Statistics
Final Assessment Report & Implementation Plan
May 2025

Faculty / Affiliated University College	Faculty of Science	
Degrees Offered	M.Sc., Ph.D.	
Date of Last Review	2016-2017	
Approved Fields	Statistics Actuarial Science Financial Modelling	
External Reviewers	Lisa Lix Max Rady College of Medicine University of Manitoba	Mu Zhu Statistics and Actuarial Science University of Waterloo
Internal Reviewers	Tom Drysdale, Associate Dean, Schulich School of Medicine & Dentistry	Matheus Sanita Lima, Ph.D. Candidate, Biology
Date of Site Visit	January 30 & 31, 2025	
Date Review Report Received	March 25, 2025	
Date Program/Faculty Response Received	Program – April 22, 2025 Dean – April 22, 2025	
Evaluation	Good Quality	
Approval Dates	SUPR-G: June 23, 2025 ACA: September 9, 2025 Senate (for information only): September 19, 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 graduate programs in Statistics housed in Western's 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 Decanal Office, 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 Graduate Program Review Committee (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 graduate cyclical review process that is made public; all other documents are confidential to the Faculty of Science, the School of Graduate & Postdoctoral Studies (SGPS), and SUPR-G.

Executive Summary

The Department of Statistical and Actuarial Sciences has been offering graduate programs in Statistics (M.Sc. and Ph.D.) since it was founded in 1980. Each degree is offered in three core fields (Statistics, Actuarial Science, Financial Modelling). For the M.Sc., the vast majority of students follow the non-thesis (project-based) path, with thesis-based M.Sc. as an option. In 2022-2023 full-time enrolment in the Masters was at 24 students with 48 students in the Ph.D.

The self-study was led by the Graduate Chair and supported by the members of the Graduate Affairs Committee (GAC). With revised program learning outcomes, all faculty members were involved in a curriculum mapping exercise. Reflections were also informed by surveys administered to current students and recent graduates of both the M.Sc. and Ph.D.

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

Strengths and Innovative Features Identified by the Program

- Good success in preparing students for diverse career paths, with graduates securing positions across academia, government, and industry. Ph.D. graduates have obtained academic positions at universities worldwide, while M.Sc. graduates work as data scientists, statisticians, and risk analysts across various sectors.
- Flexible Academic Pathways - program structure allows students to transition between professional careers and academic research paths based on their evolving interests.
- ELO Internship Success - Financial Modelling program has experienced significant growth following the introduction of the ELO internship option, which allows international students to participate in full-time internships while providing valuable industry experience and professional connections.
    - This initiative has been so successful that the department is now implementing this option for Actuarial Science students.
- Dedicated lab facilities support intensive simulation studies in statistical methodology development.
- As one of the few programs providing funding for Financial Modeling M.Sc. students, increased total funding was maintained over the past five years through stable NSERC Discovery Grants and additional sources including CANSSI, MITACS, private companies, and the Ontario Ministry of Natural Resources.

- Students consistently publish in high-quality journals across all three program fields, with publications spanning theoretical work, applied research, and interdisciplinary collaborations.
- Opportunity to work as statistical consultants with Western Data Science Solutions (WDSS) – the Department of Statistical and Actuarial Sciences statistical consulting service.
- Participation in three collaborative specializations: 1) Hazards, Risks, and Resilience; 2) Environment and Sustainability; and 3) Scientific Computing.

Areas of Improvement Identified and Discussed by the Program

- Current funding limitations restrict TA positions, which constrains opportunities for graduate student funding support.
- Most external funding opportunities, including NSERC and OGS, are available only to domestic students. Given the program's high proportion of international students, this creates substantial funding disparities that could negatively impact international student experience and retention.
- Reduction in international student enrollment resulted in the suspension of the 3+1+1 international partnership program, highlighting the need for a more robust and resilient internationalization strategy that can adapt to national and global challenges.
- Continued curriculum enhancements to integrate more diverse perspectives that reflect a global context – 1) adapting entrance requirements to accommodate a wider range of academic backgrounds; 2) enhancing accessibility in course delivery and material design; 3) incorporating community-based learning projects that address local needs while supporting decolonization and practical learning outcomes.
- Examining curriculum gaps resulting from restricted course offerings in specialized areas and the absence of formal industry advisory input to ensure curriculum remains relevant to evolving professional needs.
- Develop specific support structures to identify and assist struggling students before they reach failure, moving beyond the current case-by-case approach for students who fail to meet progression requirements.
- Explore opportunities for possible program expansion:
    - Adding ELO internship options to the Actuarial Science field.
    - Developing new courses on Data Science, Machine Learning, and AI applications across all subject areas.
- Current classroom and office space constraints limit program growth potential and may impact the quality of student experience.

