



Mechanical & Industrial Engineering  
UNIVERSITY OF TORONTO

COURSE AND OPTIONS SELECTION HANDBOOK

# INDUSTRIAL ENGINEERING

## 4TH YEAR

# WHAT IS COURSE & OPTIONS SELECTION ?

Each year the Office of the Registrar asks you to provide them with indicators as to which program option and technical elective courses you plan to take in the coming academic year. **The information that you provide to us through Course and Options Selection (COS) helps us identify the demand for program options and courses. This information is used for the course scheduling process and for uploading your course selections to ROSI.** You do not need to select your core courses in COS, these will be uploaded automatically to ROSI. When selecting your technical electives be sure that your selections meet the program requirements for your program of study.

**Please be advised that students who do not participate in COS will not be guaranteed a space in technical elective courses, so it is in your interest to complete the survey. The enrollment caps on technical elective courses are set according to the demand indicated to us via the COS data.**

Even though you have made your course selections through COS it is not possible to schedule every technical elective available to a program of study conflict free. The information collected from COS does however help the faculty minimize conflicts between technical electives that students have chosen.

We greatly appreciate your cooperation with this exercise, and we strongly suggest that you take five minutes of your time to complete the survey. Even if you are returning from, or planning to go on PEY next year, we would still ask that you participate in completing the survey.

The COS website will be activated as of Tuesday, February 18, and will remain active until midnight, Tuesday, March 4.

**COS Website Login**  
**<http://www.apsc.utoronto.ca/cos>**

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# IMPORTANT DATES

DATE	
February 18 to March 4	<b>COURSE &amp; OPTION SELECTION OPENS</b> <a href="http://www.apsc.utoronto.ca/cos">www.apsc.utoronto.ca/cos</a>  Students may now login and make their curriculum selections for the upcoming academic year
March 7	<b>LAST DAY FOR STUDENTS TO APPLY TO RE-ENROL OR SWITCH TO FULL-TIME FOR 2014 FALL SESSION*</b>
Mid-July	<b>TIMETABLES BECOME AVAILABLE ON ROSI</b>
July 22	<b>COURSE SELECTION (ROUND 1) OPENS</b> <a href="http://www.rosi.utoronto.ca">www.rosi.utoronto.ca</a>  For electives offered by the Faculty of Engineering and Enhanced Enrollment Arts & Science electives. Students may now make changes to their timetable
August 6	<b>COURSE SELECTION (ROUND 2) OPENS</b> <a href="http://www.rosi.utoronto.ca">www.rosi.utoronto.ca</a>  For electives offered by the Faculty of Arts & Science
Mid to Late August	<b>MIE490 CAPSTONE PROJECT SELECTION</b>
August 22	<b>LAST DAY TO PAY OR DEFER TUITION FEES</b>

\*For students who are returning to fourth year from a year off or wanting to switch to full-time for their final year of study.

# IMPORTANT DATES

## DATE

September 4

### **ENGINEERING FALL (F) LECTURES BEGIN**

Last day to receive a 100% tuition refund if you are choosing to withdraw for the 2014-2015 academic year.

September 15

### **DEADLINE TO SUBMIT TECHNICAL ELECTIVE SUBSTITUTION REQUESTS FOR 4F**

### **DEADLINE TO SUBMIT THESIS ENROLLMENT FORMS FOR FALL (F) & FULL-YEAR (Y) PROJECTS**

### **DEADLINE TO SUBMIT COURSE REQUEST FORMS FOR FALL (F) & FULL-YEAR (Y) COURSES**

September 21

### **FALL (F) & FULL-YEAR (Y) COURSE ADD DEADLINE**

Last day to add or substitute Fall (F) or Full-Year (Y) Session courses

Last day to receive a 100% tuition refund (with a minimum charge of \$242) if you are choosing to withdraw for the 2014-2015 academic year.

November 3

### **FALL (F) COURSE DROP DEADLINE**

Last day to drop Fall (F) Session courses without academic penalty, withdraw from the Fall (F) session without academic penalty, or transfer to part-time studies for the Fall (F) session

Last day to receive a 50% tuition refund if you are choosing to withdraw for the 2014-2015 academic year.

# IMPORTANT DATES

DATE	
January 5	<b>ENGINEERING WINTER (S) LECTURES BEGIN</b>
January 12	<b>DEADLINE TO SUBMIT TECHNICAL ELECTIVE SUBSTITUTION REQUESTS FOR 4W</b>  <b>DEADLINE TO SUBMIT THESIS ENROLLMENT FORMS FOR WINTER (S) PROJECTS</b>  <b>DEADLINE TO SUBMIT COURSE REQUEST FORMS FOR WINTER (S) COURSES</b>
January 18	<b>WINTER (S) COURSE ADD DEADLINE</b>  Last day to add or substitute Winter (S) Session courses
January 31	<b>DEADLINE TO SUBMIT PER HOURS FOR JUNE CONVOCATION</b>
Early March	<b>IRON RING CEREMONY</b>
March 8	<b>WINTER (S) &amp; FULL YEAR (Y) COURSE DROP DEADLINE</b>  Last day to drop Winter (S) Session and Full-Year (Y) courses without academic penalty, withdraw from the Winter (S) session without academic penalty, or transfer to part-time studies for the Winter (S) session.
March 20	<b>NAME CHANGE DEADLINE</b>  Deadline to submit any name changes to the Office of Convocation that are to appear on your degree.
June	<b>CONVOCATION</b>  Congratulations!

# CURRICULUM

FALL SESSION - YEAR 4		LEC/LAB/TUT/WGT.
CORE REQUIRED COURSES		
Integrated System Design	MIE463H1	3/-/2/0.5
Capstone Design	MIE490Y1	-/-/4/1.00
TECHNICAL ELECTIVES (TWO OF):		
Financial Engineering	APS502H1	3/-/-/0.5
Ergonomic Design of Information Systems	MIE344H1	3/3/-/0.5
Business Process Engineering	MIE354H1	3/2/-/0.5
Operations Research III: Advanced OR	MIE365H1	3/2/1/0.5
Engineering Psychology and Human Performance	MIE448H1	3/3/-/0.5
Decision Support Systems	MIE451H1	3/1/1/0.5
Research Thesis	MIE498H1	-/-/4/0.5
Research Thesis	MIE498Y1	-/-/4/1.0
Scheduling	MIE562H1	3/-/2/0.5
Decision Analysis	MIE566H1	3/-/2/0.5
COMPLEMENTARY STUDIES ELECTIVE		
CS Elective	-	0.5

## WHAT'S THE DIFFERENCE BETWEEN AN AREA OF FOCUS AND A STREAM?

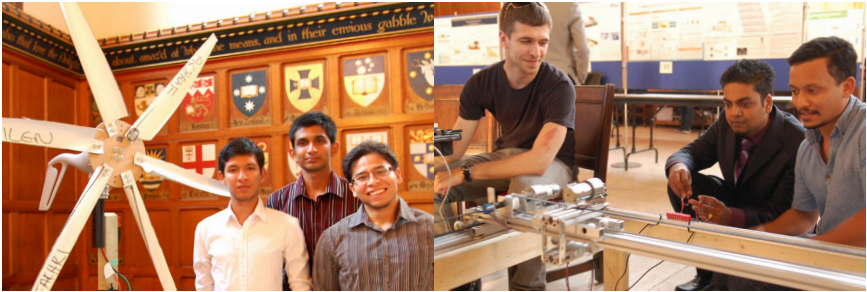
In the Mechanical Engineering program, students select streams. These streams require them to take a continued stream course in 4F from their stream selections in 3W. In the Industrial Engineering program, it is not mandatory to continue with courses in your particular area of focus. If you choose a Human Factors technical elective in third year, you can choose another Human Factors course in fourth year or choose a course in information engineering or operations research.

