

Final Assessment Report for the 2023-2024 Cyclical Review of the Chemistry and Biochemistry Programs

INTRODUCTION

In accordance with Laurier's Institutional Quality Assurance Procedures ([Policy 2.1](#)), this Final Assessment Report provides a summary of the cyclical program review process for the undergraduate and graduate programs in the Department of Chemistry and Biochemistry, along with the joint PhD in Biological and Chemical Sciences with the Department of Biology, prepared by the Quality Assurance Office, along with an identification of strengths of the program(s) under review authored by the Dean of the Faculty of Science and the Associate Vice-President and Dean of the Faculty of Graduate and Postdoctoral Studies. All recommendations made by the external review committee in their report are listed, followed by a summary of the units' response, and the decanal responses. Recommendations prioritized are listed in the Implementation Plan, with those not being prioritized for implementation noted as well.

The Final Assessment Report is reviewed and approved by the Provost and Vice-President: Academic. Following completion of the Final Assessment Report, it is approved by the Program Review Sub-Committee and Senate Academic Planning Committee. Approval dates are listed at the end of this report. Final Assessment Reports are submitted to Senate as part of an annual report on cyclical reviews, and to the Ontario Universities Council on Quality Assurance for information. Final Assessment Reports and Implementation Reports are posted on the public-facing page of the [Quality Assurance Office](#) website.

The Implementation Plan for the recommendations prioritized in the Final Assessment Report can be found at the end of this report. Units will submit their first Implementation Report two years following approval of the Final Assessment Report at Senate. The Implementation Report will include comments from the unit on actions taken toward the completion of recommendations, comments from the relevant Dean(s) related to the progress made, and comments from the Program Review Sub-Committee, which is responsible for approving the Implementation Report and deciding if further reports are required. The Implementation Report is submitted to the Senate Academic Planning Committee for information.

SUMMARY OF REVIEW PROCESS

The last cyclical program review for the Department of Chemistry and Biochemistry took place as part of the 2016-2017 review cycle. This was the first review of the PhD in Biological and Chemical Sciences program.

The Department formed a cyclical review sub-committee and authorship of the Self-Study is attributed to Dr. Louise Dawe, Dr. Lillian DeBruin, Dr. Steve MacNeil and Dr. Ken Maly. The Self-Study notes broad faculty involvement in the cyclical program review process. In addition to the Self-Study (Volume I), the Department also

submitted a copy of faculty curricula vita (Volume II), a volume of course syllabi, and a list of proposed external reviewers (Volume III). A draft of the Self-Study was reviewed by the Quality Assurance Office, Dean of Science, and Associate Vice-President and Dean of the Faculty of Graduate and Postdoctoral Studies prior to submission of the final version.

Following Laurier's IQAP, the external review committee for the review consisted of two external reviewers from outside the university, and one internal reviewer from Laurier but outside of the unit. The review committee was selected by the Program Review Sub-Committee on September 28, 2023, and an in-person site visit took place on the Waterloo campus on January 23-24, 2024.

The review committee consisted of **Dr. Christine Neill** from the Department of Economics at Wilfrid Laurier, **Dr. Marie Elizabeth Fraser** from the Department of Biological Sciences at the University of Calgary, and **Dr. Jeffrey Keillor** from the Department of Chemistry and Biomolecular Sciences at the University of Ottawa. During the external review, the committee had met with the following individuals and groups:

- Dr. Trish McLaren, Associate Vice-President: Academic
- Dr. Anthony Clarke, Dean of the Faculty of Science
- Dr. Brent Wolfe, Associate Vice-President and Dean, Faculty of Graduate and Postdoctoral Studies
- Dr. Ken Maly, incoming Chair
- Full-time Faculty in the Department representing undergraduate programming
- Full-time Faculty in the Department representing graduate programming
- Undergraduate students in the Chemistry and Biochemistry programs
- Mr. Matt Thomas, Head of Collections and Acquisitions
- Departmental administrative, academic and technical staff
- Graduate students in the Master's and doctoral programs
- Ms. Sally Heath, Manager: Academic Program Development and Review

The review committee was also provided with a tour of the Chemistry and Biochemistry laboratory spaces.

