



MEMORANDUM

To: Executive Committee of Faculty Council (March 22, 2016)
Faculty Council (April 12, 2016)

From: Professor Markus Bussmann
Chair, Engineering Graduate Education Committee (EGEC)

Date: March 10, 2016

Re: EGEC Information Report

REPORT CLASSIFICATION

This is a routine or minor policy matter that will be considered by the Executive Committee for approving and forwarding to Faculty Council for information.

NEW EMPHASES APPROVED

ELITE Emphasis [Appendix 1]
Robotics and Mechatronics Emphasis [Appendix 2]
Engineering and Globalization Emphasis [Appendix 3]
Identity, Privacy and Security Emphasis [Appendix 4]

MINOR MODIFICATIONS

Change to Emphasis in Advanced Water Technologies & Process Design [Appendix 5]

Departments: Chemical Engineering & Applied Chemistry, Civil Engineering, Materials Science & Engineering

Graduate Program Involved: MEng

Summary of Change: Emphasis in Advanced Water Technologies & Process Design original requirement of five courses: four core and one specialization, has been changed to four courses: three core and one specialization, which brings it in line with most of our other emphases.

Change to Graduate Calendar Entry

Department: Materials Science & Engineering

Graduate Programs Involved: MASc and PhD

Summary of Change: An increase of one required course for students fast-tracking from the MASc to the PhD [Appendix 6a], and text that clarifies the expectations of students transferring from the MEng to the MASc [Appendix 6b].

RECOMMENDATION FOR FACULTY COUNCIL

For information.



Appendix 1

New Emphasis in Entrepreneurship, Leadership, Innovation and Technology in Engineering (ELITE)

Minor Modification: 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:	Aerospace Studies, MEng Biomedical Engineering, MEng Chemical Engineering & Applied Chemistry, MEng Civil Engineering, MEng Electrical & Computer Engineering, MEng Materials Science & Engineering, MEng Mechanical & Industrial Engineering, MEng
Graduate Unit:	Above seven
Faculty / Academic Division:	Applied Science & Engineering
Dean's Office Contact:	Markus Bussmann (Vice-Dean, Graduate)
Version Date:	March 9, 2016

1 Summary

	<i>Changing Admission Requirements</i>		<i>Renaming Field, Concentration or Emphasis</i>
	<i>Changing Program Requirements or Length</i>		<i>Renaming of Program</i>
	<i>Changing Timing of Program Requirements</i>	X	<i>Creating a new Emphasis</i>
	<i>Adding/Removing Option (i.e. part-time, flex-time)</i>		<i>Changes to programs affecting a MOA</i>

Master of Engineering (MEng) students in each of seven graduate units can earn an Emphasis in “Entrepreneurship, Leadership, Innovation and Technology in Engineering” (ELITE) by completing any four courses from the following list.

Leadership

- APS1010H: Cognitive and Psychological Foundations of Effective Leadership
- APS1011H: Concepts and Application of Authentic Leadership
- APS1019H: Leadership in Project Management
- APS1026H: Positive Psychology for Engineers
- APS1027H: Engineering Presentations
- APS1029H: The Science of Emotional Intelligence and its Application to Leadership
- APS1030H: Engineering Careers - Theories & Strategies to Manage your Career for the Future
- APS1501H: Leadership and Leading in Groups and Organizations

Entrepreneurship and Innovation

- APS1012H: Management of Innovation in Engineering
- APS1013H: Applying Innovation in Engineering
- APS1015H: Social Entrepreneurship
- APS1023H: New Product Innovation
- APS1033H: Innovation via Imagineering
- APS1035H: Taking a New Venture to Market
- APS1036H: Formative Experiential Entrepreneurial Learning (FEEL)
- APS1088H: Entrepreneurship and Business for Engineers

Finance and Management

- APS502H1: Financial Engineering
- APS1001H: Project Management
- APS1004H: Human Resources Management: An Engineering Perspective
- APS1005H: Operations Research for Engineering Management
- APS1009H: Natural Resources Management
- APS1014H: Advanced Project Management
- APS1016H: Financial Management for Engineers
- APS1017H: Supply Chain Management and Logistics
- APS1020H: International Business for Engineers
- APS1022H: Financial Engineering II
- APS1028H: Operations and Production Management for Manufacturing and Services
- APS1032H: Introduction to Energy Project Management

Engineering and Society

- APS510H: Innovative Technologies and Organizations in Global Energy Systems
- APS1018H: History and Philosophy of Engineering
- APS1024H: Infrastructure Resilience Planning
- APS1025H: Infrastructure Protection

APS1031H: Infrastructure Planning
APS1034H: Understanding Technological Catastrophes
APS1420H: Technology, Engineering and Global Development
JMG2020H: Big Data and Global Cities

2 Effective Date of Change

September 2016

3 Academic Rationale

This new emphasis has existed as an unofficial “certificate” for most of ten years.

