Western UNIVERSITY · CANADA

# Chemistry
## Final Assessment Report & Implementation Plan
## October 2025

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| **Faculty / Affiliated University College** | Science | |
| **Degrees Offered** | MSc, PhD | |
| **Date of Last Review** | 2016-2017 | |
| **Approved Fields** | Inorganic<br>Organic<br>Physical/Analytical | |
| **External Reviewers** | Dr. Jennifer van Wijngaarden<br>Professor of Chemistry,<br>York University | Dr. Alexander Brolo<br>Professor of Chemistry,<br>University of Victoria |
| **Internal Reviewers** | Dr. Elizabeth Hayden<br>Associate Dean Graduate<br>Faculty of Social Science | Edward Wang<br>MD/PhD Candidate<br>Schulich School of Medicine and Dentistry |
| **Date of Site Visit** | March 10 & 11, 2025 | |
| **Date Review Report Received** | March 28, 2025 | |
| **Date Program/Faculty Response Received** | Program – June 9, 2025<br>Faculty – June 9, 2025 | |
| **Evaluation** | Good Quality | |
| **Approval Dates** | SUPR-G: October 20, 2025<br>ACA: October 28, 2025<br>Senate (for information): November 14, 2025 | |
| **Year of Next Review** | Year of next cyclical review: 2032-2033 | |
| **Progress Report** | June 2028 | |

**Overview of Western's Cyclical Review Assessment Reporting Process**

In accordance with Western's Institutional Quality Assurance Process (IQAP), the Final Assessment Report (FAR) provides a summary of the cyclical review, internal responses, and assessment and evaluation of the Chemistry Graduate Program delivered by the Faculty of Science.

This FAR considers the following documents:
- the program's self-study brief;
- the external reviewers' report;
- the response from the Program; and
- the response from the Dean, Faculty of Science.

This FAR identifies the strengths of the program and opportunities for program enhancement and improvement, and details the recommendations of the external reviewers – noting those recommendations to be prioritized for implementation.

The Implementation Plan details the recommendations from the FAR that have been selected for implementation, identifies who is responsible for approving and acting on the recommendations, specifies any action or follow-up that is required, and defines the timeline for completion.

The FAR (including Implementation Plan) is sent for approval through the Senate Subcommittee on Program Review - Graduate (SUPR-G) and ACA, then for information to Senate and to the Ontario Universities' Council on Quality Assurance. Subsequently, it is publicly accessible on Western's IQAP website. The FAR is the only document from the cyclical review process that is made public; all other documents are confidential to the Chemistry Graduate Program, Faculty of Science, the School of Graduate & Postdoctoral Studies (SGPS), and SUPR-G.

**Executive Summary**

The Department of Chemistry at Western was established in 1882 – the first Doctor of Philosophy in Chemistry being awarded in 1953. Since then, the department has grown considerably, with 31 tenured or tenure track faculty members. The graduate program has two degree options, the Master of Science and the Doctor of Philosophy – both are thesis-based degrees that encompass original research. Current research themes are (i) Chemical Biology and Biomaterials, (ii) Synthesis, Catalysis and Molecular Materials, (iii) Design, Function and Characterization/Energy and Mechanism, (iv) Theory and Computation. Each Fall, 25-30 new graduate students enter the program, leading to a departmental average of 110 graduate students.

The self-study was informed by a dedicated student survey (with 81 respondents), a participatory student focus group discussion (with 17 participants) and a series of guiding departmental meetings.

The external reviewers shared a positive assessment of the Graduate Chemistry Program. They offer seven recommendations with considerations for further enhancement.

**Strengths and Innovative Features Identified by the Program**

- Graduate students have the option of several collaborative specializations which are: (i) Scientific Computing; (ii) Molecular Imaging; and, (iii) Environment and Sustainability. These multi-disciplinary collaborative specializations facilitate interactions between graduate students and faculty from different departments/Faculties.
- 2+2 degree arrangement with Soochow University (China-Renewed Fall 2024), offering a Doctoral degree via the “Soochow University-Western University Centre for Synchrotron Radiation Research”.
- Optional Experiential Learning and Professionalism in Chemistry (EPIC) course – a self-directed learning experience to recognize and encourage practical professional development activities in the MSc or PhD degrees.
- Events co-organized by the department and the chemistry club such as the “Oh my goodness it has started” and “Thank goodness it is over” events that are taking place at the start (October) and the end (May) of the academic year.
- Program researchers teaming up to successfully lead large grant applications for the benefit of the whole chemistry community.
    - Two new Canadian Fund for Innovation (CFI) projects have been selected by Western University to move forward for the 2025 competition. These will enable modernization of critical instrumentation located at Western.

