

ACADEMIC COUNCIL REPORT

ACTION REQUESTED:

- Recommendation
- Decision
- Discussion/Direction
- Information

DATE: 27 February 2024

FROM: Undergraduate Studies Committee

SUBJECT: Major Program Modification – BEng Mechatronics Engineering and Mechatronics Engineering and Management programs – Artificial Intelligence specialization (for approval)

Minor Program Adjustment - BEng Mechatronics Engineering (for information)

COMMITTEE MANDATE:

In accordance with the Undergraduate Studies Committee (USC) Terms of Reference, USC has the responsibility “to examine proposals for new undergraduate degree programs and major changes to existing programs and to recommend their approval, as appropriate, to the Academic Council”. Additionally, USC has the responsibility “to approve minor program adjustments and report them to Academic Council for information.”

The Undergraduate Studies Committee is presenting a Major Program Modification for approval and a Minor Program Adjustment for information.

MOTION FOR CONSIDERATION:

That pursuant to the recommendation of the Undergraduate Studies Committee, Academic Council hereby approves the Major Program Modification to the BEng Mechatronics Engineering and Mechatronics Engineering and Management programs to create a specialization in Artificial Intelligence.

BACKGROUND/CONTEXT & RATIONALE:

The Faculty is proposing to create a specialization in Artificial Intelligence by replacing the three existing engineering electives in the core Mechatronics Engineering program with three AI specific courses:

ENGR 3150U: Artificial Intelligence and Machine Learning,
ENGR 4170U: Deep Learning

ENGR 4270U: Machine Learning Applications.

Artificial Intelligence (AI) and Machine Learning (ML) are rapidly becoming a tool that can be used to solve numerous engineering problems. The proposed specialization in AI will provide students a solid foundation on the main aspects of ML and AI, including Deep Learning, and their application to solving modern engineering problems and challenges. In addition, students will learn the ethical implications of the use of Artificial Intelligence in engineering and society.

The proposed specialization aligns well with Ontario Tech's mission to "... equip future leaders to solve complex problems." AI is a tool that will help our graduate solve these complex problems. In addition, the proposed specialization will be a unique offering amongst engineering programs in Canada.

For Minor Program Adjustment (information only):

The Faculty proposed to replace MATH 2070U: Numerical Methods with ENGR 2100U: Computational Engineering Applications in Year 2, Semester 2 in the Mechatronics Engineering program. ENGR 2100U better meets the learning outcomes of the program. As well, the course will expose students to Python programming, which is important for Mechatronics engineers. Lastly, the addition of this course will allow students to take the Artificial Intelligence Specialization that is being proposed since this course is a prerequisite.

RESOURCES REQUIRED:

No additional financial/physical resources required.

TRANSITION PLAN:

New specialization and courses will be available to students beginning Fall 2024. There is no impact on the core Mechatronics Engineering program since the specialization is simply replacing the three existing engineering electives with specific courses for those students who take the specialization. Existing students can potentially take the specialization by taking the three specified courses as their electives.

Fall 2023 cohort and later will take ENGR 2100U instead of MATH 2070U.

Fall 2022 cohort and earlier will take MATH 2070U.

Note if a student is missing MATH 2070U, they may take ENGR 2100U instead.

CONSULTATION AND APPROVAL:

- ✓ FEAS Curriculum Committee: 23 November 2023
- ✓ Faculty Council: 30 November 2023
- ✓ Undergraduate Studies Committee (MPM Recommendation, MPA Approval): 16 January 2024
- Academic Council (MPM Approval, MPA Information): 27 February 2024

Additionally, prior consultation at program level curriculum committees and Department Council garnered support from faculty and student representatives.

NEXT STEPS:

Pending the approval of Academic Council, the Major Modification will be included in the 2024-2025 Academic Calendar.

SUPPORTING REFERENCE MATERIALS:

- [Major Program Modification Proposal](#) (For Approval)
- [Minor Program Adjustment Proposal](#) (For Information)
- [ENGR 4170U – New Course Proposal](#)

- [ENGR 4270U - New Course Proposal](#)