This emphasis in ELITE is comprised almost exclusively of APS courses, which is the Faculty-wide FASE course code. The courses are not discipline-specific, and so are open to MEng students from across the FASE. These courses in leadership, entrepreneurship and innovation, finance and management, and engineering and society, complement the technical courses these students take.

4 Impact on Students

This new emphasis has been popular with students for many years, and we now issue about 100 “certificates of completion” each year. This proposal will make this an official emphasis.

As many MEng students are part-time or extended full-time students who also work, many of these courses are scheduled with such students in mind. The schedule includes a mix of daytime, evening and Saturday courses in each of the fall, winter, and summer sessions. The format of the courses also varies: some are taught once a week for 12 weeks. A few are taught online. Others, especially in the summer, are taught on a 2-week intensive basis.

5 Consultation

This proposal was prepared by the Vice-Dean, Graduate Studies, who administers these courses and this emphasis on behalf of all graduate units in the FASE. The proposal was sent to the Graduate Coordinators and Chairs of each of the seven graduate units, and was also reviewed by the Engineering Graduate Education Committee (EGEC).

6 Resources

None that are not already allocated.

7 Governance Approval

Unit sign-off: Graduate Coordinators and Chairs of each of the graduate units (March 2016)

Dean's Office sign-off: Markus Bussmann, Vice-Dean, Graduate Studies (March 2016)

Faculty/Division Council Approval: approved by the Engineering Graduate Education Committee (EGEC) on behalf of the Council of the Faculty of Applied Science & Engineering (March 10, 2016), and presented to the Council of the Faculty of Applied Science & Engineering for information (April 12, 2016)

Appendix A: Calendar Entry

Please use track-changes to indicate where changes have been made.

Emphasis: Entrepreneurship, Leadership, Innovation and Technology in Engineering (ELITE)

Master of Engineering (MEng) students must complete any four of the following courses.

APS 1010H, APS 1011H, APS 1019H, APS 1026H, APS 1027H, APS 1029H,
APS 1030H, APS 1501H,
APS 1012H, APS 1013H, APS 1015H, APS 1023H, APS 1033H, APS 1035H,
APS 1036H, APS 1088H,
APS 502H1, APS 1001H, APS 1004H, APS 1005H, APS 1009H, APS 1014H,
APS 1016H, APS 1017H, APS 1020H, APS 1022H, APS 1028H, APS 1032H,
APS 510H, APS 1018H, APS 1024H, APS 1025H, APS 1031H, APS 1034H,
APS 1420H, JMG 2020H

Appendix 2

New Emphasis in Robotics and Mechatronics

Minor Modification: 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.

Programs being modified	Aerospace Studies, MEng, MAsC, PhD Electrical & Computer Engineering, MEng, MAsC, PhD Mechanical & Industrial Engineering, MEng, MAsC, PhD
Graduate Units	the above three
Faculty / Academic Division:	Applied Science & Engineering
Dean's Office Contact:	Markus Bussmann (Vice-Dean, Graduate)
Version Date	March 9, 2016

1. Summary

	<i>Changing Admission Requirements</i>		<i>Renaming Field, Concentration or Emphasis</i>
	<i>Changing Program Requirements or Length</i>		<i>Renaming of Program</i>
	<i>Changing Timing of Program Requirements</i>	X	<i>Creating a new Emphasis</i>
	<i>Adding/Removing Option (i.e. part-time, flex-time)</i>		<i>Changes to programs affecting a MOA</i>

MEng, MAsC and PhD students in three graduate units can earn an emphasis in Robotics and Mechatronics by completing four courses, chosen from at least three of four groups of courses, listed here:

