



MEMORANDUM

To: Executive Committee of Faculty Council (March 20, 2018)
 Faculty Council (April 11, 2018)

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

Date: April 4, 2018

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

APS1050	Blockchain Technologies and Cryptocurrencies
APS1051	Portfolio Management Praxis under Real Market Constraints
MIE1444	Engineering for Psychologists
MSE1043	Polymers and Composites Engineering

MINOR MODIFICATIONS

APS1305Y-PsychEng Seminar Series	The duration of the course will be changed from one year to one term as APS1305-PsychEng Seminar Series (offered in the fall, winter and summer). Students in the PsychEng collaborative specialization will register in the fall, winter and summer term course when possible.
Emphases in MEng CIV	Eight new emphases created in the MEng program in CIV (See Appendix)
MIE1619- Constraint Programming and Local Search	Course name changed to MIE1619-Constraint Programming and Hybrid Algorithms; course description not changed.

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.

Appendix

University of Toronto Minor Modification Proposal

Change to an Existing Graduate Program

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

Program being modified:	MEng in Civil Engineering
Graduate unit:	Civil Engineering
Faculty/academic division:	Applied Science & Engineering
Dean's office contact:	Julie Audet, Vice-Dean Graduate
Version date:	March 23, 2018

1 Summary

	Changing admission requirements		Renaming field, concentration or emphasis
	Changing program requirements or length		Renaming of program
	Changing timing of program requirements	x	Creating a new emphasis
	Adding/removing option (i.e., part-time, flexible-time)		Changes to programs affecting an MOA

Civil Engineering proposes to create eight new emphases, based on eight established technical subfields within CIV. These emphases would be open only to MEng students registered in Civil Engineering. To earn an emphasis, a student would need to complete six technical courses (3.0 FCE) in the given area, as detailed below, as part of their 10 course (5.0 FCE) requirement for an MEng in Civil Engineering. One or two of the six courses may be a one-term (CIV1001H) or two-term (CIV1002Y) project that is undertaken in the given emphasis area.

The requirement for students to take at least six "CIV" courses out of a total of ten for the MEng degree has not changed.

Students may double-count at most one course towards any CIV emphases or towards any other Faculty emphasis.

2 Effective Date of Change

September 1, 2018

3 Academic Rationale

By introducing these emphases, the University would officially acknowledge that students have studied a certain concentration of subject matter within the MEng program.

4 Impact on Students

Students earning an emphasis would receive a corresponding notation on their academic transcript. Emphases will be applied for by students at the time of program completion. As such, continuing students who have already completed the requirements will be accommodated automatically.

5 Consultation

The creation of emphases was discussed and accepted at the Civil Engineering Academic Council meeting on November 23, 2017. The proposal was also discussed and approved by the Civil Engineering Graduate Studies Committee. No major issues were identified.

6 Resources

No resource implications are anticipated.

7 Governance Approval

Unit sign-off	Civil Engineering Academic Council meeting on November 23, 2017
Dean's office sign-off	Julie Audet, Vice-Dean, Graduate Studies on February 28, 2018
Faculty/division council approval (or delegated body) if applicable	Approved on March 5, 2018 by the Engineering Graduate Education Committee (EGEC) on behalf of the Council of the Faculty of Applied Science & Engineering

Calendar Entry

[No track changes are included because the following information can simply be added to the end of the current section of “Civil Engineering: Civil Engineering MASC, MEng, PhD Emphases”.]

Students must take at least six “CIV” courses (out of a total of ten) to meet the general MEng requirements. Students may double-count at most one course towards any CIV Emphasis or towards any other Faculty Emphasis.

Emphasis: Building Science (MEng only)

Complete at least six courses (3.0 FCE) with a combination of core and elective courses as detailed below. One or two of the optional courses may be a one-term (CIV1001H) or two-term (CIV1002Y) project (not listed below). Other courses may be considered but will require approval of the emphasis coordinator.