# CURRICULUM

WINTER SESSION - YEAR 4		LEC/LAB/TUT/WGT.
<b>CORE REQUIRED COURSES</b>		
Organization Design	MIE459H1	4/-/-/0.5
Capstone Design	MIE490Y1	-/-/4/1.00
<b>TECHNICAL ELECTIVES (TWO OF):</b>		
Cases Studies in Human Factors and Ergonomics	MIE345H1	3/-/2/0.5
Cases in Operations Research	MIE367H1	3/-/2/0.5
Knowledge Modelling and Management	MIE457H1	3/1/1/0.5
Facility Planning	MIE468H1	3/-/2/0.5
Reliability and Maintainability Engineering	MIE469H1	3/-/2/0.5
Research Thesis	MIE498H1	-/-/4/0.5
Research Thesis	MIE498Y1	-/-/4/1.0
Human Factors Integration	MIE542H1	3/-/2/0.5
Healthcare Systems	MIE561H1	3/-/2/0.5
<b>COMPLEMENTARY STUDIES ELECTIVE</b>		
CS Elective	-	0.5



# MIE490/APS490: CAPSTONE DESIGN



The capstone design course provides an experience in engineering practice through a significant design project. Student teams meet specific client needs through a creative, iterative, and open-ended design process.

Throughout the fourth year of your program, you will work with a faculty Supervisor and an industry Client on a Capstone Design Project. The Capstone Design Project provides you with an opportunity to work on a problem of real value to your Client. You will work with them and your Supervisor to define your project goals (within the scope of the problem identified), to decide how you will go about achieving these goals and to organize yourself to achieve them.

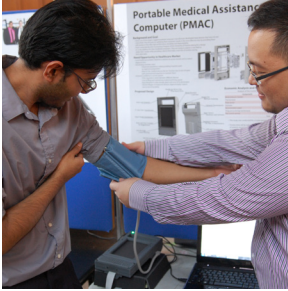
All capstone projects fall into one of the following categories:

**STANDARD CAPSTONE PROJECT:** These projects are sourced by Capstone Coordinators and each project is supervised by a single MIE Faculty member. Students are matched with projects in early September.

**STUDENT-SOURCED CAPSTONE PROJECT:** These projects are sourced by students through PEY, eSIP employer or other industry contacts. Students must form a team and find a single MIE faculty member to supervise their project. Students interested in this type of project must submit for approval by mid-June.

**CAPSTONE INNOVATION PROJECTS:** The projects are sourced by University or MIE faculty members. These projects entail the design of new and patentable technologies, and come along with high risk, high visibility, and high impact potential. Students are supervised by a single MIE faculty member. **\*Competitive Selection**

# MIE490/APS490: CAPSTONE DESIGN



## **MULTIDISCIPLINARY PROJECTS (APS490Y):**

These projects are sourced by capstone coordinators across the Faculty of Applied Science and the Multidisciplinary Capstone course coordinator. These projects require team members from at least two disciplines and are supervised by a single engineering faculty member. **\*These projects have an accelerated self-selection and matching process, and require a competitive interview.**

**INTERNATIONAL CAPSTONE PROJECTS:** These projects are sourced by the International Capstone coordinator. In these projects, students work with University partners from China, Hong Kong and USA. **\*Competitive Interview Required**

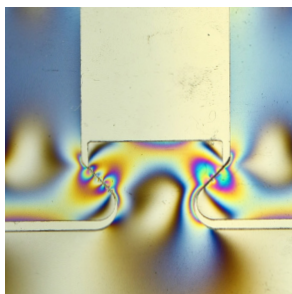
## **PROJECT SELECTION**

For those interested in the **Multidisciplinary** or **International** Capstone Projects, you must submit your name by **February 28, 2014**.

For those interested in the **Student-sourced** projects, you must submit your project for review by **June 13, 2014**.

For those interested in **Standard Capstone Projects** or **Capstone Innovation Projects**, you will be contacted mid-August to initiate the matching process.

# MIE498H1/Y1: RESEARCH THESIS



The purpose of MIE498 is two-fold: to let students pursue a technical project of interest, and to improve their communication skills. **It is particularly useful for students thinking about graduate school and who want to learn more about engineering research.** Preparing a Progress Report and a Thesis gives students experience in technical writing, and making oral presentations about their projects helps students improve their oral communication skills. MIE498 is

an important course in the curriculum because an engineering graduate should be able to present to prospective employers proficiently.

Formal approval to register for the fourth-year thesis must be obtained from the Undergraduate Office. **Enrollment in our thesis course is restricted to students with an overall average of 75%.** This criterion can be relaxed under exceptional circumstances with the written approval of the supervisor.

At the beginning of the term, students will establish with the supervisor, in writing, which reports are to be submitted, the content of these reports, their due dates, and the grading scheme. **The Thesis Topic Form, however, must be submitted to the undergraduate office by one week before the course add date and is not negotiable.** Notice that your supervisor may choose to follow these guidelines, but modifications may be desirable to best fit the nature of the thesis.

**In the event your thesis project is not approved, as part of COS and on course selection day, please select a back-up approved curriculum technical elective.** By submitting your thesis form on time, you will receive a decision before the course add deadline.

## ENROLLMENT PROCEDURE

1. Find a supervisor and a thesis topic: You can review the available thesis topics at **[www.mie.utoronto.ca/undergrad/thesis-projects](http://www.mie.utoronto.ca/undergrad/thesis-projects)** or you can independently contact MIE faculty members who you are interested in working with. The website will be updated with project submissions as they become available.

# MIE498: THESIS

2. Once you have found a faculty member who will supervise you, complete a thesis enrollment form. Ensure that your supervisor signs the form. This form is available at **[www.mie.utoronto.ca/undergrad/thesis-projects](http://www.mie.utoronto.ca/undergrad/thesis-projects)**
3. Attach a 1-page outline of the project you plan to undertake:
  - » Explain how the research project builds upon one or more aspects of engineering science introduced in the student's academic program
  - » Provide an estimate of a level of effort not less than 40 productive hours of work per term
  - » Specify a deliverable in each term to be submitted by the last day of lectures
4. Submit your completed thesis enrollment form and 1-page outline to the MIE Undergraduate Office by the following deadlines:
  - » **September 15** for a fall-term (MIE498H1F) or full year (MIE498Y1Y) thesis
  - » **January 12** for a winter-term (MIE498H1S) thesis
5. If approved, your research thesis will be added to your transcript on ROSI by the MIE Undergraduate Office. If it is not approved, we will notify you by email.