Group 1: Control

ECE1619H - Linear Geometric Control Theory
ECE1636H - Control of Discrete Event Systems I
ECE1647H - Introduction to Nonlinear Control Systems
ECE1653H - Hybrid Systems and Control Applications
ECE1657H - Game Theory and Evolutionary Games
ECE557H - Systems Control (exclusion ECE410H; *Engineering Science Course*)
MIE1064H - Control Analysis Methods with Applications to Robotics
MIE1068H - Applied Nonlinear Control

Group 2: Signal and Image Processing

AER1513H - State Estimation for Aerospace Vehicles
CSC2503H - Foundations of Computer Vision
CSC2506H - Probabilistic Learning and Reasoning
CSC2515H - Introduction to Machine Learning
ECE1511H - Signal Processing
ECE1512H - Digital Image Processing and Applications
ECE516H - Intelligent Image Processing
JEB1433H - Medical Imaging

Group 3: Dynamics

AER1503H - Spacecraft Dynamics and Control II
AER1512H - Multibody Dynamics
AER506H - Spacecraft Dynamics and Control (*Engineering Science Course*)
JEB1444H - Neural Engineering
MIE1001H - Advanced Dynamics

Group 4: Systems Integration

AER1514H - Mobile Robotics
AER525H - Robotics (exclusion ECE470H; *Engineering Science Course*)
ECE1373H - Digital Design for Systems-on-Chip
ECE1460H - Special Topics in Photonics: Introduction to Micro/Nano-Fabrication
ECE532H - Digital Systems Design
MIE1070H - Intelligent Robots for Society
MIE1071H - Advanced Robotics
MIE1809H - Advanced Mechatronics
MIE505H - Micro/Nano Robotics
MIE506H - MEMS Design and Microfabrication

2. Effective Date of Change

September 2016

3. Academic Rationale

This new emphasis in Robotics and Mechatronics has existed as an unofficial “certificate” for a number of years, and is an integral part of the Institute for Robotics and Mechatronics academic program. As a Faculty-wide extra-departmental unit, IRM offers students the opportunity to enrich their applied science and engineering education at the University of Toronto by undertaking a concentration of courses in robotics and mechatronics, as well as provides students exposure to cutting edge research in the field. IRM also offers an ongoing distinguished seminar series, and events to introduce students to the robotics and mechatronics industry.

This emphasis will require that MEng, MASc and PhD graduate students take courses in three of four cross-disciplinary areas that are key to the development of smart and high performance systems: (i) control systems, (ii) signal and image processing, (iii) dynamics and modeling, and (iv) systems integration.

4. Impact on Students

A number of students have earned an unofficial “certificate” in Robotics and Mechatronics over the past few years. Making this an official emphasis will legitimize this credential, especially as the Institute for Robotics and Mechatronics intends to market this more strongly.

5. Consultation

This proposal was prepared in consultation with the Steering Committee of the Institute for Robotics and Mechatronics. The proposal was sent to the Graduate Coordinators and Chairs of each of the three graduate units, and was also reviewed by the Engineering Graduate Education Committee (EGEC).

6. Resources

None

7. Governance Approval

Unit sign-off: Graduate Coordinators and Chairs of each of the three graduate units (March 2016)

Dean’s Office sign-off: Markus Bussmann, Vice-Dean, Graduate Studies (March 2016)

Faculty 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 (March 9, 2016) and presented to the Council of the Faculty of Applied Science & Engineering for information (April 12, 2016)

Appendix A: Calendar Entry

Emphasis: Robotics and Mechatronics

Graduate students (MEng/MASc/PhD) must complete four courses chosen from at least three groups:

Group 1: Control - ECE1619H, ECE1636H, ECE1647H, ECE1653H, ECE1657H, ECE557H (exclusion ECE410H), MIE1064H, MIE1068H

Group 2: Signal and Image Processing - AER1513H, CSC2503H, CSC2506H, CSC2515H, ECE1511H, ECE1512H, ECE516H, JEB1433H

Group 3: Dynamics - AER1503H, AER1512H, AER506H, JEB1444H, MIE1001H

Group 4: Systems Integration - AER1514H, AER525H (exclusion ECE470H), ECE1373H, ECE1460H, ECE532H, MIE1070H, MIE1071H, MIE1809H, MIE505H, MIE506H