- Western was the first university (excluding the University of Toronto) in Ontario to reach the $30,000 stipend level for PhD students, effective January 2023.
- Chemistry does very well in ensuring their MSc and PhD cohorts complete their degrees in a timely manner and to the standards for the discipline – approximately 2 years for MSc, and 5 years for PhD.
- Students indicate main program strengths as: 1) Equipment and facilities the department offers (Electronics, machine shop, SSW, NMR, X-ray, etc.); 2) Faculty and staff who are respectful with good supervisors which actively help students throughout their studies; 3) Invited academic speakers; and 4) the split course style, allowing for shorter courses and less long-term time commitments.

**Concerns and Areas of Improvement Identified and Discussed by the Program**

- There are virtually no scholarships for international students – International MSc admissions being halted since 2021.
- While updates and renovations to facilities have taken place over the past decades, certain facilities and laboratory spaces are significantly outdated.
- Students indicated areas for improvements for the program mainly as: 1) Lack of communication (e.g., student expectations, scholarships/bursaries); 2) Need for more easily accessible information (e.g., out of date website); 3) General re-balancing of the TA ships offered, their duties and the hours allocated; and 4) lack of industry exposure in current professional development offerings.
- Students requested that the department hold feedback sessions more frequently and create an updated report that highlights the changes requested by students and the steps taken to meet these expectations (or where they can't be met) which is then shared back with the students.

**Review Process**

As part of the external review, the review committee, comprising two external reviewers, one internal reviewer and a graduate student reviewer, were provided with Volume I and II of the self-study brief in advance of the scheduled review and then met in-person over two days with the:

- Associate Vice-Provost, School of Graduate & Postdoctoral Studies
- Acting Vice-Provost, Academic Planning, Policy and Faculty
- Director, Office of Academic Quality and Enhancement
- Associate Chief Librarian and Team Members
- Dean, Faculty of Science
- Associate Dean – Graduate Studies, Faculty of Science
- Department Chair

- Graduate Chair
- Education, Admission, and Scholarship Committee Members
- Graduate Committee Members
- Associate University Librarian
- Graduate Program and Department Staff
- Program Faculty Members
- Graduate Students

Following the site visit, the external reviewers submitted a comprehensive report of their findings which was sent to the Program and Dean for review and response. Formative documents, including Volumes I and II of the Self-Study, the External Report, and the graduate Chemistry Program and Decanal responses form the basis of this Final Assessment Report (FAR). The FAR is collated and submitted to the SGPS and to SUPR-G by the Internal Reviewer with the support of the Office of Academic Quality and Enhancement.

**Summative Assessment – External Reviewers' Report**

External reviewers shared that *"the graduate program in Chemistry is of very high quality and fits well within the institution's strategic priorities. Most notable is the well-planned milestones of the program that ensures that students progress in a timely manner and achieve all PLOs and GDLEs […] the high quality of the scientific contributions in biological chemistry and health sciences clearly places this graduate program among the best nationally."*

**Strengths of the Program**

- Strong sense of community through faculty-led initiatives (e.g., coffee breaks with Chair) and the chemistry graduate students' association.
- Courses cover a wide range of advanced topics in chemistry using broad faculty expertise.
    - Courses designed with professional development in mind (e.g., Experiential Learning and Professionalism in Chemistry - EPIC).
- Equitable funding policy ensures all graduate students receive comparable stipends with transparent levels posted on website.
- Clear timeline for each milestone promotes timely completion; particularly compared to programs analogous in length at comparable institutions.
    - Low withdrawal rates: ~5% for MSc, only 2 PhD students in 8 years.
- Strong indication that program learning outcomes are met: students move successfully to positions in academia and industry.
- Level of research scholarship achieved is very high; department has strong reputation.

- Faculty members and graduate students generate a respected stream of publications (around 50 papers/year) in high profile peer-reviewed international journals from learned societies.