The review committee submitted their completed report on February 21, 2024. The executive summary from the report, and its recommendations, are provided below.

EXTERNAL REVIEWERS' REPORT EXECUTIVE SUMMARY

The Department of Chemistry and Biochemistry is committed to delivering high quality undergraduate and graduate programs, while fostering a sense of community and engagement with their student body. Current admission requirements are clearly appropriate, and student success is evident. The curriculum is current, although a slight increase to the number of lab hours in certain programs would allow for accreditation by the Canadian Society for Chemistry, thereby increasing national, if not international, visibility. Some programs would

also benefit from an increased level of flexibility, which would also enhance the student experience. Assessment methods in practice in the Department are creative, current and supportive. Existing resources are being used highly efficiently, largely owing to highly dedicated support staff. Office and lab space for research is used to absolute capacity, which may limit the Department's ability to expand research efforts for current faculty, and the ability to recruit new faculty. This is relevant to the replacement of faculty members who have indicated they will be retiring soon, which is an opportunity for the Department to consolidate their current research strengths and/or expand into new areas. Both the undergraduate and graduate programs are small, but of high quality. Continued support from the Faculty of Science will be required to maintain this standard of excellence.

RECOMMENDATIONS AND RESPONSES

The External Reviewers' Report included 12 recommendations to improve the quality of the Department of Chemistry and Biochemistry, and the PhD in Biological Sciences, programs. All recommendations have been listed verbatim below, followed by a summary of the program's response, and responses from the Dean of the Faculty of Science and the Associate Vice-President and Dean of the Faculty of Graduate and Postdoctoral Studies.

Recommendation #1: The department should formulate a simple mission statement or strategic plan at the *departmental* level would help the department to guide their development, in the context of dramatic changes at the Faculty and University levels. We recommend that the incoming chair writes out a few sentences to capture what is important for the department.

Unit Response: We agree with this recommendation. While a brief strategic plan is provided in the Self-study, an updated plan that considers updated institutional-level plans and changes at the Faculty and University level is important. Such a plan should be developed with input and consultation from the department.

Dean of the Faculty of Science: This is a timely recommendation given the recent approval of the Laurier Strategic Academic Plan, together with an imminent approval of a revised Laurier Strategic Research Plan. With these, the Department will be able to prepare a mission statement (not a strategic plan).

Recommendation #2: The department should continue to monitor the success of students in the undergraduate and graduate programs, with respect to the training and academic performance they have demonstrated for admission.

Unit Response: We agree with this recommendation, particularly as it pertains to undergraduate students. As indicated by the reviewers and undergraduate students they met with, admission requirements are appropriate so the focus will be on monitoring these students as they progress through degree requirements and advertising and/or providing supports where needed. Academic advising in the Department of Chemistry & Biochemistry has been excellent, but the new dual model of advising in the Faculty of Science, concomitant with a reduction in compensation for Departmental Undergraduate Advisors, has meant that advising at the Department level has been more reactive than proactive in the current academic year. As Departmental advisors and Faculty of Science

academic advisors adapt to the new model, and tweaks to the model are made to improve student services, attempts will be made to better monitor student success and to be more proactive in directing students to appropriate supports.

The graduate officer will continue to lead the charge in monitoring graduate student success, e.g., times to completion, and will work with supervisors and advisory committees to ensure graduate students are well supported.

Dean of the Faculty of Science: The Department is encouraged to continue its collaboration with the Science Advising office, especially as it expands its services to include a Graduate Studies Advisor.

Dean of the Faculty of Graduate and Postdoctoral Studies: To monitor progress of graduate students in research-based programs, the Unit will be familiar with the well-established progress and activity report that PhD students are required to complete on at least an annual basis, and which are tracked by the FGPS. I understand that the Unit also employs a progress report at the master's level. We have also now developed a progress and activity report for students in research-based MSc programs, with the intention that they will be universal for these programs and subsequently tracked by the FGPS. A draft version is currently being employed in a couple of MSc programs as a pilot project.

