



MEMORANDUM

To: Executive Committee of Faculty Council (November 24, 2021)
Faculty Council (December 16, 2021)

From: Professor Julie Audet
Chair, Engineering Graduate Education Committee (EGEC)

Date: November 8, 2021

Re: **EGEC Information Update**

REPORT CLASSIFICATION

This is a routine or minor policy matter that has been approved by the Engineering Graduate Education Committee on behalf of Faculty Council¹. It will be considered by the Executive Committee for endorsing and forwarding to Faculty Council for information.

NEW COURSES APPROVED

APS1081	Quantum Machine Learning
MIE1626	Data Science Methods and Quantitative Analysis

MINOR MODIFICATIONS

MIE1050 Signal Processing	Course code changed to MIE1452
MIE1628 Big Data Science	Course name changed to “Cloud-Based Data Analytics”
MEng Emphasis in Analytics (CHE, CIV, ECE, MIE, MSE)	Add MIE1626 in the list of core courses for the emphasis (with an exclusion for those who have taken MIE1624 and <i>vice versa</i>). Update the list of electives. (See Appendix I.)

¹ As a result of the 2005 Task Force on Graduate Education at the University of Toronto, EGEC has delegated authority to “consider and approve on behalf of Faculty Council and/or recommend to Faculty Council and/or SGS, matters relating to graduate curriculum, policy, new initiatives, program and course changes”.

RECOMMENDATION FOR FACULTY COUNCIL

For information.

University of Toronto

Minor Modification Proposal: Change to an Existing Graduate Program or Collaborative Specialization

This template should be used to bring forward all proposals for minor modifications to program or admissions requirements for existing graduate programs or collaborative specializations under the University of Toronto's Quality Assurance Process.

Program/Collaborative Specialization being modified:	Chemical Engineering & Applied Chemistry, MEng Civil Engineering, MEng Electrical & Computer Engineering, MEng Mechanical & Industrial Engineering, MEng Materials Science and Engineering, MEng
Graduate unit:	Above five
Faculty/academic division:	Applied Science & Engineering
Dean's office contact:	Julie Audet, Vice-Dean, Graduate Studies
Version date:	November 8, 2021

1 Summary

	Changing admission requirements		Renaming field, concentration or emphasis
x	Changing program requirements		Renaming of program or collaborative specialization (please notify VPAP before governance)
	Changing timing of program requirements		Creating a new emphasis
			Changes to programs affecting an MOA

Currently, Master of Engineering (MEng) students in graduate units in the departments of Chemical Engineering & Applied Chemistry, Civil & Mineral Engineering, Electrical & Computer Engineering, and Mechanical & Industrial Engineering can earn an Emphasis in Analytics by successfully completing four courses from the two lists presented in Appendix A. At least one course must be from the list of core courses. The other courses must be selected from the list of elective courses. In addition, students must complete a pre-requisite course before taking any of the core courses.

Herein, we propose the following changes:

- 1) Expand the list of eligible core courses by adding MIE1626H: *Data Science Methods and Quantitative Analysis* (pending approval). This will create a fifth choice in the list of core courses for the emphasis in Analytics. There will be an exclusion for MIE1624H: *Introduction to Data Science and Analytics* which is a core course as well in the emphasis. MIE1626 can be seen as a more technically rigorous (i.e., statistically grounded) introduction to data science than the less technical and mostly experimental MIE1624. This explains the exclusion with MIE1624
- 2) Update the list of elective courses in the emphasis as new courses have been created since the launch of the emphasis almost 3 years ago.

2 Effective Date of Change

September 1, 2022 for adding MIE1626 to the list of core courses

3 Academic Rationale

Additional core course choices are beneficial to the large number of students interested in earning this emphasis since the courses would be scheduled at different times and offered in different terms. This will make it easier for students to avoid scheduling conflicts and course waitlists. In this proposal, the list of elective courses is also updated to reflect new offerings in this area.

4 Impact on Students

See above.

5 Consultation

MIE (Industrial Engineering AI group including Scott Sanner).

6 Resources

N/A

7 Governance Approval

Unit sign-off	MIE graduate curriculum committee, Sept 1, 2021:
Dean's office sign-off	Julie Audet, Vice-Dean, Graduate Studies: Oct 6, 2021
Faculty/division council approval (or delegated body) if applicable	Approved by the Engineering Graduate Education Committee (EGEC) on behalf of the Council of the Faculty of Applied Science & Engineering: October 20, 2021

Template developed by the Office of the Vice-Provost, Academic Programs; updated on March 6, 2018.

Appendix A: Calendar Entry (Revised)

Emphasis: Analytics (MEng only)

To be admitted to the emphasis in Analytics, MEng students must first successfully complete a **prerequisite course APS 1070H (0.5 full-course equivalent [FCE])**.

Subsequently, to earn the emphasis, students must successfully complete **four additional half courses (2.0 FCEs)** from the list of core courses or elective courses. These must include at least one core course; the remaining courses must be selected from the list of elective courses.

Students must have completed the prerequisite course APS 1070H before taking any of the core courses.

Prerequisite Course

APS 1070H *Foundations of Data Analytics and Machine Learning*

Core Courses

CHE 1147H *Data Mining in Engineering*

ECE 1513H *Introduction to Machine Learning* (exclusions: CSC 411H, CSC 2515H, ECE 421H, ECE 521H, ECE 1504H)

MIE 1624H *Introduction to Data Science and Analytics* (exclusion MIE 1626H)

MIE 1626H *Data Science Methods and Quantitative Analysis* (pending approval) (exclusion: MIE 1624H)

MSE 1065H *Application of Artificial Intelligence in Materials Design* (exclusion MSE1063H)

Elective Courses

APS 502H, APS 1005H, APS 1017H, APS 1022H, APS 1040H, APS 1050H, APS 1051H, APS 1052H, APS 1053H, **APS 1080H, CEM 1002H**
 CHE 507H, CHE 1108H, CHE 1148H, CHE 1434H
 CIV 1504H, CIV 1506H, CIV 1507H, CIV 1532H, CIV 1538H
 ECE 537H, ECE 1504H (exclusions: CSC 411H, CSC 2515H, ECE 421H, ECE 521H, ECE 1513H), ECE 1505H, ECE 1510H, ECE 1657H, ECE 1778H, ECE 1779H

MIE 562H, MIE 1077H, MIE 1413H, MIE 1501H, MIE 1512H, MIE 1513H,
MIE 1517H, MIE 1620H, MIE 1621H, MIE 1622H, MIE 1623H, MIE 1625H, MIE
1628H, MIE 1653H, MIE 1666H, MIE 1721H, MIE 1723H, MIE 1727H, MIE 1769H,
MSE 1063H (exclusion MSE1065H)

Appendix A: Calendar Entry (Current SGS Calendar Version)

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CIV 1504H, CIV 1506H, CIV 1507H, CIV 1532H, CIV 1538H

ECE 537H, ECE 1504H (exclusions: CSC 411H, CSC 2515H, ECE 421H, ECE 521H, ECE 1513H), ECE 1505H, ECE 1510H, ECE 1657H, ECE 1778H, ECE 1779H

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