FINAL ASSESSMENT REPORT - DRAFT

Institutional Quality Assurance Program (IQAP) Review

Biochemistry

Date of Review: April 4 - 5, 2017

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 ***Biochemistry*** *undergraduate program delivered by Biochemistry and Biomedical Sciences. 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 Biochemistry Program

In accordance with the Institutional Quality Assurance Process (IQAP), the Biochemistry program submitted a self-study in February 2017 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, Faculty 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 April 4 - 5, 2017. The visit included interviews with the Provost and Vice-President (Academic); Vice-Provost, Faculty, Dean of Science and Chair of the department and meetings with groups of current undergraduate students, full-time faculty and support staff.

The Chair of the program and the Dean of the Faculty of Science submitted responses to the Reviewers' Report (August 2017, June 2018). Specific recommendations were discussed and clarifications and corrections were presented. Follow-up actions and timelines were included.

Strengths

In their report (May 2017), the Review team noted that the Biochemistry program is incredibly strong and provides students with an engaging and current curriculum with emphasis on all critical areas ranging from memorization of fundamental key concepts, development of critical thinking, exposure to "real world" lab experience, and development of "soft skills" including effective teamwork, public speaking, and reading primary literature. Many students in this program participate in laboratory research and a real strength of the program is the true excellence of the faculty and facilities they have access to.

The reviewers' further noted that the program's success is reflected by the fact that the students in the program are both largely happy and extremely loyal to the school. Many of the students choose to stay at McMaster for their graduate degrees and approximately 40% of the graduate students in Biochemistry were undergraduates from this program. This is a strong endorsement showing that both students and faculty are generally happy with the program.

Further highlights identified in the report include:

- On average, each year, 50-90 students have participated in research projects due to the increased interest and demand from students to obtain first-hand research experience. In order to facilitate and meet the increased demand, we opened up our restrictions to only being permitted to do research with a faculty member to any faculty member at the university who would supervise a project suitable for a degree in Biochemistry. And in spite of the opening of a new program in Biomedical Discovery and Commercialization which requires a thesis placement, we continue to accommodate large numbers of students in our research courses.
- The core biochemistry program is strong and emphasizes transferable skills and active learning
- The reviewers identified the teaching professors and support staff as a key strength to the program.

Areas of Improvement

In their report, the Review Team identified some recommendations for areas of improvement as outlined below.

- Increasing the number of course offerings in areas of interest to students, which will also facilitate scheduling for co-op students which always proves to be a challenge due to the distribution of the co-op terms. For this reason, we have included student representation on our undergraduate curriculum committee for the first time this year, and will continue with this very positive addition to the committee.
- Students expressed mixed/negative feelings about the launch of the Biomedical Discovery and Commercialization program three years ago. Some of the issues are no doubt growing pains and we have always been mindful of the divergence and perceived competition. These will be

identified and resolved over time and with careful handling, Our goal is to have two unique programs but with equity wherever feasible.

- The reviewers suggested that we use focus groups in light of recent changes in the department and the introduction of the new Biomedical Discovery and Commercialization program. While we formerly conducted round table sessions at the end of each academic year, attendance was very low, and these sessions were abandoned, we propose that scheduling such groups in January will improve attendance and feedback.
- Career mentoring was formerly included in Biochemistry 2L06 upon its first few offerings, however, the course has changed with the introduction of a new instructor. This can be reintroduced to the course or another suitable area in our programming.

The Dean of the Faculty of Science, in consultation with the Chair of the program 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 Dean's Responses

Recommendation	Proposed Follow-Up	Responsibility for Leading Follow-Up	Timeline for Addressing Recommendation
1.Top-to-bottom review of the program and curriculum in light of changes that have occurred over the past eight years	In light of changes in our faculty complement, and in line with discussions at the department educational retreat in November 2016, and the feedback from the IQAP review, we propose to develop suites of courses that would flow from level II through to IV that would align with our faculty expertise. Program learning objectives (PLOs) and course learning objectives (CLOs) will be integrated in course outlines across the curriculum in a format similar to the Faculty of Engineering and the School of Business with assistance and direction from the MacPherson Institute	Michelle MacDonald, Associate Chair, Undergraduate Studies Undergraduate Curriculum Committee Vivian Leong, Undergraduate Instructional Assistant	General overview and plan of curriculum changes to be completed by September 2018 for implementation. PLOs and CLOs to be integrated in course outlines by September 2018.
2.Expand course offerings	As above, in Recommendation #1, in light of discussions at the educational retreat in November 2016, and the feedback from the IQAP review, we propose to develop suites of courses that are of interest to students and in the areas of expertise of our faculty members	Michelle MacDonald, Associate Chair, Undergraduate Studies Undergraduate Curriculum Committee	Mount 1-2 additional courses on dean's permission for 2018-19 Propose 2-3 additional courses for 2019-20 during the next calendar cycle