Core Courses *(take at least four):*

- CIV575H1 - Studies in Building Science
- CIV576H1 - Sustainable Buildings
- CIV 578H1 - Design of Building Enclosures
- MIE507H1 - Heating, Ventilating, and Air Conditioning (HVAC)
- CIV1282H - Case Studies in Building Science
- CIV1320H - Indoor Air Quality

Elective Courses *(others can be approved by emphasis coordinator):*

- CIV1299 - Building Performance Assessment
- CIV1279H - Construction Contract Documents
- CIV514H1 - Concrete Technology
- CIV536H1 - Urban Activity, Air Pollution and Health
- CIV577H1 - Infrastructure for Sustainable Cities
- MIE515H1 - Alternative Energy Systems
- MIE1240H - Wind Power

Emphasis: Concrete (MEng only)

Complete six of the following technical courses (3.0 FCE), one or two of which may be a one-term (CIV1001H) or two-term (CIV1002Y) project. Other courses may be considered but will require approval of the emphasis coordinator.

- CIV514H1 - Concrete Technology
- CIV517H1 - Prestressed Concrete
- CIV1201H - Concrete Technology and Non-Destructive Testing Principles
- CIV1250H – Instrumentation Methods for Concrete Research
- CIV1252H - Infrastructure Renewal

- CIV1260H – Chemistry of Cement and Concrete
- CIV1262H – Microscopy Applied to Building and Geomaterials
- CIV1275H – Construction Modelling Methods
- CIV1504H – Applied Probability and Statistics in Civil Engineering

Emphasis: Construction Management (MEng only)

Complete six of the following technical courses (3.0 FCE), one or two of which may be a one-term (CIV1001H) or two-term (CIV1002Y) project. Other courses may be considered but will require approval of the emphasis coordinator.

- CIV1279H - Construction Contract Documents
- CIV1281H - Asset Management
- CIV1283H - Civil Informatics, Inactive
- CIV1299H - Special Studies Course - The Business of Civil Engineering Knowledge
- CIV1307H – Life Cycle Assessment and Sustainability of Engineering Activities
- CIV1504H – Applied Probability and Statistics in Civil Engineering
- APS1001H - Project Management
- APS1004H - Human Resources Management: An Engineering Perspective
- APS1005H - Operations Research for Engineering Management
- APS1017H - Supply Chain Management and Logistics
- MIE1413H - Statistical Models in Empirical Research
- MIE562H – Scheduling

Emphasis: Geomechanics (MEng only)

Complete six of the following technical courses (3.0 FCE), one or two of which may be a one-term (CIV1001H) or two-term (CIV1002Y) project. Other courses may be considered but will require approval of the emphasis coordinator.

- CIV523H – Geotechnical Design
- MIN540H - Borehole Geophysics for Engineers and
- MIN565H - Design and Support of Underground Mine Excavations
- CIV1404H – Numerical Methods in Geomechanics
- CIV1419H - Rock Dynamics
- CIV1420H - Soil Properties and Behaviour
- CIV1429H - Advanced Rock Engineering: Fractured Rock Masses
- CIV1498H - Specials Studies in Civil Engineering: Rock Reinforcement and Support
- CIV1498H - Specials Studies in Civil Engineering: Constitutive Modelling in Geomaterials
- CIV1499H - Special Studies in Civil Engineering: Geotechnical Earthquake Engineering
- CIV1499H - Special Studies in Civil Engineering: Rock Fracture Dynamics and Induced Seismicity: Experimental Methods
- CIV1499H - Special Studies in Civil Engineering: Mine Optimization

- CIV1499H - Applications of Geology in Geotechnical Engineering Seminar

Emphasis: Environmental Engineering (MEng only)

Complete six of the following technical courses (3.0 FCE), one or two of which may be a one-term (CIV1001H) or two-term (CIV1002Y) project. Other courses may be considered but will require approval of the emphasis coordinator.