Appendix 3

New Engineering and Globalization Emphasis

Minor Modification: 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:	Aerospace Studies, MEng Biomedical Engineering, MEng Chemical Engineering & Applied Chemistry, MEng Civil Engineering, MEng Electrical & Computer Engineering, MEng Materials Science & Engineering, MEng Mechanical & Industrial Engineering, MEng
Graduate Unit:	Above seven
Faculty / Academic Division:	Applied Science & Engineering
Dean's Office Contact:	Markus Bussmann (Vice-Dean, Graduate)
Version Date:	March 9, 2016

1 Summary

	<i>Changing Admission Requirements</i>		<i>Renaming Field, Concentration or Emphasis</i>
	<i>Changing Program Requirements or Length</i>		<i>Renaming of Program</i>
	<i>Changing Timing of Program Requirements</i>	X	<i>Creating a new Emphasis</i>
	<i>Adding/Removing Option (i.e. part-time, flex-time)</i>		<i>Changes to programs affecting a MOA</i>

MEng students in each of the seven graduate units in the Faculty of Applied Science & Engineering can earn an Emphasis in Engineering and Globalization by completing four half courses from the following lists, with at least two half courses (or one full course) taken from Group A.

Group A

APS510H - Technologies and Organizations in Global Energy Systems
APS530H - Appropriate Technology & Design for Global Development
APS1420H - Technology, Engineering and Global Development
GLA1000H - Introduction to the Development of the Global System
JCR1000Y - An Interdisciplinary Approach to Global Challenges (this is a full year course)

Group B

APS1015H - Social Entrepreneurship
APS1020H - International Business for Engineers
APS1024H - Infrastructure Resilience Planning
CHL5700H - Global Public Health
JMG2020H - Big Data and Global Cities

MEng project course – If students choose to pursue an MEng project in their home department that aligns with the CGEN mandate, as deemed by the CGEN Director, the project can also be considered a Group B course.

2 Effective Date of Change

September 2016

3 Academic Rationale

Every day people in the developing world struggle to obtain many of the things that most of us in Canada take for granted, like clean water, safe shelter, and basic health care. Engineering students can make a difference. But to tackle these complex challenges effectively often requires a different mindset and a different set of skills. The Emphasis in Engineering and Globalization, sponsored by the Centre for Global Engineering (CGEN), aims to develop these capabilities in our students. The Emphasis is available to MEng students across the Faculty of Applied Science and Engineering.

4 Impact on Students

The Emphasis offers an innovative curriculum that enables our students to leverage their engineering knowledge and talent for maximal impact on issues of global importance. We develop the wide range of professional skills necessary to address the evolving technological challenges in an increasingly global society.

5 Consultation

This proposal was prepared in consultation with the Centre for Global Engineering (CGEN) instructors. The proposal was sent to the Graduate Coordinators and Chairs of each of the seven graduate units, and was also reviewed by the Engineering Graduate Education Committee (EGEC).

6 Resources

None

7 Governance Approval

Unit sign-off: Graduate Coordinators and Chairs of each of the seven graduate units (March 2016)

Dean's Office sign-off: Markus Bussmann, Vice-Dean, Graduate Studies (March 2016)

Faculty 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 (March 6, 2016) and presented to the Council of the Faculty of Applied Science & Engineering for information (April 12, 2016)

Appendix A: Calendar Entry

Please use track-changes to indicate where changes have been made.

Emphasis: Engineering and Globalization

Master of Engineering (MEng) students must complete four half courses from the following lists, with at least two half courses (or one full course) taken from Group A.

Group A - APS510H, APS530H, APS1420H, GLA1000H, JCR1000Y (full year course)

Group B - APS1015H, APS1020H, APS1024H, CHL5700H, JMG2020H

MEng project course – If students choose to pursue an MEng project in their home department that aligns with the CGEN mandate, as deemed by the CGEN Director, the project can also be considered a Group B course.