# HUMAN FACTORS



Industrial Engineers also improve productivity and efficiency by studying and improving the actual physical work environment. Human factors engineering is the study of people as workers and as managers, both from the physiological and psychological points of view. The study of human physiology, particularly the nervous system, leads to fascinating discoveries concerning reaction to stimuli, sensory perception, human performance at operator tasks, and people's ability to process information. These principles are applied to the design of human-machine systems, with particular attention to problems of information display, control layout, compensatory controls systems, and the design of work environments. People's behaviour in work organisations is examined from the point of view of individual and social psychology. These studies lead to important conclusions concerning managerial and leadership styles, organisational goals and incentives, employee relations, and the implementation of planned change.

For example, a mechanical engineer may design a new car, and a human factors engineer would be responsible for the design of the interior: control layout, seating, vision, reachability, usability in unusual circumstances, etc. A nuclear engineer will design a nuclear generator, and a human factors engineer will design the control system displays to minimise the probability of human error.

## TECHNICAL ELECTIVES

*\*Evaluations & Textbook information accurate as of 2013/2014. Please note that this information is subject to change and should be used as a general guide ONLY\**

### **3F – MIE344H1F – ERGONOMIC DESIGN OF INFORMATION SYSTEMS**

The goal of this course is to provide an understanding of how humans

# HUMAN FACTORS

and machines can be integrated with information systems. By the end of the course, students will be able to: Observe, and engage in dialogue with, users in ways that clarify users' views, needs, and capabilities; Develop all phases of the user interface design process in response to the needs of a user interface design project; Demonstrate initiative, personal responsibility and accountability in both personal and group contexts; Communicate information, analyses, and solutions accurately, reliably, orally, and in writing to a range of audiences (e.g., the professor, the TAs, classmates, users); Extend the insights they have gained from their experience through the course in their future interactions with users in the workplace; Use the completed project to promote their candidacy for employment opportunities.

**TOPICS:** Design of human-machine interfaces, Analysis of the impact of computers on people, Coverage of usability engineering and rapid prototyping design, Analysis of user mental models and their compatibility with design models, and Quantitative modelling of human-computer interaction.

**EVALUATIONS:** Design Project – 40%, Poster Session – 5%, Mid-Term Exam – 15%, Labs – 5%, Final Exam – 35%

**TEXTBOOK:** Interaction Design: Beyond Human-Computer Interaction – 3rd Edition, 2011, Wiley; Yvonne Rogers, Helen Sharp, and Jenny Preece; ISBN-13: 978-0470665763.

## 3W – MIE345H1S – CASE STUDIES IN HUMAN FACTORS AND ERGONOMICS

A detailed analysis will be made of several cases in which human factors methods have been applied to improve the efficiency with which human-machine systems operate. Examples will be chosen both from the area of basic ergonomics and from high technology. Emphasis will be placed on the practical use of material learned in earlier human factors courses.

**TOPICS:** Understand and analyze human factors and ergonomics requirements outlined in a Request for Proposal (RFP); Respond to a RFP in a clear and concise manner to propose human factors and ergonomics analysis methods based on a problem description; Apply human factors and ergonomics methods to a set of circumstances under which humans are considered central to the proposed solution; Understand and mitigate obstacles associated with conducting human factors and ergonomics activities in different situations; Map human factors and ergonomics characteristics of different case studies to the Human-Tech ladder;

# HUMAN FACTORS

Demonstrate initiative, personal responsibility, and accountability in both personal and group contexts; Use “real-world” knowledge acquired from this course to market candidacy for employment opportunities.

**EVALUATIONS:** Assignment #1 – 15%, Assignment #2 – 15%, Assignment #3 – 20%, Participation – 10%, Final exam – 40%

**TEXTBOOK:** N/A

## **4F – MIE448H1F – ENGINEERING PSYCHOLOGY AND HUMAN PERFORMANCE**

The aim of the course is to study, and model, the relationship between human information processing and the design of human-machine systems, especially for complex workplaces.

**TOPICS:** Introduction to the concept of human information processing, Information theoretic models of human information processing, Theory of signal detection, Attention in Perception and Display Space, Spatial Cognition and Navigation, Memory, Human Decision Making, Attention Sharing / Multitasking, Mental Workload, Stress and Human Error, Automation and Human Performance

**EVALUATIONS:** Laboratory Projects – 30%, Mid-Term Exam – 25%, Final Examination – 45%

**TEXTBOOK:** C.D. Wickens, J.G. Hollands, S. Banbury & R. Parasuraman: Engineering Psychology and Human Performance; (Fourth Edition) Pearson (2013)

## **4W – MIE542H1S – HUMAN FACTORS INTEGRATION**

The aim of this course is to develop an understanding of approaches to integrating human factors in systems design engineering, for complex, safety-critical environments; describe and apply methods and approaches for integrating Human Factors into design processes; understand systems design processes and cycle; develop an understanding of the roles and responsibilities of Human Factors practitioners within the design process and team; develop an understanding of how to communicate requirements arising from human factors integration analyses and methods; develop design concepts which meet the identified requirements; and to prepare for continuous learning through professional practice of HFI methods.

# HUMAN FACTORS

**EVALUATIONS:** Project Write-up – 5%, Case Study Analysis Write-up – 5%, HFI Analyses – 20%, Quizzes – 20%, Final Project (group) – 35%, Oral Presentation (individual) – 10%, Pop Quizzes – 5%

**TEXTBOOK:** N/A

## FIELDS OF APPLICATION

Transportation, Communication, Healthcare, Military, Energy, Banking

## COMPANIES

University Health Network, Candu Energy, AMEC-Nuclear Safety Solutions, SapientNitro, CIBC

## LINKS

Human Factors and Ergonomics Society  
[www.hfes.org](http://www.hfes.org)



# OPERATIONS RESEARCH



Operations research and management science involve the mathematical modelling of real systems and processes with a view to being able to predict and optimally control their performance. For example, we can use statistics to determine how much inventory should be carried in a warehouse to minimise expected costs of carrying the stock and of shortages. We use queueing theory to analyse the waiting time of people or jobs waiting for service in banks, emergency rooms and production facilities. We use linear algebra (called linear programming) to determine the optimal product mix to maximise profit subject to capacity constraints on resources, or the optimal allocation of service facilities (like fire stations) to minimize the expected service time. Areas include scheduling, reliability, maintenance, forecasting, queueing, value analysis and decision making under uncertainty.

Operations Research came into its own during the Second World War, when it became apparent that many problems of scheduling and deployment of resources, which had previously been managed intuitively, could be quantitatively modelled and solved analytically. Since the war, operations research techniques and models have been applied in an ever-increasing variety of industries, from finance to healthcare to government. The modern manager can no longer rely on seat-of-the-pants judgement, but must take a scientific approach to decision making. Much of today's industrial engineering activity is the application of management science in support of decision making at all levels of any organisation.

## TECHNICAL ELECTIVES

\*Evaluations & Textbook information accurate as of 2013/2014. Please note that this information is subject to change and should be used as a general guide ONLY\*

# OPERATIONS RESEARCH

## **3F – MIE354H1F – BUSINESS PROCESS ENGINEERING**

This course focuses on understanding multiple perspectives for grouping, assessing, designing and implementing appropriately integrated and distributed information systems to support enterprise objectives.

