

FINAL ASSESSMENT REPORT

Institutional Quality Assurance Program (IQAP) Review

Biomedical Discovery and Commercialization BSc., MSc.

Date of Review: April 26 and 27, 2023

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 and graduate Biomedical Discovery and Commercialization programs. This report identifies the significant strengths of the program, 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 Review

In accordance with the Institutional Quality Assurance Process (IQAP), the Biomedical Discover and Commercialization program submitted a self-study in March 2023 to the Vice-Provost Teaching and Learning and Vice-Provost and Dean of Graduate Studies to initiate the cyclical program review of its 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 the CVs for each full-time member in the department.

Two arm's length external reviewers and one internal reviewer were endorsed by the Dean, Faculty of Health Sciences, and selected by the Vice-Provost Teaching and Learning and Vice-Provost and Dean of Graduate Studies. The review team reviewed the self-study documentation and then conducted a virtual review on April 26th and 27th, 2023. The review included interviews with the Deputy Provost; Vice-Provost Teaching and Learning and Vice-Provost and Dean of Graduate Studies, Vice-Deans of the Faculty of Health Sciences, Director of the program and meetings with groups of current students, full-time faculty and support staff.

The Director of the program and the Dean of the Faculty of Health Sciences submitted responses to the Reviewers' Report (October 2023 and February 2024 respectively). Specific recommendations were discussed and clarifications and corrections were presented. Follow-up actions and timelines were included.

Strengths

- The BDC & MBDC programs align very well with McMaster's Strategic Mandate.
- The 4+1 BDC-MBDC program is unique in Canada and crosses disciplines and Faculties to equip students with a unique skill set that supports an essential component of Canadian industry.
- Cooperation between the Department of Biochemistry & Biomedical Sciences and the DeGroot School of Business.
- Internationally recognized faculty members and research programs.
- Outstanding leadership within the Department and the Faculty.
- World-class facilities and instrumentation.
- Engagement of the whole faculty body in the programs, from didactic teaching to mentoring.
- The high number of MBDC students who end up finding employment in pharma/biotech.
- The balance that the program has struck in both biomedical and business training.

Areas for Improvement

- Expansion of the BDC undergraduate program via adjustment of the funding allocation prioritized by McMaster through its Strategic Mandate Agreement with the Province.
- Expansion of the MBDC program by adjustment of Admission requirements for external applicants.
- Improved alignment of the Commerce curriculum with the focus of the BDC undergraduate program.
- Clearer recognition of Biochemistry & Biomedical Sciences faculty as instructors and mentors within the program.

Implementation Plan

BBS = Department of Biochemistry & Biomedical Sciences; BDC = Biomedical Discovery & Commercialization Program; FHS = Faculty of Health Sciences

Recommendation	Proposed Follow-Up	Responsibility for Leading Follow-Up	Timeline for Addressing Recommendation
<p>That the program considers ways to expand and optimize the business curriculum beyond that offered by the DeGroote School of Business, to better align with the broad range of career interests of students.</p>	<p>Given the recent growth of non-clinical programs in FHS with a business aspect to their training, the Director BDC will investigate the possibility of shared curriculum content and instructors.</p>	<p>Director, BDC</p>	<p>1-3 years</p>
<p>That the program explores the feasibility of offering an option for an 18-month or 2-year version of the graduate MBDC program, primarily to allow more non-BDC students to enter MBDC by providing a route for them to catch up on needed components of curriculum prerequisites.</p>	<p>The Director BDC will explore expanding the MBDC program to include an optional summer 4-month curriculum prior to the September start of the existing program to fill gaps in scientific or business training.</p>	<p>Director, BDC</p>	<p>1-3 years</p>
<p>That the Faculty of Health Sciences centralize advising and programming supports for students.</p>	<p>BDC will pass this recommendation on to the Vice-Dean Education in FHS. As FHS includes a large diversity of both clinical and non-clinical programs with very different requirements, until such time as centralized advising exists BBS will continue to provide this service directly to our Biochemistry and BDC students.</p>	<p>Vice-Dean Education, Faculty of Health Sciences</p>	<p>None, outside of scope for the BDC program.</p>
<p>That the program strives to maintain connections with alumni, who may be potential future employers, to stay current on relevant skill sets that should be covered by the curriculum.</p>	<p>This is a core value of the program, facilitated by the program CDRMs as well as the BDC Student Society. Alumni are involved in all levels of the program, including strategic review of the curriculum.</p>	<p>Director, BDC</p>	<p>Ongoing</p>

<p>That the purposeful recruitment and integration of Biochemistry and non-Biochemistry students be continued and even formalized such that the expectations of the contributions from various types of people within a group are understood by all.</p>	<p>BBS is strongly committed to maintaining and growing successful Biochemistry and BDC undergraduate programs. A key component of this commitment is that recruitment into the BDC program is not exclusively from the Biochemistry program, but that the BDC program reflects diverse student backgrounds. Creation of an effective cohort from this diverse group of students, with individual contributions, will remain a hallmark of the BDC program.</p>	<p>Director, BDC</p>	<p>Ongoing</p>
<p>That the program fully explores the ramifications of condensing the lab course (i.e., BIOMEDDC 3C09 becoming BIOMEDDC 3C06).</p>	<p>The decision to reduce the third year BDC lab course involved a combination of pressures around available teaching space, instructor roster, balancing Biochemistry & BDC program needs, and a strong desire of the BDC students for more units dedicated to electives. The Associate Chair Undergraduate, BBS and Director, BDC will review the impact of this change to ensure there are no impacts in learning outcomes.</p>	<p>Associate Chair Undergraduate, BBS Director, BDC</p>	<p>1-3 years</p>
<p>That the program continues pushing to engage more and diverse companies as placement hosts.</p>	<p>The Director BDC and program CDRMs will continue to expand the diversity of companies involved in all levels of the BDC and MBDC curriculum and internship placements.</p>	<p>Director, BDC</p>	<p>Ongoing</p>

