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

**Date of Review:** March 28 – March 29, 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 Materials Science and 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 Materials Engineering Program

In accordance with the Institutional Quality Assurance Process (IQAP), the Department of Materials Science and Engineering submitted a self-study in January 2016 to the Associate Vice-President, Faculty to initiate the cyclical program review of its undergraduate programs. 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 the United States 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 28 – March 29, 2016. The visit included interviews with the Provost and Vice-President (Academic); Associate Vice-President, 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 Director of the program and the Dean of the Faculty of Engineering submitted responses to the Reviewers' Report (January 2017). 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 2017).

**Strengths**

In their report (April 2016), the Review Team highlighted the following strengths of the program:

- International reputation, especially in the areas of thermodynamics and phase transformations

**Areas for Improvement and/or Enhancement**

The Review Team provided seven suggestions for improvement. Details of these suggestions are provided in the chart below.

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

**Recommendations**

| Recommendation | Proposed Follow-Up | Responsibility for Leading Follow-Up | Timeline for Addressing Recommendation |
|---|---|---|---|
| In order to recruit more talented students, incorporate more challenging and qualitatively advanced topics in the introductory 1M03 class | This topic has been discussed in the past during MSE departmental meetings. We will continue to identify possible topic areas. | MSE Chair and instructors of 1M03 | Fall term 2016 |
| Build on the interdisciplinary nature of Materials Science by offering elective courses from other departments | This recommendation has also been discussed during departmental meetings and efforts are already underway to offer a broader range of electives. For example, a course on photovoltaics from Engineering Physics has recently been added to the list of approved technical electives. | MSE Chair | On going |
| Develop a vision for the future of biomaterials within the MSE department | This topic will be addressed in the MSE hiring plan for 2016-17 | MSE Chair | August 2016 |
| Institute a plan to optimize the effectiveness of teaching assistants | The following changes will be implemented: 1) Based on a suggestion from the | MSE Chair and Associate Chair of Graduate Studies | On going |

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| | IQAP review team, evaluations specific to TAs will be conducted in each course at roughly the midpoint of the term. Any TA who is found to be inadequate will meet with the Chair and Associate Chair for Graduate Studies to discuss plans for improvement.<br>2) Although we try to align TA expertise with classes, we endeavour to improve this process in the future.<br>3) Hire more undergraduate TAs by allowing faculty members to transfer fourth year PhD students to RA funding. | | |
| Develop a clear picture of in-course students' participation in the co-op program | The IQAP review team noted that the MSE participation in the co-op program was substantially less frequent than in other departments and they suggested this may be affecting our recruiting ability. However, we have researched the participation rate in more detail. For the incoming second year class in 2016-17, 35 students out of 44 total have listed co-op as their degree choice. Further, it appears that many students in MSE participate in internships, but do not officially enrol in the co-op program due to the prohibitively high cost. Thus, we conclude that | | |

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| | students are well aware of the co-op opportunity, but simply elect not to participate. We will pursue no follow up at this time. | | |
| Enhance the opportunities for structured oral presentations | This topic has been discussed at our recent annual Grad Attributes meeting. With respect to oral presentations, in the future we will provide clear and consistent expectations to our students throughout our curriculum. In addition we will attempt to identify additional courses in which oral presentation can be implemented. | MSE department | Fall term 2016 |
| Make a plan for a new foreign exchange program to replace the one with Grenoble | We are currently investigating an exchange program with the University of Lorraine and Ecole de Mines de Nancy | Andre Phillion<br>Hatem Zurob | On going |

**Faculty Response:**

As detailed in the Chair's response, the recommendations in the review have led to a series of discussions within the Department focused on TA effectiveness, recruitment into the Materials Science and Engineering program from Engineering I, enhancing the number of technical electives outside of the Department, and development of a strategic vision for biomaterials within the Department of Materials Science and Engineering. At this time, the Department is addressing all of the recommendations made in the report and a significant number have been completed.

Overall, the dean 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.**