Appendix 4

New Emphasis in Identity, Privacy and Security

Minor Modification: 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:	Electrical & Computer Engineering, MEng
Graduate Unit:	Electrical & Computer Engineering
Faculty / Academic Division:	Applied Science & Engineering
Dean's Office Contact:	Markus Bussmann (Vice-Dean, Graduate)
Version Date:	March 10, 2016

1 Summary

<i>Changing Admission Requirements</i>		<i>Renaming Field, Concentration or Emphasis</i>
<i>Changing Program Requirements or Length</i>		<i>Renaming of Program</i>
<i>Changing Timing of Program Requirements</i>	X	<i>Creating a new Emphasis</i>
<i>Adding/Removing Option (i.e. part-time, flex-time)</i>		<i>Changes to programs affecting a MOA</i>

MEng students in ECE can earn an Emphasis in Identity, Privacy and Security (IPS) by completing four half courses, as follows:

- JIE1001/ECE1518 - Seminar in Identity, Privacy and Security
- two courses from the following list:
 - ECE568H - Computer Security
 - ECE1517H - Biometric Systems
 - ECE1529H - Adaptive Systems for Communication & Signal Processing
 - ECE1776H - Computer Security, Cryptography and Privacy
 - ECE1778H - Creative Applications for Mobile Devices

- one course from the following list:
 - INF2124H - Surveillance and Identity
 - INF2181H - Information Policy
 - INF2165H - Social Issues in Information and Communications Technologies
 - INF2241H - Critical Making

2 Effective Date of Change

September 2016

3 Academic Rationale

The Canadian security industry has been the fastest growing among Canadian industries. This is a trend observed internationally. A recent census indicates that Canada has over 700 information and communications technology (ICT) security companies. Demand for qualified IT security staff is growing quickly.

This emphasis in IPS aims to provide interdisciplinary training in the new era of security technologies, which requires engineers with a comprehensive know-how and a holistic understanding of security technologies, privacy and identity policies and sciences.

4 Impact on Students

This emphasis will offer MEng students in ECE the opportunity to take a few courses in support of a specialization in Identity, Privacy and Security. Completion of the requirements will be acknowledged with a certificate of completion.

5 Consultation

This proposal was prepared in consultation with the ECE graduate unit, the Identity, Privacy and Security Institute (IPSI), and the Faculty of Information at the University of Toronto.

6 Resources

None

7 Governance Approval

Unit sign-off: ECE Graduate Studies Committee (March 2016)

Dean's Office sign-off: Markus Bussmann, Vice-Dean, Graduate Studies (March 2016)

Faculty 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 (March 10, 2016) and presented to the Council of the Faculty of Applied Science & Engineering for information (April 12, 2016)

Appendix A: Calendar Entry

Please use track-changes to indicate where changes have been made.

Emphasis: Engineering and Globalization

MEng students can earn an Emphasis in Identity, Privacy and Security (IPS) by completing four half courses, as follows:

JIE1001/ECE1518 - Seminar in Identity, Privacy and Security

two courses from the following list:

- ECE568H - Computer Security
- ECE1517H - Biometric Systems
- ECE1529H - Adaptive Systems for Communication & Signal Processing
- ECE1776H - Computer Security, Cryptography and Privacy
- ECE1778H - Creative Applications for Mobile Devices

and one course from this list:

- INF2124H - Surveillance and Identity
- INF2181H - Information Policy
- INF2165H - Social Issues in Information and Communications Technologies
- INF2241H - Critical Making

Appendix 5

Change to Emphasis in Advanced Water Technologies & Process Design

Minor Modification: 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:	Emphasis in Advanced Water Technologies & Process Design, offered to: Chemical Engineering & Applied Chemistry, MEng Civil Engineering, MEng Materials Science & Engineering, MEng
Graduate Unit:	above three
Faculty / Academic Division:	Applied Science & Engineering
Dean's Office Contact:	Markus Bussmann (Vice-Dean, Graduate)
Version Date:	March 9, 2016

1 Summary

	<i>Changing Admission Requirements</i>		<i>Renaming Field, Concentration or Emphasis</i>
x	<i>Changing Program Requirements or Length</i>		<i>Renaming of Program</i>
	<i>Changing Timing of Program Requirements</i>		<i>Creating a new Emphasis</i>
	<i>Adding/Removing Option (i.e. part-time, flex-time)</i>		<i>Changes to programs affecting a MOA</i>

The emphasis in Advanced Water Technologies & Process Design is offered to MEng students in three graduate units. Currently the emphasis requires that students complete five half-courses: four core courses and one specialization course. This proposal is to revise the requirements slightly, to require three core courses and one specialization course. This brings the overall requirement, of four half courses, in line with the requirements of other emphases offered by grad units within the FASE.