The emphasis is on understanding how Business Process Management techniques and tools can contribute to align an organization's business and information technology perspectives, as well as the characteristics of application and system types and the implications for their design, operation, and support of information needs. The course reviews platforms and technology infrastructure, including; legacy systems, client/server, the Internet, the World Wide Web, and the emergence of a web-service-based service oriented architecture

Students will work in the laboratory to develop business process that can be specified in BPMN and executed by information systems supporting BPEL, two industry standards for describing and implementing business process.

The course covers Information Systems concepts, tools and techniques, and it is addressed primarily to an audience of process/business analysts instead of targeting an audience of developers/programmers. After taking this course the students should have achieved the following objectives: Know the characteristics of business process management and workflow processes; Is able to make a process model based on an informal description, recognizing concepts such as case, task, work item, activity, role, organizational unit, resource, etc.; Can design and analyze a process (validation, verification, and performance analysis; Know the reference architecture of service-oriented business process management and workflow systems, and is aware of the basic functionality offered by contemporary systems, with an emphasis on web services and web-based information systems.

**TOPICS:** Introduction and Motivation to Business Processes Management, Petri Nets with applications to Workflow Modelling, Workflow and Groupware, Ad-hoc Processes, Social BP, Workflow Patterns, Event Diagrams, Process Orchestrations, Modelling Business Processes and Resource Management, Enterprise Architecture and BPMS, Service-Oriented Computing, Web-Services, and Composite Applications, Organization, Architecture and Standards Choreographies, B2B Collaborations, Service Interaction Patterns, Business Process Modeling Notation, Process Choreographies and B2B Collaborations, Service Interaction Patterns, Choreography Consistency

# OPERATIONS RESEARCH

**EVALUATIONS:** Final – 35%, Midterm – 25%, Assignments/Course Project – 40%

**TEXTBOOK:** “Business Process Management: Concepts, Languages, Architectures”, Mathias Weske, 2nd Ed, ISBN 9783642286155, Springer-Verlag, 2012.

## **3F – MIE365H1F – OPERATIONS RESEARCH III: ADVANCED OR**

Design of operations research models to solve a variety of open-ended problems. Linear programming extensions are presented: goal programming, column generation, Dantzig-Wolfe decomposition, and interior point solution methods. Non-linear programming solution methods are developed: optimality conditions, quadratic programming. Solutions to advanced stochastic models: stochastic programming, Robust Optimization and Semi-Definite Programming.

**EVALUATIONS:** Homework – 15%, Midterm – 30%, Final Exam – 45%, Computational Project – 10%

**TEXTBOOK:** Introduction to Linear Optimization and Extensions with MATLAB by Roy H. Kwon, CRC Press 2013.

## **3W – MIE367H1S – CASES IN OPERATIONS RESEARCH**

To provide students with the experience and confidence to apply Operational Research techniques to solve a variety of cases that industrial engineers may face in their professional life. The course will use one case per week which describes a real situation. Students will be required to analyze the case on their own, in a small group and with the class. Extensive preparation of each case prior to class participation is essential for the success of this course. After initial discussion, students will be required to fully solve the case, including a numerical solution. Timely individual analysis and solution of each case is critical to both class participation and development of the ability to analyze a case during the midterm and final exams.

**EVALUATIONS:** Weekly Cases – 40%, Participation – 10%, Midterm – 15%, Final exam – 35%

**TEXTBOOK:** N/A

# OPERATIONS RESEARCH

## **4W – MIE468H1S – FACILITY PLANNING**

Fundamentals of developing efficient layouts of production/ service systems and determining optimal locations of facilities in a network. Activity relationships, manufacturing flow patterns, layout procedure types (construction and improvement algorithms), manual and computerized layout techniques, single and multiple facility location, and supply chain (location) network-distribution design.

## **4W – MIE469H1S – RELIABILITY AND MAINTAINABILITY ENGINEERING**

An introduction to the life-cycle costing concept for equipment acquisition, operation, and replacement decision-making. Designing for reliability and determination of optimal maintenance and replacement policies for both capital equipment and components. Topics include: identification of an item's failure distribution and reliability function, reliability of series, parallel, and redundant systems design configurations, time-to-repair and maintainability function, age and block replacement policies for components, the economic life for capital equipment, provisioning of spare parts.

**TOPICS:** Statistical Preliminaries, Basic Reliability Models, System Reliability, Replacement Decisions, Reliability Improvement through Inspection, Capital Equipment Replacement Decisions, Effective Use of Maintenance Resources, Data Collection and Reliability Testing, Analysis of Component Failure Data

**EVALUATIONS:** Quizzes – 10%, Midterm – 35%, Final Exam – 55%

**TEXTBOOK:** Maintenance, Replacement and Reliability Theory and Applications by Jardine, A.K.S and Tsang, A.H.C. Taylor & Francis, 2nd ed., 2012.

## **4W – MIE561H1S – HEALTHCARE SYSTEMS**

The purpose of MIE 561 is to give students an opportunity to integrate the engineering tools learned in previous courses by applying them to real world problems. While the specific focus of the case studies used to illustrate the application of engineering will be the Canadian health care system, the approach to problem solving adopted in this course will be applicable to any setting. This course will: Provide a framework for identifying and resolving problems in a complex, unstructured decision-making environment; Give students the opportunity to apply a problem

# OPERATIONS RESEARCH

identification framework through real world case studies; Provide insight into the appropriate uses (and abuses) of engineering techniques in a practical setting; Prepare students to become productive, practising engineers; Make students aware of the implications of context on the practice of engineering

**EVALUATIONS:** Group case study discussion – 10%, Case study reports – 40%, Midterm exam – 10%, Final exam – 40%

**TEXTBOOK:** “Public Health and Preventive Medicine in Canada” 5th edition by Chandrakant Shah

## 4F – MIE562H1F – SCHEDULING

This course takes a practical approach to scheduling problems and solution techniques, motivating the different mathematical definitions of scheduling with real world scheduling systems and problems. The linking theme for the course is the use of search (partition, relaxation, and inference) to solve hard combinatorial problems. A group project will require the implementation of two or more scheduling algorithms. Evaluation will be based on two terms tests, two assignments, the project, and the final exam. Students should have a basic knowledge of standard optimization techniques as taught in second and third year MIE courses.

**TOPICS:** Job shop scheduling, timetabling, project scheduling, and solution approaches including constraint programming, mixed-integer programming, local search, heuristics, and dispatch rules. Stochastic scheduling, complexity theory, recent research on decomposition techniques, and information engineering aspects of building scheduling systems for real world problems.

**EVALUATIONS:** Assignment #1 – 5%, Term Test #1 – 15%, Assignment #2 – 5%, Term Test #2 – 15%, Term Project – 15%, Final Exam – 45%

**TEXTBOOK:** Pinedo, M., Planning and Scheduling in Manufacturing and Services, Springer, 2nd edition, 2009

## 4F – MIE566H1F – DECISION ANALYSIS

Students taking this course will attain competence in formulating Bayesian decision analysis models, attain an understanding of methods for solving such models, and attain competence in using commercial software for solving such models

# OPERATIONS RESEARCH

**TOPICS:** Intro, Decision Trees and Bayes Rule, Complex Decisions with Decision Trees, Bayesian Networks, Formulating Influence Diagrams, Solving Influence Diagrams, Attitude to Risk, Multi-Attribute Decisions, Continuous Uncertainty - Conjugate Distributions, Conjugate Distributions, Non-Conjugate Distribution, Multivariate Inference

**EVALUATIONS:** Project part 1 – 5%, Project part 2 – 5%, Lab Mid-Term – 40%, Project part 3 – 5%, Project part 4 – 5%, Lab Final Exam – 40%

**TEXTBOOK:** N/A

## 4F – APS502H1F – FINANCIAL ENGINEERING

This course will focus on capital budgeting, financial optimization, and project evaluation models and their solution techniques. In particular, linear, non-linear, and integer programming models and their solution techniques will be studied. The course will give engineering students a background in modern capital budgeting and financial techniques that are relevant in practical engineering and commercial settings.

