

UNIVERSITY OF WINDSOR
UNIVERSITY PROGRAM REVIEW (UPR)
FINAL ASSESSMENT REPORT AND IMPLEMENTATION PLAN: MATHEMATICS AND STATISTICS
UNDERGRADUATE AND GRADUATE PROGRAMS
January 2024

Executive Summary of the Cyclical Program Review of the Department of Mathematics and Statistics' Programs

In accordance with the University's Institutional Quality Assurance Process (IQAP), this final assessment report provides a synthesis of the external review and the internal responses of the undergraduate and graduate programs in the Department of Mathematics and Statistics.

In addition to identifying the significant strengths of the programs, together with opportunities for program improvement and enhancement, the report prioritizes the recommendations that have been selected for implementation and sets out a plan (including the agent(s) responsible for addressing the recommendations and deadline dates) for follow-through. Timelines for monitoring the implementation of the recommendations are built into the process, with areas reporting mid-cycle on their progress to the Senate Program Development Committee, or earlier where there are significant concerns requiring urgent follow-up.

The Department of Mathematics and Statistics' 2021-2022 Self-Study, submitted to the Office of Quality Assurance on February 28, 2023, included: 1) a summary of activities since the last review; 2) descriptions and an analysis of the programs, their learning outcomes, curriculum structure, and student experience; 3) information on enrolments as well as financial, physical, and human resources; and 4) the program data including the standard data package provided by the Office of Quality Assurance. Included in the appendices to the Self-Study were faculty member CVs, recommendations from the previous IQAP review, the Leddy Library report, undergraduate and graduate course outlines, learning outcomes, and calendar descriptions, and student-related surveys and data.

The Department of Mathematics and Statistics programs were reviewed by Dr. Andrew Dean, Department of Mathematical Sciences, Lakehead University; Dr. Geneviève Gauthier, Department of Decision Sciences, HEC Montreal; and Dr. Priscila Correa, Faculty of Education, University of Windsor. In addition to assessing the Self-Study, the Review Team conducted a two-day on-site visit on May 4-5, 2023, which included meetings with faculty, students, staff, the coordinator of the Mathematics and Statistics Learning Centre, the Head of the Department of Mathematics and Statistics, the Dean of the Faculty of Science, the Associate Dean of Undergraduate Affairs, the Dean of Graduate Studies, the Academic Librarian in charge of the Data Centre, and the Associate Vice-President Academic.

The Review Team noted that the Self-Study document was created two years ago and acknowledged that a scheduled visit was delayed due to COVID and organization difficulties. In their report (July 7, 2023), the reviewers commented on how impressed they were that almost all the recommendations from the previous review had been implemented. Although there are a lot of similarities with the Department's offerings from the last review, there are a number of changes as well, including new programs such as the Masters in Actuarial Science. While there have been many new developments, the reviewers noted that these have been pursued absent a planned coherent and cohesive approach. Critical to the Department's continued success and growth is the creation of a strategic plan, including a strategic hiring plan, to better guide the Department's program development and hiring decisions.

It was also noted that admission requirements are adequate and appropriately aligned with learning outcomes. The Review Team lauded the innovative offering of undergraduate specializations, as well as the success of the actuarial science graduate specialization, noting that the latter could only be strengthened by obtaining accreditation from the Society of Canadian Actuaries. The programs are delivered by dedicated faculty, with strong research profiles, and supported by committed staff. The Review Team noted the reliance on sessionals, confirming that the number was not too high or unreasonable, though they did underscore the importance of ensuring that sessionals be available to students. The Review Team did note a difficult transition period for undergraduate students moving from second year to third year, recommending that there be abstraction built into courses in years one and two. Finally, while the means of assessments are appropriate, the Reviewers urged the area to address the "lack of consistency in teaching the same

course from year to year and across all sections of the same course”, impacting student learning and progression through the undergraduate program.

Overall, the Review Team concluded that Department’s suite of undergraduate and graduate programs and courses are similar to those offered at other similar-sized institutions, noting a shift from operational research to actuarial sciences. The Review Team also commended the Department on its recognition of the importance of service teaching, and its innovative Math and Stats Learning Centre, open to all students and demonstrating a strong commitment to student success and providing an exceptional student experience.

The Head of the Department of Mathematics and Statistics and Dean of Science submitted their responses to the External Reviewers’ Report (July 7, 2023), addressing the recommendations, identifying follow-up actions, and providing clarification or corrections, as appropriate. The Senate Program Development Committee (PDC) Final Assessment Report and Implementation Plan (January 2024) considered all the above documentation. The Executive Summary and Implementation Plan, along with any response from the area on the final recommendations, were submitted to Senate in March 2024.

Final Recommendations and Implementation Plan (in priority order)

Final recommendations were arrived at by the Program Development Committee, following a review and assessment of the External Reviewers (ER) report, the response from the Department of Mathematics and Statistics, and the Dean’s response.