2 Effective Date of Change

May 2016

3 Academic Rationale

The reason for the change relates to the core course STA 1004H - Introduction to Experimental Design. Some students this past year were unable to enrol in the course, which is offered outside the Faculty of Applied Science & Engineering, and so the decision was made to move the course to the list of Specialization courses from which students must choose one. At the same time, the decision was made not to add another core course.

4 Impact on Students

Students this year who were unable to enrol in STA 1004H were accommodated by allowing them to take a different course instead. This proposal, to reduce the requirements of the emphasis, and to remove STA 1004H from the list of core courses, will address this problem going forward.

5 Consultation

This proposal was prepared by the Vice-Dean, Graduate Studies on behalf of the three graduate units who offer this emphasis. The proposed changes were reviewed and approved by the steering committee that oversees this emphasis, chaired by Prof. Ron Hofmann of Civil Engineering. The proposal was then reviewed by the Engineering Graduate Education Committee (EGEC).

6 Resources

None

7 Governance Approval

Unit sign-off: Graduate Coordinators and Chairs of the three graduate units (March 2016)

Dean's Office sign-off: Markus Bussmann, Vice-Dean, Graduate Studies (March 2016)

Faculty 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 (March 10, 2016) and presented to the Council of the Faculty of Applied Science & Engineering for information (April 12, 2016)

Appendix A: Calendar Entry

Please use track-changes to indicate where changes have been made.

Emphasis: Advanced Water Technologies and Process Design

Master of Engineering (MEng) students must successfully complete ~~four~~^{three} core courses (~~1.52-0~~ full-course equivalents [FCEs]) and one specialization course (0.5 FCE), ~~which are counted toward the total 5-0 FCEs required for the MEng program.~~

• ~~Four-Three~~ core courses (~~1.52-0~~ FCEs):

1. CHE 1150H *Industrial Water Treatment*
2. CIV 1319H *Chemistry and Analysis of Water and Waste*, and
- ~~3. STA 1004H *Introduction to Experimental Design*, and~~

~~4-3.~~ at least one of the following (either of the other two can count as the specialization course):

- CIV 1308H *Physical/Chemical Treatment Processes*
- CIV 541H *Environmental Biotechnology*
- CIV 1311H *Advanced and Sustainable Drinking Water Treatment*

• One specialization course selected from the following (0.5 FCE): ~~CIV 549H *Groundwater Flow and Contamination*~~

- CIV 549H *Groundwater Flow and Contamination*
- CIV 550H *Water Resources Engineering*
- CIV 1303H *Water Resources Systems Modeling*
- CHE 565H *Aqueous Process Engineering*
- CHE 1213H *Corrosion*
- CHE 140339H *Hydrometallurgy Theory and Practice*
- JNC 2503H *Environmental Pathways*
- ~~STA 1004H *Introduction to Experimental Design*~~
- ~~MIE 1807H *Principles of Measurement*~~
- ~~or one of the remaining courses from item 34.~~

Upon successful completion of the emphasis requirements and the successful completion of the MEng degree requirements, the student will receive a Letter of Completion.



Appendix 6 (a)

Change to Graduate Calendar Entry

Minor Modification: 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: Materials Science & Engineering - PhD
Graduate Unit: Materials Science & Engineering
Faculty / Academic Division: Applied Science & Engineering
Dean's Office Contact: Markus Bussmann, Vice-Dean, Graduate
Version Date: March 11, 2016

1 Summary

	<i>Changing Admission Requirements</i>		<i>Renaming Field, Concentration or Emphasis</i>
X	<i>Changing Program Requirements or Length</i>		<i>Renaming of Program</i>
	<i>Changing Timing of Program Requirements</i>		<i>Creating a new Emphasis</i>
	<i>Adding/Removing Option (i.e. part-time, flex-time)</i>		<i>Changes to programs affecting a MOA</i>

After bypass from MASc to PhD, students will now be required to take one extra course in addition to the usual PhD requirements.

2 Effective Date of Change

September 2016

3 Academic Rationale

To ensure a strong background for preparation for the requirements of a PhD program and to more closely align course load requirements to the course load requirements of those who complete the MASc before admission to the PhD.

4 Impact on Students

n/a

5 Consultation

Agreed to at an MSE faculty meeting in January 2016.

