members
- Five new faculty members added since 2010
- Outstanding group of faculty
- Four endowed chairs and one Canada Research Chair
- The volume of research and publication is outstanding
- 30% of the students in all years of Civil Engineering are on the Dean's Honour List

**Areas for Improvement and/or Enhancement**

In their report, the reviewers noted that despite improvements over the past five years, there remains room for improvement in teaching effectiveness in some cases. Some instructors would benefit from workshops offered by MIIETL on the newest pedagogical innovations for improving student engagement. Further, work is required to improve the communication skills of TAs, along with effort to improve the knowledge of some TAs in the courses to which they are assigned. Students would also feel better prepared for the job market if more opportunities were available to acquire facility in using analysis and design software and software related to computer graphics for civil engineers, especially AutoCAD. More instruction in the area of transportation is needed but this requires hiring of more faculty with this specialization. Finally, with an eye to future planning, the department's enrolment has increased to saturation over the past five years. Further increases in student numbers would threaten the impressive improvements made over the past five years unless commensurate increases in faculty hires and physical space are provided. Laboratories and their equipment would need to be provided.

The Dean of the Faculty of Engineering, in consultation with the Chair of the Department Civil Engineering shall be responsible for monitoring the recommendations implementation plan. The details of the progress made will be presented in the progress report and filed in the Vice-Provost, Faculty's office.

## Summary of the Reviewers' Recommendations with the Department's and the Dean's Responses

**Recommendations**

| Recommendation | Proposed Follow-Up | Responsibility for Leading Follow-Up | Timeline for Addressing Recommendation |
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| Attention should be paid to the drop in | Issue will be addressed through a memo to the | Department Chair | Over next 12 months, with continuing |

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| student performance from high school to Year 1 Engineering | Associate Dean, with a cc to the director of Level 1. | | evaluation of effectiveness |
| Consideration should be given to establishing contact between the Department of Civil Engineering and the students in Year 1 of the undergraduate program through teaching of some of the course material in Year 1. | Chair to discuss possible increase in exposure of Civil Engineering to Level 1 students with Director, Level 1. | Department Chair | Over next 12 months, with continuing evaluation of effectiveness |
| Hires should be made to augment instruction in transportation planning and pavement design. | A Transportation Hire search will be conducted in 2016/17 for July 1/17 start. | Department Chair | Over next 12 months |
| Consideration should be given to provide more opportunities for students to improve their knowledge of software tools related to analysis and design of civil engineering systems, such as Revit and SAP. Similar improved instruction should be given in the use of civil engineering graphics, such as plans and elevations, and in the use of computer graphics programs, such as AutoCAD. | The issue to be considered by the structural/geotechnical curriculum committee (where Revit, SAP and AutoCAD are most germane) with a general discussion at a future departmental meeting. | Department Chair | Over next 12 months, with continuing evaluation of effectiveness |
| Attention should be paid to re-evaluating the Capstone project to allow more choice of topics. | Direction has been given to the capstone course instructors to expedite this point. | Department Chair | Over next 12 months, with continuing evaluation of effectiveness |
| Instructors should be strongly encouraged to use the workshops and individual assistance | Encouragement to fully use MIIETL resources will be done now and over time by the | Department Chair | Over next 12 months, with continuing evaluation of effectiveness |

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| offered by MIIETL to continue to develop their teaching effectiveness. | Department Chair | | |
| The department and Faculty should give attention to improving student awareness in Year 1 of the importance of oral and written language skills in all career options. | Issue will be addressed through a memo to the Associate Dean, with a cc to the Director, Level 1. Year 1 has enhanced reporting requirements of ENG 1P03 and 1C04 to include more report writing. | Department Chair | Over next 12 months, with continuing evaluation of effectiveness. |
| TAs should be strongly encouraged to improve these skills, as well as their teaching skills, through offerings at MIIETL and with the help of the School of Graduate Studies. | Improvements to the training of TAs will be expedited at the start of the 2016/17 academic year through a mentoring program and workshop offerings. We will also initiate a formal exit evaluation for TAs at the end of each term. | Department Chair | Over the next 12 months, with continuing evaluation of effectiveness. |
| Student evaluation of individual TA performance should be undertaken by all instructors | The evaluation process for individual TA performance will be expedited for the start of the 2016/17 academic year | Department Chair | Over the next 12 months, with continuing evaluation of effectiveness |
| Consideration should be given to the optimum number of students to be accepted into Civil Engineering programs. | Ongoing discussions will continue on this issue with the Associate Dean's Office, in the context of lab space, TA resources, technician resources and other constraints | Department Chair | Over the next 12 months, with continuing evaluation of effectiveness |
| Attention should be paid to providing a more advocacy-based approach in finding appropriate co-op positions | Issue will be addressed through a memo to the Associate Dean with a cc to the Manager of the Engineering Co-op and Career Services office. | Department Chair | Over next 12 months, with continuing evaluation of effectiveness |

**Dean's Response:**

As detailed in the Chair's response, the recommendations in the review have led to a series of on-going discussions and actions within the Department, the major ones of which are the approval of a new Faculty position in Transportation, a discussion surrounding providing further opportunities for enhanced use of advanced software tools in the curriculum (e.g. advanced design and drawing tools), widening of the capstone project experience, increased interaction between instructors and MIETL, and enhanced training of TAs to improve the undergraduate experience. A number of these actions have been completed with the majority being address on an on-going basis. Several other actions, more appropriately addressed at the Faculty level (e.g. an enhanced co-op positions), are also on-going.

Overall, the dean is satisfied with the replies of the department to the concerns raised by the IQAP reviewers.

## Quality Assurance Committee Recommendation

**McMaster's Quality Assurance Committee (QAC) reviewed the above documentation and the committee recommends that the program should follow the regular course of action with an 18-month progress report and a subsequent full external cyclical review to be conducted no later than 8 years after the start of the last review.**