That the program implements a Curriculum Committee.	BBS has four educational programs (undergraduate Biochemistry & BDC, graduate Biochemistry & BDC) so a Curriculum Committee exclusively for BDC will not be implemented. The BBS as a whole will contribute to curriculum design in a series of BBS Education Retreats and the Associate Chair Undergraduate BBS will develop proposals for curriculum changes/additions, including striking sub-committees as needed.	Associate Chair Undergraduate, BBS	The first BBS Education Retreat was completed in May 2023. Curriculum review and improvement is ongoing.
That the program explores whether developing a new business course(s) that might better suit the environments that students will find themselves going into.	The Director BDC will work closely with the DeGroote School of Business to explore changes to and growth of the BDC program curriculum.	Director, BDC	1-3 years
That the program explores how contributions to group learning by individuals (biochemistry or otherwise) can be evaluated and incorporated into grading.	Fair assessment of group work is always a challenge and while assessment design for individual courses is left to the instructors, BBS will evaluate if changes are needed.	Associate Chair Undergraduate, BBS Director, BDC	1-2 years
That the program looks at starting the exercise of making undergraduate thesis placements earlier, to spread out that workload and to decrease stress near the deadlines.	Review 4 th year thesis requirements with 3rd year students in September of Fall term, providing training on obtaining a thesis placement. Initiate matching process in October of the Fall term.	Associate Chair Undergraduate, BBS + BBS Thesis Coordinator	Already implemented – Fall 2023
That the program shift some of the MBDC career preparation activities into the summer.	Initiate resume preparation, career planning training by CDRMs in July & August before September start of the MBDC program.	Director, BDC	Already implemented – Summer 2023
That the program, Department, Faculty, and University find a way to generate a far better response rate in program surveys.	The Director BDC and BDC Administrative Assistant will evaluate current survey strategies, technologies used, and addition of incentives to improve survey response rates.	Director, BDC	1 year

That the program includes more regular check-ins with students throughout the programming.	The BDC program declines this recommendation as check-ins and multi-layered mentorship are already a hallmark of the program.	Director, BDC	n/a
That very quickly the program works out who will lead the program when Dr. McArthur's current term ends.	BBS to develop a strategy to train new faculty leaders of departmental programs, including BDC. Recruitment and training of Associate Director BDC as a step towards a future Director BDC.	Chair, BBS	Already implemented – Fall 2023. An Associate Director BDC has been recruited and they will replace Dr. McArthur as Director BDC in July 2024.

Dean's Response, Faculty of Health Sciences

The reviewers note many strengths of the program, including the unique, innovative, and competitive 4 +1 curriculum with links to industry, the balance of biomedical and business training, and the excellence of faculty instructors and mentors. The reviewers note some areas for improvement and make specific recommendations.

We have reviewed the program's thoughtful response to the report, and we are confident that their plan will generally address the recommendations appropriately. We have several areas of clarification below.

We note that Dr. MacArthur completes his term as director on June 30, 2024, and a new director has been selected, as of July 1, 2024.

The reviewers note that the business-focused curriculum should be expanded and improved. At inception, the program was developed within the Department of Biochemistry and Biomedical Sciences (BBS), with fee-for-service teaching provided by the DeGroot School of Business. The reviewers suggest expanding the engagement of recently hired faculty with industry experience in BBS, as well as leveraging capacity development in the new Master's of Biomedical Innovation. We agree that it is time to review the arrangements by which the business curriculum is provided.

With respect to the goal of expanding the master's program, the reviewers suggest that the program should explore whether it is possible to offer a stand-alone MBDC. We approach this suggestion with caution. Much of the innovative quality of BDC/MBDC curriculum resides in its thoughtful and efficient 4+1 curriculum. The financial and resource barriers to graduate expansion in the current funding environment offer significant barriers to the development and support of a new master's degree. It will also be important to rigorously evaluate the implied suggestion that 2 1/3 years of undergraduate training could be replaced by six to 12 months of master's curriculum.

The BDC program has indicated their intent to incorporate the curriculum review process in a department-wide manner. Given the extent of departmental support of this program and integration across faculty roles within the department, this is a reasonable plan, as long as there is a process of intentional, intermittent review of this program through that department-wide process.

The reviewers suggest more regular check-ins throughout the program; however, there is no data provided about this from the reviewers' report. We therefore defer to the program's response that there already exist multiple checkpoints in the current program.

With respect to centralization within the Faculty of important student services, such as student advising, the value proposition for moving in this direction will be reviewed in the coming year with programs, students, and Faculty leaders. Thereafter, a determination will be made of the most appropriate service model for learners in the BDC and other FHS undergraduate programs; however, all undergraduate programs should have plans to proceed with alternatives to a centralized service delivery model.

Finally, the program has provided a number of responses to other recommendations which we support at this time.

Quality Assurance Committee Recommendation

McMaster's Quality Assurance Committee (QAC) reviewed the above documentation at the March 20, 2024, meeting. The committee recommends that the Biomedical Discovery and Commercialization BSc. and MSc. program should follow the regular course of action with an 18-month progress report and subsequent full external cyclical review to be conducted no later than eight years after the start of the last review.