Recommendation #3: The department should continue the process of adding hours of laboratory work so that all undergraduate programs can be accredited by the Canadian Society for Chemistry (CSC). While adding laboratory hours, the department should consider reducing the number of lecture and tutorial hours so that the total hours of instruction in chemistry is about 1000 h, as indicated in the CSC guidelines.

Unit Response: We agree with this recommendation. Since our initial analysis of laboratory hours and our last submission for CSC accreditation, we have now exceeded the minimum number of laboratory hours (400) for an additional program: BSc Honours Biochemistry and Biotechnology (without thesis; now with 418 required lab hours). Previously, only our "with Thesis" BSc Honours Chemistry and BSc Honours Biochemistry and Biotechnology courses met the accreditation hours. We will be applying for accreditation of our additional program at the next available opportunity.

Further expansion of laboratory requirements for BSc Honours Chemistry (without Thesis) and our combined programs with Biology, Math, and Physics will require careful consideration with respect to resource availability, both with respect to time, space, and scheduling, as well as instructional resources (i.e., additional laboratory coordinator, technician, and teaching/instructional assistant support will be required). Accreditation of the BSc Honours Chemistry (without Thesis) program is achievable, and we will work toward that for the next accreditation cycle. As is the case for most interdisciplinary programs co-offered through Departments of Chemistry & Biochemistry, it will be difficult to achieve the minimum lab hours in chemistry required for accreditation of our combined programs.

Dean of the Faculty of Science: The Faculty of Science will provide as much support as possible (recognizing current fiscal constraints) to achieve this goal.

Recommendation #4: In the chemistry programs, the department should consider the workload in each year after first year to see that it is balanced and reasonable, while showing the students' progression through the program. Even the small change of renumbering courses that students are expected to take in third year to CH3XX could help students see their progression.

Unit Response: The Department recognizes the heavy workload associated with Year 2 of the Honours BSc Chemistry program. Given the need to expose Chemistry majors to each of the subdisciplines of Chemistry in Year 2 so that they acquire prerequisite knowledge and skills to pursue advanced courses in these subdisciplines in Years 3 and 4, there is little to be done to reduce workload in terms of the number of courses required. In addition, the heavy workload in Year 2 is largely due to the significant laboratory hours required and as indicated in Recommendation #3, reducing lab hours is not a viable option for reducing workload.

Consequently, we do our best to balance the workload in Year 2, with Honours BSc Chemistry students required to take 3 chemistry courses in the fall (2 with lab components) and 4 chemistry courses in the winter (3 with lab components). In addition, we provide academic and other supports through the "2nd Year Summit", an information session for 2nd year Chemistry and Biochemistry & Biotechnology students that takes place early in the fall term each year and during which we describe the documented "2nd Year Slump" and advertise academic, financial, and wellness supports in addition to a variety of engagement opportunities to fight it. We also offer significant support at the course level through Supplemental Instruction (CH206, CH207), and ample office hours with course instructors, lab coordinators, graduate TAs, and undergraduate IAs.

The workload decreases in Years 3 and 4 as the number of required lab hours is reduced and there is more flexibility with respect to elective courses. Regardless, we continue to try to balance the workload, with Honours BSc Chemistry students required to take 3 Chemistry courses in the fall of Year 3 (2 with lab components) and 3 Chemistry courses in the winter (2 with lab components).

We could do more to show students' progression through the program. Changing course numbers, e.g., CH213 becomes CH310; CH226 becomes CH320, would be reasonable and our undergraduate curriculum committee will discuss this. In addition, the curriculum committee (or the Chemistry Education Committee) could consider drafting a "course connections" document which highlights for students the connections between courses in the program.

Dean of the Faculty of Science: The Department is encouraged to continue their review and action of these issues.