6 Resources

None

7 Governance Approval

Unit sign-off: MSE Faculty Meeting (January 2016)

Dean's Office sign-off: Markus Bussmann, Vice-Dean, Graduate Studies (March 2016)

Faculty 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 (March 14, 2016) and presented to the Council of the Faculty of Applied Science & Engineering for information (April 12, 2016)

Appendix A: Calendar Entry

Please use track-changes to indicate where changes have been made.

Very strong **MASc students may apply** to transfer to the PhD program after completing one year of the MASc program. Regulations governing such transfers are available in the Materials Science and Engineering Graduate Studies office. A student who is permitted such a transfer must complete only the PhD Graduate Research Seminar, plus one more graduate level course, in addition to the four courses already completed in the MASc program.

Appendix 6 (b)

Change to Graduate Calendar Entry

Minor Modification: 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:	MSE MEng (transfer from MEng to MASc)
Graduate Unit:	Materials Science & Engineering
Faculty / Academic Division:	Applied Science & Engineering
Dean's Office Contact:	Markus Bussmann, Vice-Dean, Graduate
Version Date:	March 11, 2016

1 Summary

x	Changing Admission Requirements	Renaming Field, Concentration or Emphasis
	Changing Program Requirements or Length	Renaming of Program
	Changing Timing of Program Requirements	Creating a new Emphasis
	Adding/Removing Option (i.e. part-time, flex-time)	Changes to programs affecting a MOA

This change clarifies the criteria for transfer from the MEng to the MASc.

2 Effective Date of Change

September 2016

3 Academic Rationale

To facilitate transfer of excellent MEng students to MASc.

4 Impact on Students

n/a

5 Consultation

Discussed at MSE faculty meeting in January 2016.

6 Resources

n/a

7 Governance Approval

Unit sign-off: MSE faculty Meeting (January 2016)

Dean's Office sign-off: Markus Bussmann, Vice-Dean, Graduate Studies (March 2016)

Faculty 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 (March 14, 2016) and presented to the Council of the Faculty of Applied Science & Engineering for information (April 12, 2016)

Appendix A: Calendar Entry

Please use track-changes to indicate where changes have been made.

Master of Engineering

Minimum Admission Requirements

- Applicants are admitted under the General Regulations of the School of Graduate Studies. Applicants must also satisfy the Department of Materials Science and Engineering's additional admission requirements stated below.
- For students whose primary language is not English, the department requires a Test of English as a Foreign Language (TOEFL) with the following minimum scores:
 - paper-based TOEFL: minimum score of 580 and 4 on the Test of Written English (TWE)
 - Internet-based TOEFL: minimum score of 93/120 and 22/30 on the writing and speaking sections

Program Requirements

- For students with adequate undergraduate preparation, the normal program will include 5.0 FCEs (10 half courses). A project may be substituted for 1.5 FCEs (3 half courses). Students enrolled in this option work in consultation with a professor who acts as advisor for the project undertaken. The project must be presented at an oral examination.
- The program may be taken on a full-time, extended full-time, or part-time basis.
 - Full-time option: students normally complete the requirements in three sessions (one year).
 - Extended full-time option: students are expected to complete the requirements in six sessions (two years) and are limited to six half courses per year and three half courses per session.
 - Part-time option: students are limited to four half courses per year and two half courses per session. Students normally complete the requirements in nine sessions (three years).
- Transferring from the MEng program to the research-stream MASc program is permitted for a student enrolled full-time, subject to meeting all of the following criteria:
 - The request to transfer must be submitted at the beginning of the second term of enrolment. That is, for students enrolled in September, successful completion of coursework and agreement of a supervisor willing to provide funding starting the following January is required to be considered for transfer.
 - Successful completion of 1.5 FCE (Full Course Equivalent, or 3 half courses) with a B+ or 78% average must be achieved within the first term of enrolment.
 - The technical courses taken during MEng will be credited toward the MASc.
- Students in the MEng program have the option of completing an emphasis in Advanced Water Technologies and Process Design or Sustainable Energy as part of their degree program. Please see details below.

Program Length

3 sessions full-time (typical registration sequence: F/W/S);
6 sessions extended full-time (typical registration sequence: F/W/S/F/W/S);
9 sessions part-time

Time Limit

3 years full-time and extended full-time;
6 years part-time