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:

- Vice-Provost of the School of Graduate & Postdoctoral Studies
- Associate Vice-Provost of the School of Graduate & Postdoctoral Studies
- Director, Academic Quality & Enhancement
- Acing Vice-Provost, Academic Planning, Policy and Faculty
- Dean, Faculty of Science
- Associate Dean – Graduate and Post-Doctoral Studies, Faculty of Science
- Department Chair
- Graduate Chair
- Graduate Affairs Committee Members
- Acting Associate Chief 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 Program/Decanal response form the basis of this Final Assessment Report (FAR) of the Statistics Graduate Program. 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 "*innovative aspects of the Graduate Program in the Department of Statistical and Actuarial Sciences include the emphasis on attracting top international talent, both at present and in the past with the 3+1+1 exchange program, the range of opportunities available to students who complete co-op programs/ internships during their graduate studies, and the collegial, young, and energetic faculty. The dedication of the program staff is a key strength of the program.*"

Strengths of the Program

- Strong complement of dedicated faculty – many of whom participate in outreach activities that benefit students, such as organizing and attending academic-industry networking events.
- Maintains a robust research environment with faculty members consistently producing high-quality peer-reviewed research across various career stages.
- Graduate students make substantial contributions assisting with undergraduate instruction, advancing innovative theoretical and applied research, and participating in Western Data Science Solutions – the Department's statistical consulting unit.
- Non-thesis MSc students benefit from the annual "MSc Day," which develops their scholarly communication skills before graduation.
- Pragmatic curriculum management despite resource constraints. For example, the "generalized linear models" course was redesigned to offer tailored versions for different program fields, accommodating students' varied backgrounds and preparation levels.
- Students and faculty have excellent access to computational resources, including GPUs and parallel computing environments that support intensive research work.
- Proactive international student recruitment includes early admission offers to help students navigate permit applications.
- Faculty research outputs, in terms of number and quality of peer-reviewed publications is high, which is important for providing students with exposure to a variety of research topics and areas in which to pursue excellent, high-quality research projects.
    - Good number of publications co-authored by students and program graduates, evidence that their research programs are achieving their goals.

Prospective Improvements for the Program to Consider

- Communication gaps between faculty and students impede academic progress – consider the development of a handbook or policy manual providing clear information, guidelines, and policies for all academic programs. (*Associated with Recommendation #2*)
    - Clearer communication of alternative pathways, particularly regarding individual reading courses that could help students meet degree requirements.
- Limited availability of funding support for graduate students. (*Associated with Recommendation #3*)
    - Limited NSERC funding amounts restrict faculty capacity to support graduate students, forcing heavy reliance on teaching assistantships. The Department could clarify actual funding levels in official documents to better reflect true support levels.
- Address concerns about courses cross-listed among graduate and undergraduate students that may lack sufficient academic depth to adequately

challenge graduate students and support their advanced learning outcomes. (*Associated with Recommendation #5*)
    - Periodic difficulty for students to find enough courses to take in order to satisfy the standard/default degree requirements.
- Absence of an on-site Graduate Program Coordinator creates barriers to fostering strong graduate student community. This administrative gap impacts both student experience and faculty efficiency in managing program requirements. (*Associated with Recommendation #7*)
- Current recruitment efforts lack specific targeting of underrepresented groups, particularly Indigenous students. The Department could strengthen collaboration with internal departments and the Office of Indigenous Initiatives to develop recruitment strategies that actively engage diverse student populations.
- Overlap of three program areas combined with close involvement in the Master of Data Analytics (MDA) Program creates heavy faculty workload. Faculty currently carry heavier supervisory loads as they support students across three distinct program areas.
- Work permit restrictions significantly limit international students' internship participation. Revising curriculum to make internships required academic components may enable international students to obtain special work permits.