Recommendation #5: The Biochemistry and Biotechnology programs are very restrictive, both for the students and for the instructors. This seems like an excellent time to redesign these programs to add flexibility, while still meeting the expected learning outcomes.

Unit Response: The Honours Biochemistry and Biotechnology (BCBT) program is a comprehensive chemistry-based program that distinguishes it from the other biochemistry programs in southwestern Ontario. Indeed, the reviewers state that the "undergraduate programs provide high-quality education in Chemistry and Biochemistry and Biotechnology". The BCBT program has been significantly revised since its inception in 2004 to become

more flexible, including reducing progression requirements and reducing the number of required. The last major revision was in 2017/18 where the number of elective credits were increased (now 1.5 credits of program electives, 3.0 credits of “free” electives) and the program electives now include a wide variety of chemistry, biochemistry, and biology courses.). The number of required courses is significant since the program is chemistry-based with students needing to take courses in the subdisciplines of chemistry in 2nd year (same as the Chemistry majors) and then courses in the major areas of biochemistry in 3rd year.

We are open to considering revisions to the program, but we want to make sure we preserve the strengths and differentiating features of the program. As a first step toward improving the sequencing of courses and further increasing flexibility of the BCBT program, the Department will review the curriculum and course pre-requisites. The following are possible changes that will require departmental discussion before implementation.

- Remove CH212 Physical Chemistry 1A and CH225 Inorganic Chemistry 1 from the list of required courses;
- Change the prerequisite for CH357 (Laboratory Techniques in Biochemistry) from CH350 to CH250 (Introductory Biochemistry); and
- For the BCBT with Thesis program, remove CH452 as a requirement and replace it with a 1.0 program elective credit (Note: CH490 and CH452 are capstone courses, and the learning outcomes are similar in both. This revision may increase the number of students selecting to complete the thesis course (CH490), which might help to improve recruitment of students into our graduate program (supporting Recommendation #11)).

Dean of the Faculty of Science: The Department is encouraged to review the workload associated with the Biochemistry and Biotechnology program, recognizing that the full complement of faculty members is unable to cover all. Also, whereas the Department rightly claims that the Biotechnology emphasis distinguishes the program over others in the sector, the historical trend of registrations would suggest it is not attractive. The Department is encouraged to continue reviewing this program, from both demand and delivery perspectives.

Recommendation #6: The department needs to plan for the next five years. Research lab spaces are already used to their maximum capacity. The department must identify what resources are needed to support the undergraduate and graduate programs.

Unit Response: We agree with this recommendation. An operational plan that identifies resources (space, infrastructure, staff) to meet the evolving needs of the department is important. In the short term, we are particularly concerned about the availability of research space for new faculty. Space is allocated at the Faculty-level, so meeting the space needs for research and teaching can only be ensured with collaboration from the Dean of Science. The department will also need to address replacement of some aging infrastructure (e.g. NMR) and plan for technical support and maintenance for such equipment.

Dean of the Faculty of Science: There is no doubt that space for research and teaching is a major issue and ongoing concern of the Faculty, and one that has the full attention of the Dean. Efforts will continue to provide the appropriate space for both teaching excellence and research success.

Dean of the Faculty of Graduate and Postdoctoral Studies: Sufficient lab space is fundamental to support current research and graduate student needs of the Unit, as well as graduate program recruitment and research growth opportunities. The FGPS is aligned with the comments made by the Dean of Science and supports solutions to address this need.

Recommendation #7: The Department of Chemistry and Biochemistry has an excellent opportunity for renewal, with support from the administration at Laurier to hire three new faculty members to match the three retirements. It will be important to advertise broadly enough to cover teaching so that the programs are sustainable; and to consider the balance between teaching and research so that research opportunities are provided for both undergraduate and graduate students.

