Mathematics
Final Assessment Report & Implementation Plan
May 2025

Faculty / Affiliated University College	Faculty of Science	
Degrees Offered	Bachelor of Science (BSc)	
Date of Last Review	2016-2017	
Modules Reviewed	Honours Specialization in Applied Mathematics Honours Specialization in Mathematical & Statistical Sciences Honours Specialization in Mathematics Honours Specialization in Integrated Science with Mathematics Major in Applied Mathematics Major in Mathematics Specialization in Mathematics Minor in Mathematics	
External Reviewers	Dr. Alistair Savage, Department of Mathematics and Statistics University of Ottawa	Dr. Michael Friedlander, Department of Mathematics University of British Columbia
Internal Reviewer	Dr. Susan Knabe Associate Dean Faculty of Information and Media Studies	Brooklin Begg Double Major of Sociology and English
Date of Site Visit	February 3 & 4, 2025	
Date Review Report Received	March 7, 2024	
Date Program/Faculty Response Received	Program: March 28, 2024 Faculty: April 8, 2024	
Evaluation	Good Quality	
Approval Dates	SUPR-U: June 4, 2025 ACA: September 9, 2025 Senate (for information): September 19, 2025	
Year of Next 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 Mathematics 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 Undergraduate Program Review Committee (SUPR-U) 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 undergraduate cyclical review process that is made public; all other documents are confidential to the Program, the Faculty of Science, and SUPR-U.

Executive Summary

The Department of Mathematics at Western University is one of two Mathematical Science departments at the university. The other department is the Department of Statistical and Actuarial Sciences. Following the dissolution of the Department of Applied Mathematics in 2021, the Department of Mathematics inherited its programs (modules) and some faculty colleagues and some of its courses.

Research expertise within the Department of Mathematics includes algebra, analysis, computation, differential equations, geometry, and topology, as well as the interactions between these areas and areas such as computer science, information security, logic, mathematical biology, mathematical physics, and neuroscience. In 2023-2024, the total number of students enrolled in Mathematics modules was 129.

Led by a program-level IQAP committee, Faculty and staff provided input and insight in the review of learning outcomes, development of curriculum maps, and the provision of feedback on a series of departmental operations (e.g., the mentorship program and support for undergraduate courses). Student input was principally collected via a dedicated focus group.

The external reviewers shared a positive assessment of the Mathematics Program. They offer three recommendations with considerations for further enhancement.

Strengths and Innovative Features Identified by the Program

- Faculty members are highly regarded researchers; many have been honoured with awards and maintain research grants. The department's supportive environment encourages mentoring junior faculty.
- Exposure to varied subject areas, including current in-demand research themes, enables students to develop strong research skills in mathematics, statistics, and computation that would empower them to function effectively in teams within academia and industry.
- Students have access to summer research opportunities through USRA and USRI programs.
- Students are supported by the Math Peer Mentorship Program, Math-Physics Accelerator, and the Association for Women in Mathematics, which enhance inclusiveness within the program and build strong cohorts.
- A supportive and sociable environment is maintained by strong faculty and student collaboration (e.g., regular pizza seminars, Math Scholars group, directed reading program).
- A direct entry into Education pathway gives mathematics undergraduates direct admission into the Bachelor of Education program upon completion of their mathematical studies.
- Outreach activities with secondary and elementary schools provide students with paid and volunteer positions, along with mentorship opportunities.

Concerns and Areas of Improvement Identified and Discussed by the Program

- Ensuring that minimal enrolment thresholds in advanced courses are met.
- Community-engaged learning has had slow adoption in Mathematics. Students' professional capacity and communication skills would undoubtedly benefit from increased opportunities.
    - Explore ways of encouraging students to access the Science Internship Program; this could enhance experiential learning and result in increased enrolment in math modules.
- Adding a computing requirement into the program could ensure that students build foundational competency with this in-demand skillset.
- Work toward a single course code instead of APPLMATH, CALCULUS, and MATH to change students' perception that one kind of mathematics is better than the other.
- Consider more closely monitoring the post-graduation outcomes of undergraduates.
- Development of a dedicated plan to monitor program quality and the student experience in an ongoing capacity.

