

UNIVERSITY OF WINDSOR
UNIVERSITY PROGRAM REVIEW (UPR)
REPORT ON: MATHEMATICS AND STATISTICS
UNDERGRADUATE AND GRADUATE PROGRAMS
 January 2017

EXECUTIVE SUMMARY

Review Preparation

In preparing this document, the Program Development Committee reviewed the following: Mathematics and Statistics' Self-Study (SS) (2014), the report of the external reviewers (ER) (April 2015), the response from the Head (HR) (June 2015), and the response from the Dean (DR) (May 2016) to the above material. The external reviewers were: Dr. Andrew P. Dean, Vice-President, Research, Economics, Development and Innovation, Professor of Mathematics, Lakehead University, Dr. Arthur B. Yeh, Professor of Statistics and Chair, Department of Applied Statistics and Operations Research, Bowling Green State University, and Dr. Gurupdesh Pandher, Senior Associate Dean, Odette School of Business, University of Windsor.

Undergraduate and Graduate Programs

At the undergraduate level, the Department offers a Bachelor of Mathematics (General), a Bachelor of Mathematics (Honours), and a Bachelor of Mathematics (Honours) in Mathematics and Statistics. Students also have the option of combining their Honours Mathematics major with a major from another discipline.

The Department also collaborates with departments to offer a Bachelor of Mathematics (Honours) in Mathematics and Computer Science and a Concurrent Bachelor of Mathematics (General)/Bachelor of Education. Admissions were suspended for the latter during the time of the review, but have since been revised and the program relaunched.

The Department is also heavily involved in service teaching, providing math instructions for programs across the University that have mathematics and statistics as degree requirements.

The Department offers a Minor in Mathematics and a Minor in Statistics, as well as Major and Minor Concentrations for the Bachelor of Arts and Science in Mathematics and Statistics.

At the graduate level, the Department offers a Master of Science in Mathematics and Statistics with fields in Mathematics or Statistics, a Master of Actuarial Science (MActSc) (primarily geared towards international students), and a PhD in Mathematics and Statistics with fields in Mathematics or Statistics.

Enrolments

Undergraduate

	Fall 2012	Fall 2013	Fall 2014	Fall 2015	Fall 2016
Full-Time	85.48	81.3	72.88	70.03	62.245
Part-Time	14.5	19	12.44	9.5	13.5

Graduate

	Fall 2012	Fall 2013	Fall 2014	Fall 2015	Fall 2016
MSc Full-Time (Math Field)	9	10	6	7	8
MSc Part-Time (Math Field)	0	0	0	0	0
MSc Full-Time (Stats Field)	10	10	10	16	18
MSc Part-Time (Stats Field)	1	0	0	0	0
MActSc Full-Time	----	----	----	16	39
MActSc Part-Time	----	----	----	0	0
PhD Full-Time (Math Field)	0	0	0	0	0

PhD Part-Time (Math Field)	0	0	0	1	1
PhD Full-Time (Stats Field)	9	6	8	9	10
PhD Part-Time (Stats Field)	0	0	0	0	1

Human Resources

Faculty/Instructors

Tenure/tenure-track faculty	12 (including Head)
AAS Learning Specialist III	1
Sessional Lecturer	1
Faculty members involved in graduate program delivery	18 (includes 12 tenure/tenure-track faculty + 3 emeritus faculty + 2 adjunct appointments + 1 cross-appointment)

Full/Part-time Staff

Secretaries	2
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FINAL ASSESSMENT REPORT (with Implementation Plan)

Significant Strengths of the Programs

The Department offers high quality undergraduate and graduate education delivered by faculty with very strong records and some notable awards in teaching excellence. (ER, p. 7, 10, 11) Faculty members strive to make the student experience exceptional. The external reviewers noted that “Students feel comfortable and welcomed by the professors to drop by and discuss topics in their offices. This is great and clearly is a strength of the program at University of Windsor. It was evident from the students that they feel that the professors care and are willing to take the time to help motivated students individually.” (ER, p.5) The number of publications in refereed journals by both Masters and PhD students, and the level and number of external scholarship funding awarded to graduate students from agencies such as the Tri-Councils and OCG is evidence of the high caliber of the graduate programs. (ER, p. 7,11)

The Department has a number of programs to assist students as they work their way through the rigorous studies. In addition to the Math and Stats Learning Centre, which provides support for undergraduate students across the University as well as tutoring and mentoring opportunities for students, the Department offers weekly colloquia (attendance is required for graduate students) which provides “graduates students with the opportunities to be exposed to the latest technical developments in mathematics and statistics, and to interact with outside speakers. These contribute to developments of professional and transferable skills for graduate students.” (ER, pp. 2, 11, 12). The PDC supports the external reviewers’ suggestions that all students be encouraged to attend these colloquia. (ER, p.5) The Department is also an affiliate of the Fields Institute which opens up research activity and opportunities for students. (ER, p. 13)

Other notable initiatives for which the Department is to be commended include:

- The Foundational Mathematics Instruction Project that was initiated in 2010 helped enhance the undergraduate experience in a number of ways, including increasing contact-hours, staffing classes with full-time faculty members, increasing tutorial hours, and facilitating learning in small study groups.
- The creation of Mathematics and Statistics Club gives a venue in which faculty members and students can get together and exchange ideas on the regular basis. The Club also arranges to have faculty and external speakers to give presentations on various mathematics and statistics topics.
- The collaboration with Oakland University in offering virtual classes (via video conferencing), thus giving graduate students more flexibility to take required or/and additional courses. (ER, p.11,12)

Opportunities for Program Improvement/Enhancements

The Department is encouraged to review its curricula. In particular, it should consider adding a thesis or special project requirement to its undergraduate programs or modifying course assessment methods to ensure that learning outcomes F and I are met:

- F. communicate mathematically concepts effectively and precisely to a variety of audiences (this is also relevant to learner outcome G)
- I. Study new mathematical material independently, and identify future steps for further development. (ER, p.5)

The external reviewers encourage "the department to be more entrepreneurial with regards to future developments", in order to attract new students, noting that funding concerns and discussions of program prioritization (or similar discussions) are common across the sector. The reviewers note that "[t]he mathematics and statistics department is making some progress towards this but could take a more proactive approach." (ER, p.16)

Further opportunities for program improvements are captured in the recommendations listed below.