**Prospective Areas of Improvement for the Program to Consider**

- Proctoring duties are often assigned on short notice (*Associated with Recommendation #1*).
- Stipend levels relative to increasing living costs in London, despite stipends being comparable to top Canadian universities (*Associated with Recommendation #2*).
- More proactive communication of opportunities and campus resources – for instance, mental health resources and PD opportunities (*Associated with Recommendation #3*).
- State of physical laboratory space dedicated to graduate student research; even while piecemeal renovations have been carried out, remains a major concern.
- Decrease in technical personnel and support through the facilities leads to longer waits for basic research-related services that can delay graduation time.
- Consider implementing a plan to maintain and upgrade shared infrastructure facilities (e.g., NMR, mass spec, X-ray) with specific priorities and timeline for major acquisitions (*Associated with Recommendation #4*).
- Students could benefit from more library collaboration - particularly for students with little experience in database searches and data management (*Associated with Recommendation #7*).
- Minimum course enrollments may pose a risk to the program if course offerings need to be reduced.

While not all areas of improvement noted by the external reviewers were explicitly expanded on as stand-alone recommendations, several are embedded in the recommendations offered, as outlined in the section below. The points above remain suggestions for consideration by the Program.

**Summary of the Reviewers' Recommendations and Program/Faculty Responses**

The following are the reviewers' recommendations in the order listed by the external reviewers.

| Reviewers' Recommendation | Program/Faculty Response |
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| **Recommendation #1:** Devise and deploy an administrative process that establishes a proctoring schedule for midterm exams at the start of each term. | **Program:** The Department far exceeds the timeline related to proctoring duties outline in the relevant collective agreement – attempting at all costs to schedule proctoring duties on average 1 month prior to an exam. Nevertheless, the program will endeavor to provide the proctoring schedule with even longer notice.<br><br>**Faculty:** The Faculty of Science recognizes the challenges faced by the program to find proctors for numerous large courses. Chemistry has done a good job providing the proctoring information to the TAs in a timely manner and we appreciate that they will endeavor to increase the notice provided to the TAs to improve their working conditions. If the program wants to hire external proctors instead of TAs, this might alleviate some of their scheduling issues. The Dean's Office maintains a pool of external proctors and can assist with this transition if the program wants to pursue this. |
| **Recommendation #2:** Continue to devise strategies to increase graduate students' stipends to values more compatible with the living costs in the London area. | **Program:** The Chemistry Department has been proactive in regular review and improvement of the compensation packages for graduate students and has established some of the highest stipends in the U15 (outside of U of Toronto). This is an ongoing process and addressed yearly at Faculty meetings. The program will evaluate the possibility of increasing minimum stipends in the context of the current financial stress.<br><br>**Faculty:** The Chemistry department faces the same problems with graduate student stipends seen across the university. This program has been very proactive to ensure that their stipends are competitive among other Canadian Chemistry graduate programs. Chemistry is very mindful of their students' stipends and the implications for recruitment and student support. |
| **Recommendation #3:** Consider new, multi-pronged strategies to improve communication with graduate students on ancillary topics. | **Program:** The program will emphasize the resources offered by Western University, such as for mental health awareness by: 1) having a dedicated section on the program website; 2) regular reminders to graduate students about these resources by email in the fall and winter periods; 3) invite the Western Wellness team to give a presentation to students; 4) prepare a reference document that will be printed and given to all Faculty with a list of contacts for wellness on campus |

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| | to make referrals as necessary; and 5) integrate mental health workshops and resources in professional development as a part of the EPIC course.<br><br>**Faculty:** The program has a good plan to increase communication with students. Currently, the graduate chair meets annually with every graduate student which provides additional, personalized support. |
| **Recommendation #4:** A concerted plan should be implemented to maintain and upgrade the shared infrastructure facilities (NMR, mass spectrometry and X-ray) by defining specific priorities (e.g. new solid state NMR) and a rough timeline for major acquisitions. Protect the supporting personnel positions that are required to maintain the equipment and train graduate students. | **Program:** The previous chair had implemented an instrument renewal plan that has continued under the current administration. Of the three major instrument infrastructures within chemistry, all three have secured funding (CFI) and are either complete or in the process of renewal. This includes a new NMR instrumentation (600 MHz dual solution and solids capable), a new state-of-the-art, multi-functional mass spectrometer and powder and single-crystal X-ray spectrometers. Of major instrument infrastructure, the Department is in the planning stage for a renewed, dedicated solid-state NMR spectrometer. Moving forward, the program will initiate further discussions with faculty members regarding the departmental instrumental and facility needs and their integration in training the graduate students.<br><br>**Faculty:** The Chemistry department has an internal process for assessing and prioritizing department needs and renewal of infrastructure. The Chair has been a strong advocate for departmental resources in their annual budget submissions. The Faculty of Science will support equipment renewal grants through the services of our research officers. |
| **Recommendation #5:** Review their course offerings to establish a balance between the breadth of topics required by the program and future financial challenges. | **Program:** The department will enhance the possibility to cross list more senior undergraduate courses depending on the need and the request in the different fields. The program will also keep a good equilibrium between the different themes covered by the graduate courses.<br><br>**Faculty:** The Faculty of Science agrees with the program's plans to offer more cross-listed courses. This will also aid with enrollment in 4th year undergraduate courses. |