Unit Response: We agree with this recommendation. At the time of this response, recruitment for two new hires is underway (one in biochemistry and one in theoretical/computational chemistry). These positions will be essential for meeting the teaching needs of the undergraduate programs and provide important research opportunities for undergraduate and graduate students. It is anticipated that recruitment for a third position will be approved for next year.

Dean of the Faculty of Science: The appointment of the two new faculty members in the areas of biochemistry and theoretical chemistry has been made, and every effort will be made to support the developing careers. And indeed, it is anticipated that the position for the third faculty member will be returned to the Department for recruitment.

Dean of the Faculty of Graduate and Postdoctoral Studies: It is excellent to hear that two of the appointments have been made, and that they will support research opportunities for both undergraduate and graduate students.

Recommendation #8: In recruiting undergraduate students, the department should think about attractive programs. The Biochemistry and Biotechnology programs seem more attractive than the Chemistry programs, even though students in high school are unlikely to know the meanings of either biochemistry or biotechnology. With so many Chemistry programs in Ontario, it would be good to have something that would make the program at Laurier distinctive, in addition to its small size and caring faculty.

Unit Response: We agree with this recommendation, but we believe that the research opportunities we provide for undergraduate students already sets us apart. Most research-active Chemistry and Biochemistry faculty members have a recent, as well as a longer history, of publishing with undergraduate co-authors. These undergraduates have engaged in directed studies (CH495), thesis projects (CH490), co-op placements, and have been funded by internal and external scholarships and grants. These students then go on to excellent post-degree opportunities. We are considering the addition of directed studies courses that are available not only to 4th year undergraduates but to 2nd and 3rd year students as well so that we can increase these research opportunities and have them available earlier in a student's program. We hope that in the future, we can work with Laurier's Recruitment Office to center this information in their recruitment strategies: that not only do we

have a small and caring department, committed to academic success, but also that we are invested in future opportunities and provide students with a plethora of ways to be involved in all aspects of scholarship.

Dean of the Faculty of Science: Regarding both this and Recommendation #5, the Department is encouraged to conduct a review/survey of its current students to understand why they selected Laurier for their studies, which may inform on emphasis and direction for the future.

Recommendation #9: The help sessions in chemistry were clearly appreciated by students and align with Laurier's strategic plan to increase student retention. Such sessions are likely to be even more important as Laurier tries to increase diversity in the student body and provide non-traditional paths into programs. The department needs to address what help is needed by students and whether the need is best met by having teaching assistants available during office hours to teach about writing lab reports, for example, or by having peer tutors.

Unit Response: We agree that additional help to support student success is required. On November 17, 2023, the following statistics were shared with the first and second year organic instructional team with respect to access to drop-in help with peer tutors and attendance at structured Supplemental Instruction tutorials:

Summary Data for the Period: Sept. 13 2023 – Nov. 10 2023

Unit	Activity Name	Total Participants Visits	Unique Participants
Co-Curricular Learning Support (Brantford)	Drop-in Help Session ONLINE - CH Support (Brantford)	6	4
Co-Curricular Learning Support (Brantford)		6	4
Co-Curricular Learning Support (Waterloo)	Drop-in Help Session IN PERSON - CH Support (Waterloo)	517	173
Co-Curricular Learning Support (Waterloo)	SI - CH110/CH120/CH130	1,639	348
Co-Curricular Learning Support (Waterloo)	SI - CH202/CH204/CH206	1,064	220
Co-Curricular Learning Support (Waterloo)		3,220	599

Anecdotally, lecture and laboratory instructors have reported that students who attended the drop-in help during the reporting period experienced long waits to ask questions. Additionally, due to the small room allocated for drop-in help, there was often nowhere to sit while waiting for assistance. We were also informed that the peer tutors regularly stayed beyond their posted hours to help with questions. This experience aligns with that of the

CH110/120/130/111/121/131 and CH202/204/206/203/205/207 lecture and laboratory instructors during their office hours.

We agree that these flexible supports can positively contribute to the growth and retention of a diverse student population, not only within the Chemistry and Biochemistry programs but also within the Faculty of Science, benefiting all students required to take these courses.