3.Define how the older Biochemistry program fits in with the new BCD undergraduate program and work towards improving harmonization	We will continue to work closely with the BDC program administration to ensure consistency and equality to the extent that it is possible. We will ensure that there are unique and distinct aspects to each program through the re-introduction of annual focus groups with the Biochemistry program students. Student representation on the Undergraduate Curriculum Committee was introduced this year. These student impressions are no doubt growing pains and we have always been mindful of the divergence. These will likely	Michelle MacDonald, Associate Chair, Undergraduate Studies	Ongoing Next student focus group will occur in January to optimize student turn out vs the end of the year.
	be resolved over time and with careful handling,		
4.Support teaching staff	Our complement of teaching faculty are dedicated to optimizing the student learning experience and creating an environment which supports teaching and research. Onboarding of new faculty members to the teaching roster in 2018-19 will alleviate some of the pressures on the teaching faculty.	Michelle MacDonald, Associate Chair, Undergraduate Studies	Ongoing
5.Improve the TA experience	The process for hiring TAs is transparent and involves a matching process which takes into consideration the optimal arrangement for students, while trying to meet the requests of the TAs and the instructors. Discussions have already taken place between the associate chair of undergraduate education and the associate chair of graduate education to create a mentoring program for graduate students and post-docs with an interest in teaching. The process will be piloted beginning in 2018-19.	Michelle MacDonald, Associate Chair, Undergraduate Studies	Implementation for 2018-19
6.Move carefully toward establishing the program under a single administrative Faculty	Discussions have been ongoing for the past year between both faculties. Transition to the faculty of health sciences is dependent on an agreement between both faculties.	Karen Mossman, Chair	Ongoing. Possible transition to be initiated in 2018-19.

Dean's Response, Faculty of Science:

The Dean would like to thank the members of the review team for their report, including the recommendations and suggestions. Due to some turnover in the Office of the Dean of Science, the response of the Dean has been considerably delayed. The Dean would like to also thank Michelle MacDonald, Associate Chair of Undergraduate Studies, Department of Biochemistry and Biomedical Sciences for the thoughtful and comprehensive Program Response. The reviewers report highlighted several areas of strength in the undergraduate programs in Biochemistry. In particular, the structure of the curriculum with an innovative and team based second year lab course, feeding into a suite of upper year courses based on the Program learning objectives was highlighted, along with the strength and dedication of the teaching faculty and staff. The review team recommendations have provided areas for continued improvement and consideration and have all been incorporated into a plan for moving forward.

Due to the considerable delay between the development of the Program response and the submission of the Dean's response, the Dean was now able to provide more context for some of the specific recommendations.

Recommendation: "Move carefully toward establishing the program under a single administrative Faculty. This recommendation stimulated a series of conversations related to the administrative structure of the Biochemistry Program and any potential negative consequences of this administrative structure." The review team noted that the main concerns were the fact that "This means that the Chair is burdened with the task of evaluating and reporting on the activity of the teaching personnel to two different Deans. Students also complained about hidden inter-faculty barriers that occur that block them from taking many classes they are interested in."

The Dean agrees with the stated concern that any move would have to be very carefully planned and as such we have not moved beyond the initial discussion stage. Biochemistry students enter their program at Level 2 after successful completion of Level 1 Science. If the Biochemistry program was to move to the Faculty of Health Sciences, this would require students to switch Faculties or to enter into the Faculty of Science at level 1, thereby resulting in a very complex series of changes and potentially limiting student flexibility for program choice. Additionally, all of the student support services including Program advising and career and co-op services are provided through the Faculty of Science and would have to be developed from within the Faculty of Health Sciences should any change be advanced. As such, the Faculty has taken some steps to address the specific concerns of the review committee. While the Chair of Biochemistry and Biomedical Sciences still reports to governing bodies in both Faculties, changes have been forwarded to the tenure and promotion practices such that the cases for tenure, promotion (and permanence) will now only flow through the Faculty of Health Sciences, reducing one area of dual report. With respect to expansion of student offerings, one way this concern has been addressed is through the offering of 2 additional elective courses on "Dean's Permission" in 2018/2019 with more on-going curriculum changes to be approved in due course.
While not a specific recommendation, it was stated in the review team report that there was "A desire from students for more career mentorship. Some students stated that they chose the Biochemistry program because it kept their options open, but felt they were not truly aware of what options are available outside of graduate research or professional schools."This desire for additional career supports was also expressed by students in other programs in the Faculty of Science, and as such the Faculty is moving forward with plans to hire a "career integration officer", to assist with the development and implementation of career mentorship programming and supports for all undergraduate and graduate students in the Faculty of Science.

As the Faculty of Science moves forward with its commitment to excellence in undergraduate education, progress will be monitored with respect to the individual recommendations of the review team and engage in the highly valued partnership with the Faculty of Science in refining and delivering these outstanding undergraduate programs in Biochemistry.

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 a progress report and subsequent full external cyclical review to be conducted no later than 8 years after the start of the last review.