Review Process

As part of the external review, the review committee, comprising two external reviewers, an internal faculty reviewer, and an internal 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:

- Vice-Provost (Academic Programs)
- Acting Vice-Provost (Academic Planning, Policy and Faculty Relations)
- Director of Academic Quality and Enhancement
- Associate University Librarian
- Dean, Faculty of Science
- Associate Dean (Academic), Faculty of Science
- Department Chair
- Undergraduate Chair
- Administrative Staff
- Program Faculty
- Program 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 Program and Decanal responses form the basis of this Final Assessment Report (FAR) of the Mathematics Program. The FAR is collated and submitted to SUPR-U by the

Internal Faculty Reviewer with the support of the Office of Academic Quality and Enhancement.

Summative Assessment – External Reviewers' Report

External reviewers noted that *"Western University's Mathematics Department is a strong and well-functioning unit. It compares favorably with similar programs at other Canadian universities. A particular strength is its high proportion of full-time faculty, with minimal reliance on sessional instructors. The program structure and curriculum are well-aligned with national standards."*

Strengths of the Program

- Strong and diverse faculty members across a range of mathematical fields with a high percentage holding NSERC Discovery Grants.
- Tenure-track professors teach nearly all second- and upper-year courses, which ensures consistent instruction, strong faculty engagement, and high program quality.
- A dedicated staff member coordinates large first-year multi-section courses, ensuring consistency across sections.
    - The cross-support for staff between the Department of Mathematics and the Department of Statistical and Actuarial Sciences ensures continuity when staff members are on leave.
- Responsiveness of the in-house Math advising services.
- Numerous undergraduate research options are available to students through the USRA and USRI programs.
- Sense of collaborative learning through initiatives such as Math Peer Mentorship Program and the Math-Physics Accelerator, which give students structured academic support and opportunities to engage with peers.
- Active student engagement in the Association for Women in Mathematics (AWM).
- Curriculum follows a logical progression, enabling students to develop both theoretical understanding and practical problem-solving skills, preparing them for graduate studies and relevant jobs in industry.

Prospective Improvements for the Program to Consider

- Students expressed the need for improved access and clearer communication about available facilities. (*Associated with Recommendation #1*)
    - Improve communication aimed at increasing student uptake in the Science Internship Program. (*Associated with Recommendation #1*)

- Addressing the new university-mandated minimum course enrollment requirements requires strategic planning, enhanced student outreach, and innovative course design, while ensuring that the department continues to offer high-quality and engaging mathematics education. (*Associated with Recommendation #2 and #3*)
- Enhance accessibility by allowing students enrolled in summer courses to take their final exams at one of the many Canadian exam centres.
- Enhance student pathways beyond academia, broadening career prospects while maintaining the rigor and depth of mathematical training by strengthening the interdisciplinary coursework and applied problem-solving components of the program.
- Opportunities to expand course offerings to better integrate applied and computational mathematics (in areas such as data science, AI, mathematical modeling).

Summary of the Reviewers' Recommendations and Program/Faculty Responses

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

Reviewers' Recommendations	Program/Faculty Response
Recommendation #1 Improve communication with students. For instance, by clarifying: • course offering rotations in advance; • recommended (as opposed to compulsory) prerequisites; and • how the Math Scholars program works.	**Program:** • The Program currently posts courses for the upcoming year on the program webpage and will clarify that the list of courses is categorized by regular and rotated offerings. • The curriculum committee is in the process of streamlining the course offerings and module requirements; this includes developing documents and/or webpages describing student pathways. These resources will include a discussion of rotated offerings. • Course prerequisites are addressed in course outlines. The undergraduate chair reviews the outlines before they are circulated to ensure that course description and requisites match the information in the academic calendar. Instructors are expected to adhere to these requisites and to avoid tacitly imposing additional prerequisites. • Information pertaining to Math Scholars program is now linked to a webpage students can easily access. • To make program admission more transparent, revisions will be made to the program's webpages. **Faculty:** • The Faculty supports the department's efforts to improve communication with students regarding course rotations, prerequisites, and the Math Scholars program. While in-person advising opportunities can be beneficial, web-based communication (departmental webpages and targeted emails) is the most effective way to reach students. To complement these efforts, the department is encouraged to offer Course Selection Advising Zoom meetings in the summer prior to course enrolment periods. These sessions, coordinated with the Science Academic Advising Office, allow students to ask real-time questions about course sequencing and program planning. • The Dean's Office will continue to support departments in maintaining accurate and visible course planning tools online, ensuring students can easily access course rotation schedules and program pathways.