## FIELDS OF APPLICATION

Logistics, Supply Chain Management, Healthcare, Production System, Financial Engineering, Maintenance

## COMPANIES

Canadian Tire, FedEx, Purolator, Wal-mart, Bombardier, Celestica, General Motors, Honda, Procter and Gamble, Ford Motor Company, St. Michael's Hospital, CIBC, Manulife Insurance, IBM, Oracle

## LINKS

Canadian Operational Research Society  
[www.cors.ca](http://www.cors.ca)

# INFORMATION ENGINEERING



The Information Engineering specialization of the Industrial (Systems) Engineering program creates professionals that address the challenge of successfully applying information technology to help people and organizations innovate and become more efficient.

Our graduates have outstanding employment opportunities in numerous private and public organizations as well as in the global consulting firms that service them. There is current and future demand for professionals that combine expertise in process design and management, business analysis, project management, systems integration, and a fusion of industry knowledge and information technology skills.

Information engineering provides exciting and diverse career opportunities that encompass the development and evolution of information systems. Our graduates address the following challenging issues: how to provide doctors and nurses with timely access to electronic patient data wherever is needed, how to design information systems that run the business of online stores such as music download sites and bookstores, how to reduce large volumes of data into information that is useful to the decision-making processes of government officials, and how to take advantage of information technology to plan, coordinate and support disaster recovery and relief efforts

## CORE COURSES

*\*Evaluations & Textbook information accurate as of 2013/2014. Please note that this information is subject to change and should be used as a general guide ONLY\**

### **4F – MIE463H1F – INTEGRATED SYSTEM DESIGN (FOURTH YEAR CORE)**

Integrated System Design is a capstone course that integrates the various perspectives of an integrated system taught in third year,

# INFORMATION ENGINEERING

including: Optimization, Quality, Management, Information, and Economics. The course approaches systems design from a Business Process perspective. Beginning with the Business Processes, it explores the concept of Business Process Re-engineering. It extends the concept of business processes to incorporate perspectives such as cost, quality, time, behaviour, etc. The second part of the course focuses on business process design tools. Namely, software tools to both design, simulate and analyse business processes. The third part of the course explores the application of process design to various domains. Guest speakers are used to provide domain background.

## **4W – MIE459H1S – ORGANIZATIONAL DESIGN (FOURTH YEAR CORE)**

This course examines how engineers as managers can create more effective organizations. We focus on the following areas for improving organizational effectiveness: Conflict, power, and politics within an organization; Personal and professional networks within an organization; Alternative organizational structures, such as functional, divisional, geographic, matrix, and horizontal structures; Techniques for managing an organization's dependencies on its external (resource) environment; The role of innovation and organizational learning. Our perspective is based on past research and hands on practice in the management of organizations. The course will be linked to your team capstone project. The class will be divided into teams the first day and the teams will be formed around your capstone project team.

**TOPICS:** Introduction to Organizations and Organizational Theory, Strategy, Organizational Design and Effectiveness, Organizational Structure, External Environments, Inter-organizational Relationships, Designing Organization for International business, Manufacturing & Service Technologies, IT and E Business Information Technology Evolution, Org Size Lifecycle & Decline, Organizational Culture & Ethics, Innovation and Change Management, Decision Making Process, Conflict Power and Politics

**EVALUATIONS:** Team Presentations – 10%, Mid Term Exam – 30%, Final Team Report – 25%, Final Exam – 35%

**TEXTBOOK:** Richard Daft / Ann Armstrong. “Organizational Theory and Design – Canadian 2nd edition”



# INFORMATION ENGINEERING

## TECHNICAL ELECTIVES

### **3F – MIE344H1F – ERGONOMIC DESIGN OF INFORMATION SYSTEMS**

See page 9.

### **3F – MIE354H1F – BUSINESS PROCESS ENGINEERING**

See page 14.

## TECHNICAL ELECTIVES (4TH YEAR ONLY)

### **4F – MIE451H1F – DECISION SUPPORT SYSTEMS**

This course provides students with an understanding of the role of a decision support system in an organization, its components, and the theories and techniques used to construct them. The course will cover basic technologies for information analysis, knowledge-based problem solving methods such as heuristic search, automated deduction, constraint satisfaction, and knowledge representation.

### **4F – MIE562H1F – SCHEDULING**

See page 17.

### **4F – MIE566H1F – DECISIONAL ANALYSIS**

See page 18.

### **4W – MIE457H1S – KNOWLEDGE MODELING AND MANAGEMENT**

MIE457 explores both the modelling of knowledge and its management within and among organizations. Knowledge modelling will focus on knowledge types and their semantic representation. It will review emerging representations for knowledge on the World Wide Web (e.g. RDF and ontologies) . Emerging knowledge modelling and automated reasoning software will be used in the laboratory.

**TOPICS:** Introduction to Ontologies, First-Order Logic, Methodologies, Common Logic, RDF (Resource Description Framework), OWL (Web Ontology Language), Rule Languages, Ontology-Based Search, Ontologies for Bioinformatics

**EVALUATIONS:** Ontology Design Project – 20%, Midterm – 30%, Final Exam – 50%

**TEXTBOOK:** N/A

# INFORMATION ENGINEERING

## **4W – MIE561H1S – HEALTHCARE SYSTEMS**

See page 16.

## **FIELDS OF APPLICATION**

Data Analysis, Database Design, Business Process Modelling, Information Systems, Ontologies

## **COMPANIES**

IBM, Microsoft, Ericsson, Walmart, Loblaw, Toronto Hydro, Environment Canada

## **LINKS**

Association for Information Systems  
[aisnet.org](http://aisnet.org)

# DEGREE REQUIREMENTS

## DEGREE EXPLORER

[degreeexplorer.utoronto.ca](http://degreeexplorer.utoronto.ca)

Degree Explorer is a tool designed to help students and advisors evaluate academic progress towards completion of requirements for graduation. Your assessment will be considered official only if confirmed by your department/division.

There is a planner tool that allows you to map out your degree and can help you determine if you are on track. Just because you are able to enrol in a course on ROSI does not mean it will fulfill your degree requirements. To make sure the electives you plan to choose fulfill your degree requirements, consider using the “Planner” tool within degree explorer.

## SUMMARY OF DEGREE REQUIREMENTS - AEMECBASC

### CORE COURSES

Students must complete all core courses.