Recommendation 1: That the Department develop a strategic plan over a horizon of 5 and 10 years, including academic programming and service teaching, research and graduate supervision, and faculty hiring/renewal plan. A strategic plan, endorsed by the Dean, will identify areas of focus and growth, allowing a better allocation of resources and better guiding important decisions such as the creation of courses, specializations, the purchase of software or computing capacity, and the hiring of new faculty members. [ER recommendations 1 and 12]

Agents: Head, Dean of Science, AAU Council

Completion by: Fall 2025

Recommendation 2: That the Department develop a standardized and exhaustive course syllabus template to ensure consistency between the courses (and course sections) and with the learning outcomes as well as to ensure stability over time. It is important that there be consistency through time; that the content of the courses not depend solely on the choice of the instructor, but on a common decision in relation to the course learning outcomes. This would have the advantage of providing better support for sessionals who would receive a full description of the material to be taught.

There should be a template for the course outlines that provides information on the following points, in addition to what is required by Senate Bylaws:

- (1) a text describing the subject of the course and to whom it is addressed,
- (2) a detailed description of the subjects covered,
- (3) the course learning outcomes as well as an enumeration of the objectives of the program which are covered in this course,
- (4) the methods of evaluations and their weighting.

[ER Recommendation 2]

Agents: Head, Undergraduate and Graduate Committees, Centre for Teaching and Learning

Completion by: Fall 2024

Recommendation 3: That the Department undertake a curriculum mapping exercise to report on and address the perceived gap between years 1-2 and years 3-4 of the BMath program. Along with implementing detailed and standardized syllabi for each course, the coherence between the courses and the progression through the program would be ensured by Department members. [ER Recommendation 4]

Agents: Head, AAU Council, Undergraduate Committee, Centre for Teaching and Learning

Completion by: Fall 2024

Recommendation 4: That the Department investigate why the conversion rate, from first-year applications to registrations, is low and put in place measures to increase it. [ER Recommendation 3]

Agents: Head, AVP Enrolment Management

Completion by: Fall 2025

Recommendation 5: That the Department report on efforts and initiatives to address concerns where undergraduate students wishing to continue their graduate studies at the University may not be able to do so, since they may have completed graduate course requirements as part of their undergraduate program due to cross-listings. This may include:

- a. allowing course substitutions (e.g, directed readings, projects within the industry, etc.) for graduate students who completed a course as part of their undergraduate degree;
- b. providing advanced standing into graduate programs by creating five-year BMath-Masters degrees.

[ER Recommendation 5]

Agents: Head, Graduate Committee, AAU Council

Completion by: Fall 2025

Recommendation 6: That the Department report on its efforts to provide hands-on undergraduate courses in programming, with applications in data science, statistics, optimization, and/or operations research, including exploring possible synergies with the School of Computer Science, which is currently developing a Data Science program. [ER Recommendation 6]

Agents: Head, Undergraduate Committee, AAU Council, Dean of Science, Director of School of Computer Science

Completion by: Fall 2025

Recommendation 7: That the Department report on the establishment of regular meetings with the Faculty of Education to ensure that the Concurrent BMath/BEd program is fulfilling the needs of students. [ER Recommendation 7]

Agents: Head, Dean of Education

Completion by: Fall 2024

Recommendation 8: With regard to Concurrent Education programs:

- a) That the Department pursue conversations with the Dean of Education regarding the feasibility of offering the honours concurrent program in five years, rather than six. While students want Honours degrees as it enables them to be higher on the pay scale when hired as a teacher, and leaves the door open to pursue Graduate studies, they may be reluctant to spend an additional year (6 years rather than 5) to get a Concurrent Education degree. Some universities have developed accelerated programs so that by using the Spring and Summer semesters, students are able to get the 4-year honours degree in 3 years. This also increases overall enrolment in Math and Stats programs as you have students for one more year before graduation.
- b) That the Department report on its efforts to highlight the concurrent education programs at recruitment events, including making use of successful students from the program as Ambassadors or at least offering testimonials, where possible.

[ER Recommendation 8]

Agents: Head, Dean of Education

Completion by: Fall 2024

Recommendation 9: That the Department fully embrace the Actuarial Science program, especially since there is a natural synergy with the specialization in statistics, and report on efforts to ensure its sustainability by:

- (1) making a case to the Dean of the Faculty for at least two members of the department who are actuaries, provided this is consistent with the Department's strategic plan; and
- (2) undertaking the process of accreditation with the society of actuaries.

[ER Recommendation 9]

Agents: Head, Dean, AAU Council

Completion by: Fall 2025

Recommendation 10: When there are many sections of the same courses, that the Department designate a coordinator to oversee all sections of a multi-section course and to make sure that the same material is covered in every sections, understanding that some course may have sections with different emphasis that need to be considered (e.g., 1st year calculus course that has both Engineering and non-Engineering sections). [ER Recommendation 10]

Agents: Head

Completion by: Fall 2024

Recommendation 11: That the Department report on how it is ensuring consistency between the content of courses from year to year and with their course outlines, for the courses taught by sessional instructors. This may be achieved by assigning oversight responsibility to a faculty member, having the undergraduate committee or Head work with the sessional instructors, or other means identified by the Department. [ER Recommendation 11]

Agents: Head, Undergraduate Committee

Completion by: Fall 2024