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| **Recommendation #6:** Consider ways to provide the MSc students a minimum of three weeks between their first meeting and their seminar. | **Program:** The fall/winter 2025 schedule will be built to accommodate a three week period between the 9657 and the first-year report. This includes possible 9657 presentations moved in the early winter schedule.<br><br>**Faculty:** The Dean's Office agrees with the program's plans to accommodate this scheduling change. |
| **Recommendation #7:** Encourage the students to interact with the library staff early in their program to acquire proficiency in database searches, data management and data security. | **Program:** Incoming international students should be acquainted with library resources, journal catalogues and how to make the best use of these Western resources. The importance of data management and integrity is critical in this field in particular in view of an AI driven document generation. The program will contact the library staff to set up a presentation for all PhD students and make it compulsory for all students.<br><br>**Faculty:** The Dean's Office is impressed with the program's decision to provide compulsory library training to incoming students. |

## Implementation Plan

The Implementation Plan provides a summary of the recommendations that require action and/or follow-up. In each case, the Graduate Program Chair, in consultation with the SGPS and the Dean of the Faculty are responsible for enacting and monitoring the actions noted in Implementation Plan.

| Recommendation | Proposed Action and Follow-up | Responsibility | Timeline |
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| **Recommendation #1:** Devise and deploy an administrative process that establishes a proctoring schedule for midterm exams at the start of each term. | • Create the material to improve the communication of proctoring duties to students.<br>• Setup meeting in early September with the new incoming students regarding their TA and proctoring duties. | Grad Chair | By December 2025 |
| **Recommendation #2:** Continue to devise strategies to increase graduate students' stipends to values more compatible with the living costs in the London area. | • Evaluate the possibility of increasing minimum stipends in the context of the current financial stress.<br>• Present and catalyze a discussion at an upcoming Faculty meeting. | Grad Chair | By December 2025 |
| **Recommendation #3:** Consider new, multi-pronged strategies to improve communication with graduate students on ancillary topics. | • Emphasize mental health awareness resources on the program website.<br>• Send out regular e-mail reminders to graduate students.<br>• Invite the Western Wellness team to give a presentation to grad students.<br>• Prepare a reference document that will be printed and given to all Faculty with a list of contacts for wellness on campus to make referrals as necessary.<br>• Integrate mental health workshops and resources as a part of the EPIC course. | Grad Chair | By June 2026 |

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| **Recommendation #4:** A concerted plan should be implemented to maintain and upgrade the shared infrastructure facilities (NMR, mass spectrometry and X-ray) by defining specific priorities (e.g. new solid state NMR) and a rough timeline for major acquisitions. | • Initiate further discussions with faculty members regarding the departmental instrument and facility needs via survey and scheduled meetings.<br>• Using the instrument renewal plan implemented by the previous Chair, continue defining priorities and outlining strategies for funding of major instrument infrastructure.<br>  ○ For instance, solid-state NMR spectrometer. | Grad Chair<br><br>Departmental Chair | By June 2026 |
| **Recommendation #5:** Review their course offerings to establish a balance between the breadth of topics required by the program and future financial challenges. | • Review equilibrium between the different themes covered by graduate courses in the program.<br>• Explore the possibility to cross list more senior undergraduate courses. | Grad Chair | By June 2026 |
| **Recommendation #6:** Consider ways to provide the MSc students a minimum of three weeks between their first meeting and their seminar. | • Craft the fall/winter schedule to accommodate (when possible) a three-week period between the 9657 and the first-year report. | Grad Chair | By December 2025 |
| **Recommendation #7:** Encourage the students to interact with the library staff early in their program to acquire proficiency in database searches, data management and data security. | • Contact the library staff to set up a presentation for all PhD students - making it compulsory for all students. | Grad Chair | By December 2025 |