**FIRST YEAR:** APS111H1F, CIV100H1F, MAT186H1F, MAT188H1F, MSE101H1F, APS106H1S, APS112H1S, ECE110H1S, MAT187H1S, MIE100H1S

**SECOND YEAR:** MIE236H1F, MIE242H1F, MIE250H1F, MIE258H1F, MIE262H1F, MAT234H1S, MIE237H1S, MIE240H1S, MIE253H1S, MIE263H1S

**THIRD YEAR:** MIE343H1F, MIE350H1F, MIE360H1F, MIE335H1S, MIE363H1S, MIE364H1S

**FOURTH YEAR:** MIE490Y1Y, MIE463H1F, MIE459H1S

### SEMINAR COURSES

Students must complete APS150H1F and MIE191H1S in order to graduate.

### NATURAL SCIENCE (NS)

To graduate, you must take a 0.5 credit natural science course. 0.5 credits = 1 half-year course. This is typically taken in 3F.

# DEGREE REQUIREMENTS

## COMPLEMENTARY STUDIES (CS) AND HUMANITIES & SOCIAL STUDIES (HSS)

To graduate, you must take 2.0 credits in complementary studies, of which at least 1.0 credits are HSS courses. 1.0 credits = 1 full year course or 2 half-year courses. These are typically taken in second and fourth year.

## TECHNICAL ELECTIVES

Students must take one of MIE344, MIE354, or MIE365 in 3F. Students must take one of MIE345, MIE367, MIE468, or MIE469 in 3W. Students take two technical electives in 4F, and two technical electives in 4W from the approved curriculum lists (Page 7-8). Students are permitted to take at most two technical elective substitutes in their fourth-year (one in each semester), but are required to obtain formal Departmental approval from the Undergraduate Office.

## PRACTICAL EXPERIENCE REQUIREMENT (PER)

Every student must complete a minimum of 600 hours of practical work before graduation. The nature of the work should form an integral part of a student's education and career development. It therefore must contain a good measure of responsibility (e.g., management of programs, systems, equipment, personnel, or finances), sound judgment and effective communication, and be supportive of the professional career of the student after graduation. Work in many facets of industry, government or public service would be acceptable for this requirement. This PER requirement can be obtained through summer internships. To add PER hours, please complete the **Practical Experience Form** ([www.mie.utoronto.ca/undergrad/forms](http://www.mie.utoronto.ca/undergrad/forms)) and submit it to the MIE Undergraduate Office. If you have completed PEY (12-16 month internship), you have fulfilled the PER requirement and do not need to submit a PER form to the MIE Undergraduate Office.

# ENGINEERING MINORS & CERTIFICATES

## ENGINEERING MINORS & CERTIFICATES

In addition to academic programs in Core 8 subjects/TrackOne and Engineering Science, undergraduate Engineering students may pursue a number of minors and certificates that add breadth and depth to their academic careers.

To obtain a minor, students must take six (6) courses in a particular field. Currently, the faculty offers minors in the following: Bioengineering, Environmental Engineering, Sustainable Energy, Robotics and Mechatronics, Engineering Business. To obtain a certificate, students must take three (3) courses in particular field. Currently, the faculty offers certificates in the following: Engineering Business, Global Engineering, Entrepreneurship, Preventative Engineering and Social Development, Mineral Resources, Nuclear Engineering. Students complete their minor using their electives in Second, Third and Fourth Year and therefore should consider these minors while selecting their courses

### HOW DO I ENROL IN A MINOR?

Each minor has a specific enrolment form for you to complete and submit to the Cross-Disciplinary Programs Office. Please visit [uoft.me/engminors](https://uoft.me/engminors)  
**Please note that enrolling in a minor does not guarantee you a spot in any of the engineering minor electives (for example, JRE300), as they are open to everyone.** To avoid disappointment, plan ahead and select courses early (6 AM) on course selection days. You are responsible for making sure you fulfill your degree and minor requirements.

### WHEN CAN I ENROL IN A MINOR?

Students can enrol in an Engineering Minor at any time in their program.

### WHAT'S THE DIFFERENCE BETWEEN A MINOR AND A STREAM?

A minor appears on your Bachelor of Applied Science (BASc) degree upon graduation, unlike your stream choices which do not.

### I DIDN'T GET INTO THE COURSES I WANTED TO, AND I'M WORRIED I WON'T FINISH MY MINOR BEFORE GRADUATION. WHAT DO I DO?

Due to popularity, many engineering minor courses are offered in the summer. You are also welcome to complete those courses following graduation, it just may not appear on your degree until later. You can also visit the Cross-Disciplinary Programs Office to de-enrol you in a minor.

# ENROLLMENT AND REGISTRATION

## HSS/CS ELECTIVES

Complementary Studies (CS) can be broadly defined as studies in humanities, social sciences, arts, management, engineering economics and communication that complements technical curriculum. **Engineering, math or science courses—including astronomy and psychology—may not be used to fulfill your CS elective requirements.** Humanities & Social Studies (HSS) courses are a subset of CS courses, so you may take HSS-designated courses to fulfill your CS elective requirements. In general, MechE students take their HSS/CS electives in 2nd and 4th year.

**To graduate, you must take 2.0 credits in complementary studies, of which at least 1.0 credits are HSS courses. 1.0 credits = 1 full year course or 2 half-year courses.**

The University of Toronto's Faculty of Arts & Science teaches a large number of courses that cover topics in complementary studies, though not all are suitable to fulfill your CS/HSS elective requirements. For a list of faculty approved elective lists, please consult the following links:

**HSS Courses** <http://uoft.me/hss>

**CS Courses** <http://uoft.me/cselectives>

If an elective you are interested in taking is not on those lists and you feel it meets the criteria described above, you may submit a proposal to the faculty to approve an HSS/CS course <http://uoft.me/proposecs>

### **I'M NOT SURE IF THE COURSES I'D LIKE TO TAKE ARE APPROVED HSS OR CS COURSES. WHERE CAN I CHECK?**

You can enter them into the Degree Explorer Planner ([degreeexplorer.utoronto.ca](http://degreeexplorer.utoronto.ca)) to see if they work to fulfill your HSS/CS requirements. You may also check if the course code appears on either of these lists: <http://uoft.me/hss> or <http://uoft.me/cselectives>.

### **CAN I TAKE EXTRA ENGINEERING COURSES TO FULLFILL MY HSS/CS REQUIREMENTS?**

No. Engineering, math or science courses—including astronomy and psychology—may not be used to fulfill your CS elective requirements.

# ENROLLMENT AND REGISTRATION

## **WILL MY HSS/CS ELECTIVES BE ADDED TO MY TIMETABLE AUTOMATICALLY? WHAT IF I AM ENROLLED IN A MINOR THAT REQUIRES THAT COURSE?**

No, you must add them yourself on course selection days. Enrolling in a minor does not guarantee you a spot in the required courses for your minor, as they are open to everyone on course selection day. Plan ahead and act early (6 AM) to avoid disappointment.

## **WHAT ARE ENHANCED ENROLMENT ARTS & SCIENCE ELECTIVES?**

Based on student feedback indicating that it can be difficult to enrol in desired elective courses due to the priority given to Arts & Science students, the Engineering Registrar's Office has worked with the Faculty of Arts & Science to allow Engineering students to have early access and reserved spaces in some popular CS/HSS elective courses. As a result, Engineering students will be able to add select Arts & Science course sections starting on July 22 at 6 AM. For a list of these courses, consult the Enrolment and Registration Guide available on the faculty website.