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
Recommendation #1: Encourage and support students to form a Graduate Student Association and provide resources to support formation of an association.	**Program:** The department can allocate a small amount, e.g., $1000 a year to help the graduate students form and maintain a student association by enabling them to organize social and academic activities, such as mini-conferences. The graduate program coordinator will help with organizing activities. **Faculty:** The Faculty of Science applauds the program's intention to support a graduate student association. The Associate Dean can help by introducing students to executives of grad student associations in other programs in Science (e.g. Biology, Earth Sciences, and a new student association in Math).
Recommendation #2: Develop a graduate student handbook.	**Program:** The program will develop a graduate student handbook to be available online before new students arrive in September 2025. The handbook will be a starting reference for students searching for information about academics, careers, campus life etc. **Faculty:** The Associate Dean (Graduate) will be available to consult with the program about graduate program policies to reference in the new student handbook.
Recommendation #3: Undertake a review of the minimum level of funding support provided by supervisors	**Program:** The Graduate Affairs Committee (GAC) will review and clearly communicate minimum funding policies for graduate students, making them accessible via an internal website. The MSc programs are competitive due to features like the Experiential Learning Option (ELO), now included in both the Financial Modelling and Actuarial Science MSc programs. The Statistical Science MSc program is also in high demand. Current funding levels for all three MSc programs are considered competitive. The department plans to review PhD funding levels in 2025, noting that actual funding may vary based on scholarships or supervisor contributions. **Faculty:** The Associate Dean (Graduate) will collect and annually update data on both minimum and average graduate student stipends. While PhD stipends were raised in 2023 to $19,000 plus tuition and other fees—above the university minimum—they may still fall short of being competitive, especially given the rising cost of living in London. MSc stipends, though smaller, are considered competitive, particularly in Financial Modelling. However, fully funding these MSc programs would require downsizing and could reduce the number of graduate courses offered.

Recommendation #4: Provide needs-tested travel awards to support conference/workshop travel.	**Program:** The program is committed to supporting PhD students' participation in academic conferences, offering up to $500 per student for travel, though primary funding is expected from supervisors. Students are encouraged to apply for external travel awards from organizations like the Statistical Society of Canada and the Society of Actuaries. The department also plans to explore additional support from the Faculty of Science. **Faculty:** Although the Faculty of Science cannot allocate budget to travel awards in a specific program, the Dean's Office will support the program in their effort to create awards, and will work with them to assess the allocation of their WGRS budget, explore the use of funds in their application fee account, or consult with the development team in Science about approaching alumni to donate funding for new awards. Supervisors will be further encouraged to seek additional research funding beyond Discovery Grants as a means to further support their students' research needs.
Recommendation #5: Undertake a curriculum review; as part of this review, (i) critically assess the integration of EDI principles in the curriculum, and (ii) consider the appropriateness of cross-listed courses that currently serve both undergraduate and graduate students vis-a-vis the PLOs of the graduate program.	**Program:** The program recognizes the need to undertake a curriculum review for all graduate programs. The review will ensure that the curriculum is revised and reflects the current development of the subject areas and identify areas for the integration of EDI principles and appropriate use of cross-listed graduate/undergraduate courses. **Faculty:** The Dean's office supports the program's plans to undertake a curriculum review and encourage consultation with the Center for Teaching and Learning regarding updating the Learning Outcomes.
Recommendation #6: Re-evaluate participation in collaborative specializations.	**Program:** The Scientific Computing collaborative specialization is currently inactive, with no enrolled students. Revitalizing it will require collaboration among the departments of mathematics, statistical and actuarial sciences, and computer science. The program is considering proposing a new collaborative specialization in AI, Machine Learning, or Data Science to attract more graduate students and will discuss this with the Faculty of Science. In contrast, the Hazards, Risk, and Resilience specialization is active, supported by a faculty expert who supervises students in this area. **Faculty:** The Faculty of Science is reviewing all collaborative programs in Science this spring to determine what resources are required and the roles of various departments. The program is encouraged to explore the benefits of the various collaborative programs for their students so that they can be promoted. Should this department decide to offer a new collaborative specialization, the Dean's office will support their efforts.