The current combination of structured problem-solving tutorials from Supplemental Instruction and drop-in help for students working on homework and laboratory assignments is excellent. However, two possible areas for growth and innovation are:

1. Expansion of supports to students in other second-year chemistry courses, including CH225 (Inorganic Chemistry), CH261/262 (Analytical Chemistry), and CH250 (Biochemistry I). It is noteworthy that CH212 (Physical Chemistry I) already has a tutorial timeslot associated with the course.
2. Currently, the Supplemental Instruction program and drop-in help are fully funded and overseen by the Office for Study Skills and Course Support. While their managers do consult with Chemistry and Biochemistry instructional staff, hiring decisions, oversight, and all financial considerations are independent of our department. Expanding support to new courses will require more departmental resources, including subject expertise and oversight.

Dean of the Faculty of Science: Whereas the Department is encouraged to continue in this direction of providing supports to students, it is appreciated that there are costs associated with such in terms of both resources and time/effort, which are no doubt limited. The Dean's Office will work in partnership with the Office of Student Affairs to provide as much as possible in support of the Department's initiatives.

Recommendation #10: Work with Institutional Research to better understand student retention / pathways of entering cohorts. Clearer measures of retention could help to clarify what seem to be extremely high rates of attrition, but which are inconsistent with the data on numbers of students who are graduating.

Unit Response: We agree with this recommendation. The Chair (outgoing or incoming to be determined) will request detailed reports from Institutional Research to determine the pathways for students leaving our programs as well as for those entering from other programs. If we can drill down to individual students in these reports, we might be able to follow up with surveys to determine reasons for leaving the program or, for students entering from other programs, aspects that attracted them. This information will inform changes to curriculum, academic advising, recruitment, and retention initiatives.

Dean of the Faculty of Science: The Department is encouraged to follow these lines of investigations.

Recommendation #11: Given the primary source for recruitment into the graduate program is from the department's own Honours program, the department needs to increase their efforts to advertise, de-mystify and promote the Honours program. Information sessions should be offered in the fall semester to undergraduate students in all years of the program, promoting the *opportunity* to conduct original research as a highlight of the undergraduate degree.

Unit Response: We agree with this recommendation. We will explore ways to encourage more students to consider research and CH490 (Honours Thesis Research in Chemistry and Biochemistry). As previously mentioned, the Department has discussed the introduction of new directed studies courses (CH295 and CH395) as a vehicle for 2nd and 3rd year students to gain an initial research experience. We will re-introduce this discussion to the Department in Council. Also, 2nd and 3rd year students should be encouraged to attend current CH490 events such as the proposal and poster presentations. Key CH2XX and CH3XX courses could include a small bonus for participation in these events. Information about these initiatives can be provided at the Second Year Summit, at various research/CH490 info sessions, and on the MyLS Departmental Student Advising page.

Dean of the Faculty of Science: In addition to following these avenues, the Department is encouraged to partner with the Dean's Office to continue promoting its graduate programs at, e.g., regional graduate fairs, as was done this past spring by the Chair's participation at the Cape Breton Graduate Fair.

Dean of the Faculty of Graduate and Postdoctoral Studies: This topic was raised during my meeting with the external reviewers, and I relayed to them that years ago we had a similar issue with our Honours thesis program in Geography and Environmental Studies. To address this, we developed a 3rd year winter term course (GESC 360: Research Methods and Thesis Preparation). The course is designed to expose students to undergraduate research opportunities, cultivate their interest in conducting research, and to conceive and develop their 4th year Honours thesis proposal. The course has been highly successful in de-mystifying the Honours thesis process, and students are far more prepared to carry out their research during their 4th year. The course has served as an excellent graduate program recruitment strategy, and many have cited this important preparatory course as key to developing their research interests. The model of the course is readily transferrable and adaptable to other departments and disciplines, and I would be happy to share a recent course outline if the Unit is interested in going in this direction.