IMPLEMENTATION PLAN

Recommendations (in priority order)

(Final recommendations arrived at by the Program Development Committee, following a review and assessment of the External Reviewers report, the Head's response and the Dean's response.)

Recommendation 1: That the Department submit course-level learning outcomes and assessment methods for each of its courses that clearly correspond to the program-level learning outcomes.

[Program-level learning outcomes for each of its undergraduate and graduate programs that clearly correspond to the University's stated "Characteristics of a University of Windsor Graduate" were submitted and reviewed as part of the Self-Study. (See SS, pp19-35) PDC notes that the Department has developed learning outcomes for most of its undergraduate and graduate courses and looks forward to receiving them and completing its review of the course-level learning outcomes.]

Agents: Department Council, Head, CTL, Vice-Provost, Teaching and Learning

Completion by: Fall 2018

Recommendation 2: That the Department integrate problem-solving and communication skills in more courses, especially at the fourth-year level in the honours program; and that the Department report on approaches to addressing learning outcomes F and I which might include a thesis or special project requirement to its undergraduate programs or modifying course assessment methods.

[F. communicate mathematically concepts effectively and precisely to a variety of audiences (this is also relevant to learner outcome G)

I. Study new mathematical material independently, and identify future steps for further development. (ER, p.5)]

Agents: Department Council, Head, CTL, Vice-Provost, Teaching and Learning

Completion by: Fall 2018

Recommendation 3: That the undergraduate studies committee develop a method to offer courses in a consistent and predictable manner.

[PDC notes that the Department is creating a 4-year plan for students in order that they may plan their course sequence. With the submission of this plan, PDC would consider this recommendation satisfied.]

Agents: Department Head

Completion by: Fall 2018

Recommendation 4: That the department stay as an affiliate member of the Fields Institute. The membership cost is \$5,000 per year but the benefits easily outweigh this cost in terms of research activity and opportunities for students and also graduate recruitment. If the department cannot find the funds within its own budget the Faculty and the Office of Research should be approached.

Agents: Department Head, Dean of Science, Office of VPRI

Completion by: Fall 2018

Recommendation 5: That the Head make a case to the Dean of the Faculty for recognition of the major role the department plays in terms of service teaching. Service teaching at a quality level should be seen as an important mission of the department. It should be valued and resourced at the proper level.

Agents: Department Head

Completion by: Fall 2018

Recommendation 6: That the Department pay particular attention to maintaining high consistent standards for sessional teaching in the introductory courses; that it report on the feasibility of providing doctoral students with the opportunity to teach some introductory courses; and that it consider making a case to the Dean of the Faculty for AAS as Learning Specialists and/or sessional lecturer positions with a focus on teaching the introductory courses.

Agents: Department Council, Head, Dean of Science

Completion by: Fall 2018

Recommendation 7: That the Department engage in a strategic planning exercise with a view to 1) matching the size of its programs to the size of the department so as to maintain high quality programming; 2) critically examining the future direction of the PhD in Pure Mathematics and reporting on its plan for the continued viability of the program; and 3) prioritizing opportunities for expansion. That the Department report on its findings. Opportunities and initiatives for improvement or expansion may include those listed below and/or other more appropriate opportunities and initiatives identified during the strategic planning process:

- (a) developing graduate programs which could better align industry and local demands, for example applied mathematics.
- (b) offering a course in Data Analytics
- (c) structuring the MSc in Mathematics and the MSc in Statistics course requirements in a more organized fashion, with specifically enumerated required course and the ability to select some courses from a list of approved offerings. This should help with the course scheduling.
- (d) pursuing the possibility of embedding the SAS certificate within its current applied course or offering the SAS Certificate as an add-on to the degree.
- (e) reviving the Centre for Statistical Consulting, Research and Learning (CSCRL), especially in terms of connecting and reaching out to external clients. The scope of the Centre should be broadened to include areas such as operations research and applied mathematics, in addition to statistical consulting. It can be done under the “analytics” umbrella where the general goal is to utilize quantitative techniques to help clients solve problems.
- (f) developing new programs, program partnerships and pathways to enhance enrolment. (eg, 4+1 type programs whereby students can earn a baccalaureate and a Masters degree in 5 years; 3+1 type programs in which international students can earn a baccalaureate from the University of Windsor; 3+2 (or 3+1+1 or 3+1+2) type programs in which international students can earn a baccalaureate and a Masters degree from the University of Windsor)
- (g) establishing undergraduate and master level programs in analytics (or data science) in collaboration with Computer Science Department.
- (h) establishing 12-month cost-recovery master level professional program in business analytics (for example, general business analytics or business function specific analytics such as in marketing or in finance), in collaboration with the Odette School of Business and the School of Computer Science.

Agents: Department Head, Department Council, Dean of Science

Completion by: Fall 2020

Recommendation 8: That the Department make a case to the Dean of the Faculty for additional tenure-track appointments, consistent with the strategic priorities of the area, and for replacing faculty who may be retiring in the area of Statistics.

Agents: Department Head, Dean of Science

Completion by: Fall 2018