CURRICULUM REVIEW REPORT

Faculty of Science

Department of Mathematics and Statistics

2022-2023

Acknowledgements

We acknowledge this work took place on the traditional territories of the peoples of Treaty 7, which include the Blackfoot Confederacy (comprised of the Siksika, the Piikani, and the Kainai First Nations), the Tsuut'ina First Nation, and the Stoney Nakoda (including the Chiniki, Bearspaw, and Goodstoney First Nations). The City of Calgary is also home to the Métis Nation of Alberta (Districts 5 and 6).

The University of Calgary is situated on land Northwest of where the Bow River meets the Elbow River, a site traditionally known as Moh'kins'tsis to the Blackfoot, Wichîspa to the Stoney Nakoda, and Guts'ists'i to the Tsuut'ina. On this land and in this place, we strive to learn together, walk together, and grow together "in a good way".

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EXECUTIVE SUMMARY

The Department of Mathematics and Statistics offers three undergraduate Bachelor of Science (BSc) degree programs: Actuarial Science (ACSC), General Mathematics (GMAT), and Mathematics (MATH).

Actuarial Science (ACSC)

The ACSC major program is designed to provide undergraduate students with a thorough technical foundation for the actuarial profession. The program was first established in the late 1980s. Many of the core courses in the ACSC program are designed to satisfy educational requirements outlined by relevant professional actuarial societies, which regularly review this course content.

The 2022-2023 curriculum review positions the Department of Mathematics and Statistics to prepare for upcoming accreditation requirement changes from the Canadian Institute of Actuaries (CIA). These changes include a shift to a program-level (as opposed to a course-level) approach to accreditation.

General Mathematics (GMAT)

The GMAT major program has been offered by the Department of Mathematics and Statistics since the early 2000s, when it was first introduced as a more flexible degree option for undergraduate students interested in the department's programs. Initially, the GMAT program was designed to provide a broad range of course choices from across the department that could be used to fulfill degree requirements. However, this flexibility has led to some challenges related to depth of education, skill development, and differential comparison with the department's Mathematics (MATH) major program.

A review of the GMAT program suggested that the program be reimagined to instead target students in combined BSc/BEd (Bachelor of Education) degree programs. The GMAT program's flexibility allows it to easily change focus and specifically equip future teachers with the skills they need to effectively become math educators. As a result of this review, the GMAT program will subsequently be renamed, with enrolment restricted to concurrent BSc/BEd students and any upcoming curriculum modifications made in close collaboration with the Werklund School of Education.

Mathematics (MATH)

The MATH major program was first launched in Fall 2018, coinciding with the suspension of three of the department's former degree programs (Applied Mathematics, Pure Mathematics, and Statistics). The MATH program has since positioned itself as a flexible, approachable degree program with a high standard of depth and rigour, offering multiple options for concentrations and a core first-year program shared by other programs in the department. While the MATH program has grown significantly since its introduction, the 2022-2023 curriculum review found that a reintroduction of the standalone BSc in Statistics would likely be a net benefit to both students and the department.

2022-2023 Curriculum Review – Priority Themes

Finally, as part of the overall curriculum review, several priority themes (e.g., equity, diversity, inclusion, accessibility, and Indigenization; flexibility and responsiveness, career support and skill development, and integration of technology and computing) were identified and used to inform a series of department-wide recommendations for the ACSC, GMAT, and MATH programs.

ACTION PLAN

Our 2022-2023 curriculum review prioritized the following ***key recommendations*** for each of the department's existing degree programs. Over the next four years, the department will support their implementation by convening committees and working groups specific to each item. A full action plan and timeline are available in the Appendix.

RECOMMENDATION 1: Review Programs for PLO Alignment, Skill Development, and Gaps/Overlap (Fall 2023 – Ongoing)

All programs (ACSC, GMAT, and MATH) will have relevant program documents (e.g., course outlines, calendar entries) collected for review by each discipline. Reviews of these documents will focus on alignment with program-level learning outcomes (PLOs) and seek to flag any gaps/overlap in existing programs. Additionally, these program documents will be reviewed for existing assessment practices and identify areas where support may be needed to help instructors engage in non-traditional or "authentic" evaluation of student learning.

RECOMMENDATION 2: Organize and Establish Efforts to Enhance EDIA and Indigenization Across Programs (Fall 2023 – Ongoing)

All programs (ACSC, GMAT, and MATH) will undergo a calendar review process to ensure that program calendar entries and corresponding guidelines are clear and in plain, non-technical language. Department members will engage in a mentorship process of ongoing learning around equity, diversity, inclusion, and accessibility (EDIA) to both provide opportunities for members of equity-deserving groups and build upon existing EDIA initiatives in the Faculty of Science. Finally, a working group will be formed in the department to begin the process of meaningfully including elements of EDIA and Indigenous Ways of Knowing into program curriculum in meaningful and authentic ways.

RECOMMENDATION 3: Cultivate and Sustain Alumni Connections to Support Student Skill Development/Networking (Winter 2024 – Ongoing)

All programs (ACSC, GMAT, and MATH) will begin the development of an alumni network for students who are currently in programs and recent graduates. Alumni information will be collected across all three programs and a network platform will be developed to allow current students access to networking opportunities, alumni stories, and/or potential mentorship opportunities.

PROGRAM RECOMMENDATION (ACSC): Incorporate Industry Needs and Support Student Career Goals (Fall 2023 – Ongoing)

Course documents and content in the ACSC program will be revised for alignment with skill-based PLOs (e.g., software, teamwork, communication, management, professionalism) as part of the program's ongoing work to better align with student career goals and industry needed. The ACSC program will also seek to identify more opportunities in courses to directly incorporate industry-standard computing (e.g., Excel, Jupyter Hub) so students can have more practice with this software.

PROGRAM RECOMMENDATION (GMAT): Implement Calendar Changes Restricting GMAT Enrolment (Fall 2023 – Ongoing)

The GMAT program will be pivoting to focus on students completing the GMAT program as part of the five-year combined BSc/BEd degree with the Werklund School of Education. To support this pivot and clarify the program's requirements to align with the goals of students, a series of calendar changes will be proposed. These changes will completely restrict GMAT enrolment to students in the concurrent five-year combined BSc/BEd degree, allowing the department to officially provide tailored skill development to students in the combined program that highlights the confluences between education and science. Similarly, students seeking a standalone comprehensive program in mathematics will now be better supported in the MATH program.

PROGRAM RECOMMENDATION (MATH): Reinstate the BSc in Statistics (STAT) Major Program (Fall 2023 – Fall 2024)

To better meet a growing demand for statistical knowledge and skills across multiple industries, the department is seeking to reinstate the previously suspended BSc in Statistics (STAT) program to complement the existing MATH program. As part of this change, the department will also be seeking to remove the Concentration in Statistics from the existing MATH program. These measures will ensure that students continue to have access to specialized training in statistics, with more flexibility in a program of study than is offered by the current concentration. Additionally, acknowledging the importance of this training with a named major program will support our students as they seek recognition for their valuable skills in data-driven professions.

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