Recommendation #12: The department should continue to lobby the Faculty of Science for additional office space and lab space for graduate research to be conducted safely. This discussion should be aligned with the department's vision (Recommendation 1) for their own growth (Recommendation 6), to clearly identify the infrastructural requirements for the department to achieve their goals.

Unit Response: We agree with this recommendation. The need for office and research space will increase as new faculty members come on board and as various research programs expand. In the past, a key issue was finding office space for post-doctoral fellows and graduate students that is in proximity to their research labs. The University is currently conducting a space study/audit that will hopefully lead to more efficient use of office space.

Dean of the Faculty of Science: As noted above, identifying and securing space for both offices (student and faculty) and research continues to be a high priority for the Dean. With this recommendation though, it is not clear what is meant or implied by “to be conducted safely.” The office of Safety, Health, Environment and Risk Management (SHERM) routinely conducts safety inspections of all spaces and any issues of concern are addressed immediately and rectified. Also, all graduate trainees in chemistry and biochemistry, as well as all other conducting research in “wet” labs are provided with workstations in separate offices to ensure their safety when not conducting experiments.

PROGRAM STRENGTHS

Dean of the Faculty of Science: Through the commitment and efforts of a dedicated faculty complement, the Department of Chemistry and Biochemistry provides high-quality undergraduate and graduate programs in chemistry, biochemistry and biotechnology. Despite the pressure to find savings. The Department has maintained a firm commitment to providing practical laboratory experiences in its undergraduate program, from the very beginning of first year through to the fourth. Such provides the opportunity to develop solid foundational skills for students either entering the workplace or continuing on into a graduate studies program.

Dean of the Faculty of Graduate and Postdoctoral Studies: Faculty are research-active and are externally supported by grants. There is a strong commitment to deliver high quality undergraduate and graduate programs. Interdisciplinary research opportunities via collaboration between the two departments is a strength of the PhD program. MSc students benefit from the structured mentorship, multiple advisory committee meetings and required progress reports to ensure timely completion. I appreciate the formal incorporation of ASPIRE into the MSc program.

OPPORTUNITIES FOR IMPROVEMENT AND ENHANCEMENT

Dean of the Faculty of Science: Notwithstanding the comment above regarding the quality of the programming, the Department may want to consider trimming back the number of course electives it offers as well as explore collaborative efforts with other departments (e.g., biology) to consolidate the delivery of others.

Dean of the Faculty of Graduate and Postdoctoral Studies: As pointed out by the external reviewers, not all undergraduate students were aware of what an Honours thesis entails, and some perceive the Honours thesis as more difficult and less enjoyable than course work. Given that this pathway is important for the overall undergraduate experience and graduate program recruitment, improving and enhancing the Honours thesis experience deserves some attention.

SIGNATURES

Dr. Heidi Northwood

September 16, 2024



APPROVAL DATES

Approved by Program Review Sub-Committee: October 24, 2024

Approved by Senate Academic Planning Committee: January 9, 2025

Submitted to Senate (for information): March 4, 2025

Implementation Report Due Date: March 4, 2027

RECOMMENDATIONS PRIORITIZED FOR IMPLEMENTATION AND ACTION PLAN

The following Implementation Plan was created by the Dean of Science and the Associate Vice-President and Dean of the Faculty of Graduate and Postdoctoral Studies as part of the Decanal Response.

Recommendation to be Implemented	Responsibility for Implementation	Responsibility for Resourcing (if applicable)	Anticipated Completion Date	Additional Notes
Recommendation #1: The department should formulate a simple mission statement or strategic plan at the <i>departmental</i> level would help the department to guide their development, in the context of dramatic changes at the Faculty and University levels. We recommend that the incoming chair writes out a few sentences to capture what is important for the department.	Department	n/a	May 2026	
Recommendation #2: The department should continue to monitor the success of students in the undergraduate and graduate programs, with respect to the training and academic performance they have demonstrated for admission.	Department	n/a	Ongoing	
Recommendation #3: The department should continue the process of adding hours of laboratory work so that all undergraduate programs can be accredited by the Canadian Society for Chemistry (CSC). While adding laboratory hours, the department should consider reducing the number of lecture and tutorial hours so that the total hours of	Department	n/a	May 2026	