## **I'M NOT SURE WHICH ELECTIVES TO TAKE.**

The Arts & Science Student's Union puts together a publication called the Anti-Calender, which provides honest student feedback about many arts & science elective courses offered. <http://assu.ca/anti-calendar> You may also wish to consult upper-year students in regards to your elective choices.

## **NATURAL SCIENCE ELECTIVES**

Natural Sciences (NS) are defined by the Canadian Engineering Accreditation Board as a component of the curriculum that includes elements of physics, chemistry, life sciences, or earth sciences. In general, MechE students take their Natural Science elective in 3rd year.

**To graduate, you must take a 0.5 credit natural science course. 0.5 credits = 1 half-year course.**

MIE offers CHE353, CIV220, and CIV300 as natural science electives. The faculty has since extended the list of approved natural science electives. Consult this link <http://uoft.me/nse> for the extended list. You do not need formal MIE approval to take courses from this list. If the course has prerequisites you have not taken, please meet with the specific department offering the course to discuss your eligibility. **Please note that IndE students are NOT permitted to take PSY100 as their natural science elective.**

# ENROLLMENT AND REGISTRATION

## OVERLOADS

Students that wish to take extra courses in addition to a full course load (to fulfill a minor for example), must obtain formal approval from the Undergraduate Office. **In general, a student wishing to overload must have obtained an overall 75% average or above in the previous academic semester.** If you have failed a course and must overload in order to graduate on time, this requirement may be waived. If you do not obtain formal approval to overload during the year, please consider that many engineering minor courses are also offered in the summer. To apply to overload, submit a **Overload Request Form** ([www.mie.utoronto.ca/undergrad/forms](http://www.mie.utoronto.ca/undergrad/forms)) to the Undergraduate Office by the course add deadline. If you are unsure, add the courses on the course selection dates to secure a spot in the event your overload request is approved.

## “EXT” OR EXTRA COURSES

Students who are overloading with an extra course that is beyond their degree requirements, may wish to make this course “EXT”. EXT-designated courses do not get factored into GPA. To qualify for the Dean’s List and many academic scholarships, GPA minimum requirements are calculated based on a full course load. If you feel that this extra course mark may bring down your average, it may be advantageous to make this course EXT. The deadline to make a course EXT is the same as the drop course deadline in each semester. Once your final grades are To make a course EXT, submit a **EXT Request Form** ([www.mie.utoronto.ca/undergrad/forms](http://www.mie.utoronto.ca/undergrad/forms)) to the Undergraduate Office by the course drop deadline.

## FAILED COURSES

If you have failed a core curriculum course, you can re-take it any time before graduation. Many first year engineering courses are offered during the summer, and we strongly advise you to take it during this time and not as an overloaded course during the year. If you were unsuccessful in a second or third year course that is a prerequisite for an upper level course, you must retake the prerequisite course first. To add a core curriculum course, submit the **Course Request Form** ([www.mie.utoronto.ca/undergrad/forms](http://www.mie.utoronto.ca/undergrad/forms)) to the Undergraduate Office by one week before the add course deadline. To add a failed stream course, HSS/CS elective, or natural science elective, you may do so yourself on the course selection dates.



# ENROLLMENT AND REGISTRATION

## TECHNICAL ELECTIVE SUBSTITUTIONS (FOURTH YEAR ONLY)

If you are interested in taking a course that does not appear on the approved technical elective curriculum list as part of your degree requirements, you may apply for a technical elective substitution. **Students are permitted to take at most two technical elective substitutes in their fourth-year (one per semester), but are required to obtain formal Departmental approval from the Undergraduate Office.** If you believe taking this course is critical to your success, we strongly suggest you submit a technical elective substitution form early to avoid disappointment in the case it is not approved. If your course is not approved as a technical elective substitute, you may consider taking it as an extra or overload course. To apply for a technical elective substitution, submit the **Technical Elective Substitution Form** ([www.mie.utoronto.ca/undergrad/forms](http://www.mie.utoronto.ca/undergrad/forms)) to the Undergraduate Office by one week before the add course deadline.



# INDUSTRIAL ENGINEERING 4TH YEAR

## ENROLLMENT & REGISTRATION CHECKLIST

### FEBRUARY - MARCH

#### COURSE & OPTIONS SELECTION

February 18 - March 4

- ☐ Read through this handbook
- ☐ Attend curriculum talks of interest, research, and consult upper year students to help inform your fourth year course selections
- ☐ Use [degreeexplorer.utoronto.ca](http://degreeexplorer.utoronto.ca) to map out your fourth year courses and determine if you are on track to graduate
- ☐ **Make your stream course and technical elective selections through the COS portal ([www.apsc.utoronto.ca/cos](http://www.apsc.utoronto.ca/cos)) by March 4.**

#### MULTIDISCIPLINARY OR INTERNATIONAL CAPSTONE

February 28

- ☐ If you are interested in a **Multidisciplinary** or **International Capstone** Projects, please contact [capstone@mie.utoronto.ca](mailto:capstone@mie.utoronto.ca) at this time.

#### RE-ENROLMENT & TRANSFERS:

- ☐ If you are returning to fourth year from a year off, make sure to apply to re-enrol ([www.apsc.utoronto.ca](http://www.apsc.utoronto.ca)) for the Fall session by March 7.
- ☐ If you are returning from a year of part-time studies but wish to finish fourth year full-time, please apply to transfer from part-time to full-time for the Fall 2014 session ([uoft.me/reenroltrans](http://uoft.me/reenroltrans)). **If you do not have the correct registration status come July, it may impact your ability to select courses on the course selection days.**

### MAY-JUNE

#### STUDENT-SOURCED CAPSTONE

June 13

- ☐ If you are interested in a **Student-sourced Capstone** project, submit your project for review to [capstone@mie.utoronto.ca](mailto:capstone@mie.utoronto.ca) by this date.



# INDUSTRIAL ENGINEERING 4TH YEAR

## ENROLLMENT & REGISTRATION CHECKLIST

### TECHNICAL ELECTIVE SUBSTITUTIONS

- ☐ If there is a technical elective offered by another Department that you'd like to take in your fourth year, please complete a technical elective substitution request form and submit it to the MIE Undergraduate Office. Please also contact the administering department of that course to ask for permission to enrol in the course. It is good practice to select a back-up approved MIE technical elective in the event your course is not approved. Submit early to receive an approval/denial by the course selection dates.

### JULY - AUGUST

### REVIEW YOUR TIMETABLE ON ROSI

Mid-July

- ☐ **Check that you have the correct registration status** (e.g. Part-time or Full-time) and that you are "INVIT" (Invited) for the fall session. If your registration status is incorrect, please contact the MIE Undergraduate Office at this time.
- ☐ **Review your timetable to ensure you are enrolled in the correct core curriculum courses (Page 7).** If you are missing core curriculum courses, would like to make changes to your core course lecture/tutorial/practical sections, or need a failed core course added, you will not be able to do so yourself. Please complete a Course Request Form and submit it to the Undergraduate Office.
- ☐ **Review your timetable to view your technical elective selections.** If you participated in COS, your technical elective selections will appear at this time. **Please note that only lecture sections are automatically added for fourth year students. You must add tutorial and practical sections yourself on the first course selection day.** If you did not participate in COS, your technical electives are missing, or you would like to make changes to the lecture/tutorial/practical sections of these courses, you will be able to do so yourself on the course selection days.