- CIV541H - Environmental Biotechnology
- CIV549H - Groundwater Flow and Contamination
- CIV550H – Water Resources Engineering
- CIV577H - Infrastructure for Sustainable Cities
- CIV1303H - Water Resources Systems Modeling
- CIV1307H - Life Cycle Assessment and Sustainability of Engineering Activities
- CIV1308H - Physical and Chemical Treatment Processes
- CIV1311H – Advanced and Sustainable Drinking Water Treatment
- CIV1319H - Chemistry and Analysis of Water and Wastes
- CIV1320H – Indoor Air Quality
- CIV1399H – Special Studies Course – Treatment Wetlands
- CIV1399H – Special Studies Course – Water, Sanitation and Hygiene
- CHE1134H – Advances in Bioengineering
- CHE1150H – Industrial Water Treatment
- CHE1180H – Appropriate Technology & Design for Global Development
- CHE1431H – Environmental Auditing
- CHE1432H – Technical Aspects of Environmental Regulations
- CHE 2504H - Industrial Pollution Prevention
- CHL5903H – Environmental Health
- ENV1001H – Environmental Decision Making
- ENV1701H - Environmental Law
- JCC1313H - Environmental Microbiology
- JGE1212H – Fate of Contaminants in the Environment
- JNC2503H - Environmental Pathways
- MIE1240H – Wind Power

Emphasis: Sustainable Urban Systems (MEng only)

Complete six of the following technical courses (3.0 FCE), one or two of which may be a one-term (CIV1001H) or two-term (CIV1002Y) project. Other courses may be considered but will require approval of the emphasis coordinator.

- APS1024H – Infrastructure Resilience Planning
- APS1025H – Infrastructure Protection
- APS510H – Innovative Technologies and Organizations in Global Energy Systems
- CIV514H – Concrete Technology
- CIV516H – Public Transit Operations and Planning

- CIV531H – Transport Planning
- CIV575H – Studies in Building Science
- CIV576H- Sustainable Buildings
- CIV577H- Infrastructure for Sustainable Cities
- CIV1201H – Concrete Technology and Non-Destructive Testing Principles
- CIV1252H- Infrastructure Renewal
- CIV1280H – Building Envelope Design
- CIV1303H - Water Resources Systems Modeling
- CIV1307H - Life Cycle Assessment and Sustainability of Engineering Activities
- CIV1535H - Transportation and Development
- ECE1092H – Smart Grid Case Studies
- ENV1001H- Environmental Decision Making
- MIE515H - Alternative Energy Systems
- MIE1120H –Current Energy Infrastructure and Resources
- MIE1240H – Wind Power
- MIE1715 – Lifecycle Engineering

Emphasis: Structural Engineering (MEng only)

Complete six of the following technical courses (3.0 FCE), one or two of which may be a one-term (CIV1001H) or two-term (CIV1002Y) project. Other courses may be considered but will require approval of the emphasis coordinator.

- CIV510H - Solid Mechanics II
- CIV514H - Concrete Technology
- CIV515H – Introduction to Structural Dynamics
- CIV517H - Prestressed Concrete
- CIV518H - Behaviour and Design of Steel Structures
- CIV519H - Structural Analysis II
- CIV1361H - Reinforced and Prestressed Concrete Structures
- CIV1163H - Mechanics of Reinforced Concrete
- CIV1164H - Bridge Engineering
- CIV1167H – Advanced Structural Dynamics
- CIV1169H - Advanced Topics in Building Design
- CIV1171H – Principles of Earthquake Engineering and Seismic Design
- CIV1174H - Finite Element Methods in Structural Mechanics
- CIV1175H - Design of Tubular Steel Structures
- CIV1180H – Advanced Modelling Methods for Seismic Performance Assessment of Structures
- CIV1190H – Structures Under Blast and Impact
- MIE1303H - Fracture Mechanics

Emphasis: Transportation Engineering and Planning (MEng only)

Complete six of the following technical courses (3.0 FCE), one or two of which may be a one-term (CIV1001H) or two-term (CIV1002Y) project. Other courses may be considered but will require approval of the emphasis coordinator.

- CIV516H - Public Transit Operations and Planning
- CIV531H - Transport Planning
- CIV536H – Urban Activity, Air Pollution and Health, Hatzopoulou
- CIV1307H – Life Cycle Assessment and Sustainability of Engineering Activities
- CIV1506H - Freight Transportation and ITS Applications
- CIV1508H - Airport Planning and Engineering
- CIV1520H – Travel Survey Methods
- CIV1532H - Fundamentals of ITS and Traffic Management
- CIV1535H - Transportation and Development
- CIV1536H – Modelling Transport Emissions
- CIV1538H - Transportation Demand Analysis