instruction in chemistry is about 1000 h, as indicated in the CSC guidelines.				
Recommendation #4: In the chemistry programs, the department should consider the workload in each year after first year to see that it is balanced and reasonable, while showing the students' progression through the program. Even the small change of renumbering courses that students are expected to take in third year to CH3XX could help students see their progression.	Department	n/a	May 2026	
Recommendation #5: The Biochemistry and Biotechnology programs are very restrictive, both for the students and for the instructors. This seems like an excellent time to redesign these programs to add flexibility, while still meeting the expected learning outcomes.	Department	n/a	May 2026	
Recommendation #6: The department needs to plan for the next five years. Research lab spaces are already used to their maximum capacity. The department must identify what resources are needed to support the undergraduate and graduate programs.	Department in collaboration with the Dean of Science Office	Dean of Science and VPA Offices	May 2026	If additional resources are required, they will be added to the budget plan for possible approval.

<p>Recommendation #7: The Department of Chemistry and Biochemistry has an excellent opportunity for renewal, with support from the administration at Laurier to hire three new faculty members to match the three retirements. It will be important to advertise broadly enough to cover teaching so that the programs are sustainable; and to consider the balance between teaching and research so that research opportunities are provided for both undergraduate and graduate students.</p>	<p>Department in collaboration with the Dean of Science Office</p>	<p>Dean of Science and VPA Offices</p>	<p>May 2026</p>	<p>Contingent on budget approval (return of the one remaining position to the Department)</p>
<p>Recommendation #8: In recruiting undergraduate students, the department should think about attractive programs. The Biochemistry and Biotechnology programs seem more attractive than the Chemistry programs, even though students in high school are unlikely to know the meanings of either biochemistry or biotechnology. With so many Chemistry programs in Ontario, it would be good to have something that would make the program at Laurier distinctive, in addition to its small size and caring faculty.</p>	<p>Department in collaboration with Recruitment and Admissions</p>	<p>n/a</p>	<p>May 2026</p>	
<p>Recommendation #9: The help sessions in chemistry were clearly appreciated by students and align with Laurier's strategic plan to increase student retention. Such sessions are likely to be even more important</p>	<p>Department</p>	<p>n/a</p>	<p>May 2026</p>	

<p>as Laurier tries to increase diversity in the student body and provide non-traditional paths into programs. The department needs to address what help is needed by students and whether the need is best met by having teaching assistants available during office hours to teach about writing lab reports, for example, or by having peer tutors.</p>				
<p>Recommendation #10: Work with Institutional Research to better understand student retention / pathways of entering cohorts. Clearer measures of retention could help to clarify what seem to be extremely high rates of attrition, but which are inconsistent with the data on numbers of students who are graduating.</p>	<p>Department in collaboration with Institutional Research</p>	<p>n/a</p>	<p>May 2026</p>	
<p>Recommendation #11: Given the primary source for recruitment into the graduate program is from the department's own Honours program, the department needs to increase their efforts to advertise, de-mystify and promote the Honours program. Information sessions should be offered in the fall semester to undergraduate students in all years of the program, promoting the <i>opportunity</i> to conduct original research as a highlight of the undergraduate degree.</p>	<p>Department</p>	<p>Department and Office of the Dean</p>	<p>May 2026</p>	

<p>Recommendation #12: The department should continue to lobby the Faculty of Science for additional office space and lab space for graduate research to be conducted safely. This discussion should be aligned with the department's vision (Recommendation 1) for their own growth (Recommendation 6), to clearly identify the infrastructural requirements for the department to achieve their goals.</p>	<p>Department in collaboration with the Dean of Science Office</p>	<p>Offices of the Dean and VPA</p>	<p>Ongoing</p>	
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