Recommendation #7: Re-evaluate the office locations of Graduate Program staff	**Program:** The program will discuss the office location of the Graduate program staff with the Faculty of Science. It would be good if the current graduate program coordinator could stay in UWC office at least 3 days a week. **Faculty:** The School of Mathematical and Statistical Sciences uses a shared administrative service model, meaning the graduate administrator for Statistics splits time between buildings. While this may reduce direct access for students, it enhances overall administrative efficiency. This arrangement is expected to be reviewed in the upcoming departmental evaluation this fall.
Recommendation #8: Re-evaluate the viability of the 3+1+1 exchange program	**Program:** The 3+1+1 program enabled the recruiting of many highly qualified graduate students. The department chair and grad chair will discuss with the Faculty of Science and SGPS the possibility of reinstating the program; explore whether Western can allocate some unused PAL quota to the 3+1+1 program. **Faculty:** The 3+1+1 program was paused due to uncertainty around undergraduate PALs availability—a university-level decision. With two years of PALs data now available, the department plans to consult the Registrar about restarting the program. However, challenges remain, including increased training capacity at Chinese universities and the need to rebuild post-COVID partnerships. The department is encouraged to explore alternative strategies for international student recruitment beyond the 3+1+1 model.

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
Recommendation #1: Encourage and support students to form a Graduate Student Association and provide resources to support formation of an association.	• Discuss the formation of a Graduate Student Association and identify student volunteers to provide ideas for the structure of the organization and what activities it plans to organize. • Introduce students to executives of grad student associations in other programs within the Faculty of Science.	Graduate Chair *with the Grad Affairs Committee* Associate Dean	By September 2025
Recommendation #2: Develop a graduate student handbook.	Develop and release a first edition of the handbook on the program's website. Handbook to continuously be updated as the programs evolve.	Graduate Chair *with the Grad Affairs Committee* Associate Dean	By September 2025
Recommendation #3: Undertake a review of the minimum level of funding support provided by supervisors	• Assess information pertaining to minimum and average stipends paid to graduate students. ○ Should the minimum required funding not be representative of stipends in the program, this information will be updated in the tables and tracked on a yearly basis. • Explore the option of increasing stipends for PhD students to be competitive with institutions like Waterloo and Toronto.	Graduate Chair Associate Dean	By December 2025
Recommendation #4: Provide needs-tested travel awards to support conference/workshop travel.	• Support the program in the creation of awards. • Assess the allocation of the WGRS budget and explore the use of funds in their application fee account, or consult with the development team in Science about approaching alumni to donate funding for new awards.	Associate Dean Graduate Chair	By April 2026

	• Continue to encourage supervisors to seek additional research funding beyond Discovery Grants as a means to further support their students' research needs.		
Recommendation #5: Undertake a curriculum review	• Conduct curriculum review and renewal to reflect the current state of knowledge in the subject areas, appropriate use of cross-listed (graduate/undergraduate) courses vis-a-vis the PLOs of the graduate program, and integration of EDI principles within the curriculum. ○ As relevant, connect with the Centre for Teaching and Learning for guidance and support.	Graduate Chair Associate Dean	By August 2026
Recommendation #6: Re-evaluate participation collaborative specializations.	• Explore revitalizing Scientific Computing by collaborating with the departments of mathematics, statistical and actuarial sciences, and computer science. • Evaluate the option of proposing a new collaborative specialization in AI, Machine Learning, or Data Science to attract more graduate students.	Graduate Chair Associate Dean	By April 2026
Recommendation #7: Re-evaluate the office locations of Graduate Program staff	• Review the shared administrative service model utilized by the School of Mathematical and Statistical Sciences - graduate administrator for Statistics splits time between buildings - at the upcoming departmental evaluation.	Graduate Chair Associate Dean	By April 2026
Recommendation #8: Re-evaluate the viability of the 3+1+1 exchange program	• Discuss with the Registrar the possibility/feasibility of re-starting the 3+1+1 programs. • Develop a robust and resilient internationalization strategy that can adapt to global challenges.	Graduate Chair Associate Dean	By December 2025