**FINAL ASSESSMENT REPORT**

**Institutional Quality Assurance Program (IQAP) Review**

**Chemistry and Chemical Biology**

**Undergraduate Programs**

**Date of Review:** March 9 - 10, 2015

*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 Chemistry and Chemical Biology****. 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 Chemistry and Chemical Biology Programs**

In accordance with the Institutional Quality Assurance Process (IQAP), the Department of Chemistry and Chemical Biology submitted a self-study in January 2015 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.

Two arm’s length external reviewers, both from Ontario and one internal reviewer were endorsed by the Dean of Science, 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 9 – 10, 2015. The visit included interviews with the Provost and Vice-President (Academic); Associate Vice-President, Faculty, 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 Science submitted responses to the Reviewers’ Report (May 2015). 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 QAC to be submitted to Undergraduate Council, and Senate (October 2015).

In their report (April 2015), the Review Team was impressed by the quality of both the undergraduate chemistry and chemical biology programs. The Review Team noted that both programs offer a comprehensive array of theory together with a practical lab experience that must rank amongst the best in Canada. The Review Team acknowledged that the undergraduate students they met with were enthusiastic about their respective programs of study, expressed a high degree of satisfaction with the two academic programs, and as well with the level of support offered by the Department and the faculty members teaching them.

The following program strengths and areas for improvement were noted:

**Strengths**

The reviewers made special mention of the extensive and superior quality of the experiential aspects of both programs. The report highlighted that these unusually intense integrated laboratory exercises bring the programs to the forefront of undergraduate chemistry (and probably all experimental science) programs across Canada.

The report also highlights that the department has been successful in obtaining student feedback over multiple years, which has led to incremental improvements in many courses.

**Areas for Improvement**

The report indicated that while the programs are of high quality, overall enrolment in both Honours programs is relatively low compared to others offered in the Faculty of Science. The reviewers noted that all chemistry programs in Canada are up against a demographic shift, namely an increased desire amongst students to engage with Life Science programs due to the perception that only Life Science can lead to medical school. While the reviewers acknowledged that this problem is difficult to address, they stressed the importance of the department engaging students in first year courses.

Another key concern of the reviewers was the high attrition rate between second and third year, specifically in the Chemical Biology program. The reviewers strongly encouraged the Department to review the workload in the second year of the program.

With respect to communications, the review team felt that the department could improve upon communicating its events through the academic year and the report suggested that the department increase its use of social media to communicate more effectively with students.

The Dean of the Faculty of Science, in consultation with the Chair of the Department of Chemistry and Chemical Biology shall be responsible for monitoring the recommendations implementation plan. The details of the progress made will be presented in the 18-month Follow Up Report and filed in the Associate Vice-President, Faculty’s office.

**Summary of the Reviewers’ Recommendations with the Department’s and the Dean’s Responses**

**Recommendations**

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| **Recommendation** | **Proposed Follow-Up** | **Responsibility for Leading Follow-Up** | **Timeline for Addressing Recommendation** |
| Look into courses that can be deferred to 3rd or 4th year to add flexibility in course sequence and electives within the program to potentially reduce attrition rates, without affecting quality | Review course curricula for 4PC3/4PD3 with a view to increasing the attractiveness of the courses to students in physics, material sciences, etc. | Chemistry 4PC3/4PD3 course instructors | Update at progress report |
| Look into courses that can be deferred to 3rd or 4th year to add flexibility in course sequence and electives within the program to potentially reduce attrition rates, without affecting quality | Consider development of a new level 3 separations course | Undergraduate Curriculum Committee | Update at progress report |
| Look into courses that can be deferred to 3rd or 4th year to add flexibility in course sequence and electives within the program to potentially reduce attrition rates, without affecting quality | Follow up with BBS regarding Biochem 3G03 | Chair | June 2015 |
| Further engagement with first year students and continuous review and improvement of student engagement in the first year chemistry courses | Review and enhance Level 1 recruiting “tools” | RIO Committee | Update at progress report |
| Further engagement with first year students and continuous review and improvement of student engagement in the first year chemistry courses | Review chemistry course offerings at competitor institutions; consider new service course offerings and modifications of existing courses to attract broader clientele | Undergraduate Curriculum Committee | Update at progress report |
| Review workload in second year Chemical Biology (specifically) | Develop plan for undergraduate curriculum renewal | Chair | Update at progress report |
| Review workload in second year Chemical Biology (specifically) | Enhance the follow-up on annual Program Refinement exercises in both programs | Chair | Update at progress report |
| Review workload in second year Chemical Biology (specifically) | Remedy workload issues in ChemBio 2Q03 and 2AA3 | Chair | Update at progress report |
| Increase social media presence (activate a Facebook page and/or a Twitter feed) | Create new committee to redesign departmental webpage; establish use of social media tools to enhance contact with current students and with alumni; establish workable mechanism for maintaining these resources | Chair | Update at progress report |
|  | Develop exit surveys for graduating students and 2 – 3 year alumni surveys; develop and maintain database of student contact information | Chair | Update at progress report |
|  | Examine role of communication and other soft skills development in the two programs to ensure adequate and equal representation in the curricula | Undergraduate Curriculum Committee | Update at progress report |
|  | Introduce annual or semiannual departmental reviews of course grades prior to end-of-term grade submission and approval | Chair | Update at progress report |
|  | Create faculty/staff/student committee to examine efficiencies and inefficiencies in undergraduate laboratory space usage; create a record of what is used when and to what end for all areas | Chair | Update at progress report |
|  | Develop new end-of-course surveys based on NSSE-CLASSE survey system | Chair | Update at progress report |
|  | 2014-15 Engaging Lecture Committee to review and modify initial production | 2014-15 Engaging Lecture Committee | Update at progress report |
|  | Review laboratory exercises and modify those for which time over runs are a problem | Chem 2LA3/2LB3 and ChemBio 2L03 instructors | Update at progress report |

**Quality Assurance Committee Recommendation**

McMaster’s Quality Assurance Committee (QAC) reviewed the above documentation and the committee recommended that the program should follow the regular course of action with an 18-month follow-up report and a subsequent full external cyclical review to be conducted no later than 8 years after the start of the last review. The follow-up report should include an outline of strategies to increase total enrollments in both Programs and an update on the efforts to reduce attrition in the Programs, particularly between levels II and III of the Chemical Biology program.