Recommendation #2 Consider hiring a marketing and communications staff member to enhance program advertising both externally and internally to attract first-year Science students.	**Program:** The Dean's office makes decisions regarding this type of hiring. The program will support this initiative by discussing this idea with the decanal team and exploring options that would improve enrolment across multiple programs. **Faculty:** The Faculty of Science recognizes that improving marketing and communication is a priority, particularly for programs with lower enrolments. In response to the department's request for a dedicated marketing staff member, the Faculty's Communications and Marketing team, which serves all departments, will be restructured with the goal of restoring full service by summer 2025. Recent staffing transitions, including a retirement and other position changes have temporarily disrupted these services. In the meantime, the Faculty encourages departments to work closely with the Science Communications Team to develop targeted recruitment and outreach strategies.
Recommendation #3 In response to the pressures on minimum enrollment: • maintain the current level of the program, which seems to serve students well, with small class sizes described as one of the main benefits of the program. • find a balance between consolidating the course offerings (to meet minimum enrolment requirements) and continuing to offer a sufficient number of advanced courses.	**Program:** The program agrees that it is important to sustain advanced course offerings as much as possible in order to maintain both the academic quality of the current programs and their ability to appeal to students. The curriculum committee is working on a plan to streamline all undergraduate modules by shortening some prerequisite chains and replacing second-year curriculum by a fixed suite of courses that all students will take, as well as reorganizing and updating content in upper-level courses. **Faculty:** The Faculty of Science acknowledges the challenges posed by minimum enrolment thresholds while recognizing the importance of maintaining program integrity and providing students with a high-quality learning experience. Small class sizes are a valued aspect of the Mathematics program, and the Dean's Office supports the department's efforts to preserve access to advanced courses while complying with new enrollment policies. The department is encouraged to explore flexible strategies to sustain upper-year course offerings. While maintaining all current course offerings may not be possible, the Dean's Office is committed to working with the department to identify sustainable solutions that align with both academic priorities and enrolment realities. The department is encouraged to proactively communicate any planned changes to students well in advance to support their course selection and program planning.

Implementation Plan

The Implementation Plan provides a summary of the recommendations that require action and/or follow-up. In each case, the Program Chair, 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
Recommendation #1: Improve communication with students. For instance, by clarifying: • course offering rotations in advance; • recommended (as opposed to compulsory) prerequisites; and • how the Math Scholars program works.	• Revise website to improve communication with students regarding program admissions, course rotations, prerequisites, and the Math Scholars program. • Examine the possibility of offering course selection advising meetings via Zoom in the summer prior to course enrolment periods. • Streamline course offerings and modular requirements. • Develop communications (e.g., dedicated document and on webpages) describing ideal student pathways.	• Undergraduate Chair	Webpage updates by July 2025 Other items by June 2026
Recommendation #2 Consider hiring a marketing and communications staff member to enhance program advertising both externally and internally to attract first-year Science students.	• Reorient the Faculty of Science Communications and Marketing team to enhance marketing of programs with the aim of enhancing enrolment. • Develop targeted recruitment and outreach strategies to include: a) Enhancing web and social media content to better showcase program strengths; b) Coordinating email campaigns that reach prospective and current students at key decision points; and c) Exploring interdisciplinary marketing efforts to increase visibility across Science programs.	• Dean's Office • Undergraduate Chair • Science Communications Team	By June 2026

Recommendation #3 In response to the pressures on minimum enrolment: • maintain the current level of the program, which seems to serve students well, with small class sizes described as one of the main benefits of the program. • find a balance between consolidating the course offerings (to meet minimum enrolment requirements) and continuing to offer a sufficient number of advanced courses.	• Streamline undergraduate modules by shortening some prerequisite chains and replacing second-year curriculum by a fixed suite of courses. • Reorganize and update content in upper-level courses. • Examine flexible strategies to sustain upper-year course offerings, including: 1) cross-listing courses with other departments; 2) strategically rotating low-enrollment courses while ensuring students have a clear pathway to complete their programs; and 3) leveraging blended or hybrid course delivery where feasible to consolidate offerings without reducing access. • Communicate any planned changes to students well in advance, to support their course selection and program planning.	• Undergraduate Chair • Department Chair	By June 2026