# INDUSTRIAL ENGINEERING 4TH YEAR

## ENROLLMENT & REGISTRATION CHECKLIST

- ☐ **If you have changed your mind about your technical elective selections, now is the time to plan.** Review page 41 for a list of resources that will help you determine which lecture/tutorial/practical sections fit your timetable so you are prepared for action on course selection day.
- ☐ **Make a plan as to which HSS/CS electives you would like to take in your fourth year.** Record the lecture/prac/tutorial sections so that you are ready to act quickly on course selection day. Please visit page 30 and page 41 for additional resources on selecting HSS/CS electives.

### THESIS PROJECTS:

- ☐ If you plan on doing a fourth year thesis project, it may be in your interest to now contact professors you are interested in working with. Please visit Page 13 for more information about thesis projects and the enrollment procedure.

### COURSE SELECTION (ROUND 1) OPENS 6 AM

July 22

- ☐ **You may now make changes to your timetable in terms of technical elective selections.** Log in early to avoid disappointment. If you submitted a Course Request Form, changes may begin to appear at this time.
- ☐ **You may now select HSS/CS electives offered by the Faculty of Engineering.**

### COURSE SELECTION (ROUND 2) OPENS 6 AM

August 6

- ☐ **You may now select or make changes to HSS/CS electives offered by the Faculty of Arts & Science at this time.** Log in early to avoid disappointment.



# INDUSTRIAL ENGINEERING 4TH YEAR

## ENROLLMENT & REGISTRATION CHECKLIST

### CAPSTONE

Late-August

- ☐ Student & project matching is to begin in late-August for **Standard Capstone** Projects & **Capstone Innovation** Projects.

### PAY OR DEFER TUITION FEES

August 22

- ☐ The deadline to pay or defer the minimum tuition payment to register occurs late-August. Visit [www.fees.utoronto.ca](http://www.fees.utoronto.ca) for a detailed schedule. Once you pay or defer your tuition, your status will update from “INVIT” to “REG”.

## FALL 2014

### ENGINEERING FALL (F) SESSION LECTURES BEGIN

September 4

- ☐ First day of class!
- ☐ This is also the last day to receive a 100% tuition refund if you are choosing to withdraw for the 2014-2015 academic year.

### COURSES REMOVED FOR NON-REGISTERED STUDENTS

September 8

- ☐ If you have not paid/deferred your minimum tuition payment, you will be removed from your courses as this time.

### FALL (F) & FULL- YEAR (Y) TECHNICAL ELECTIVE SUBSTITUTIONS, COURSE REQUEST FORMS & THESIS DEADLINE

September 15

- ☐ If you were interested in a fall (or full-year) thesis project, a fall technical elective substitution, or need a core course added or removed please make sure to submit your form to the MIE Undergraduate Office by this date.



# **INDUSTRIAL ENGINEERING**

## **4TH YEAR**

## **ENROLLMENT & REGISTRATION CHECKLIST**

### **COURSE ADD DEADLINE FOR FALL (F) & FULL-YEAR (Y) COURSES**

**September 21**

- ☐ Once classes begin, if you still want to make changes to any fall (F) session courses you can do so up until this date.
- ☐ This is the last day to receive a 100% tuition refund (with a minimum charge of \$242) if you are choosing to withdraw for the 2014-2015 academic year.

### **COURSE DROP DEADLINE FOR FALL (F) COURSES**

**November 3**

- ☐ This date is the deadline drop courses, switch to part-time studies, or withdraw from this session without academic penalty.
- ☐ This is the last day to receive a 50% tuition refund if you are choosing to withdraw for the 2014-2015 academic year.

## **WINTER 2015**

### **ENGINEERING WINTER (S) SESSION LECTURES BEGIN**

**January 5**

- ☐ You're halfway there!

### **WINTER (S) TECHNICAL ELECTIVE SUBSTITUTION, COURSE REQUEST FORM & THESIS DEADLINE**

**January 12**

- ☐ If you were interested in a winter thesis project, a winter technical elective substitution, or need a core course added or removed please make sure to submit your form to the MIE Undergraduate Office by this date.

# INDUSTRIAL ENGINEERING 4TH YEAR

## ENROLLMENT & REGISTRATION CHECKLIST

### COURSE ADD DEADLINE FOR WINTER (S) COURSES

January 19

- ☐ Once classes begin, if you still want to make changes to any winter (S) session courses you can do so up until this date.

### PER DEADLINE

January 31

- ☐ If you haven't submitted your PER hours yet, this day is the last day you can submit PER hours for June Convocation. For more information about PER hours, see page 27.

### EARLY MARCH

- ☐ Attend Iron Ring Ceremony



### COURSE DROP DEADLINE FOR WINTER (S) & FULL-YEAR (Y) COURSES

March

- ☐ This date is the deadline drop courses, switch to part-time studies, or withdraw from this session without academic penalty.

### NAME CHANGE DEADLINE

March 20

- ☐ Make sure to submit any name changes that are to appear on your degree to the Office of Convocation by this date

**SPRING 2015**

**JUNE CONVOCATION - CONGRATULATIONS!**

# ENROLLMENT & REGISTRATION QUICKLINKS

## COURSE FINDER

[coursefinder.utoronto.ca](http://coursefinder.utoronto.ca)

- » Allows you to sort courses by times they are available (e.g. Thursdays at 12pm)
- » Allows you to sort courses by faculty and by requirements (e.g. Faculty of Engineering, Engineering HSS/CS Requirement)
- » Contains timetable information, the current enrollment, and wait-list information

## DEGREE EXPLORER

[degreeexplorer.utoronto.ca](http://degreeexplorer.utoronto.ca)

- » Allows you to determine whether you are on track for graduation
- » Highlights which graduation requirements you are missing
- » Allows you to create and save course selection plans and determines whether your plan will fulfill graduation requirements

## ENGSOC TIMETABLE BUILDER

[schedule.skule.ca](http://schedule.skule.ca)

- » A more visual timetable builder
- » Allows you to exercise different lec/prs/tut section options for your electives to determine which will work best for your schedule

## ARTS & SCIENCE ANTI-CALENDAR

[assu.ca/anti-calendar](http://assu.ca/anti-calendar)

- » A collection of student evaluations of over 1700 courses and instructors in the Faculty of Arts & Science
- » Can help guide your Arts & Science elective selections



# ENROLLMENT & REGISTRATION QUICKLINKS

## MIE UNDERGRADUATE FORMS

[www.mie.utoronto.ca/undergrad/forms](http://www.mie.utoronto.ca/undergrad/forms)

- » **Course Request Form:** For adding/removing CORE curriculum courses  
  
All technical electives, HSS/CS electives, natural science electives, and stream courses you will be able to manage yourself on ROSI.
- » **Overload Request Form:** For requesting permission to overload
- » **EXT Request Form:** For indicating a course as EXT
- » **Technical Elective Substitution Form:** For requesting a course to be counted as a technical elective substitution in fourth year
- » **Practical Experience Form:** For adding any hours obtained for the Practical Experience Requirement (PEY students excepted)
- » **Thesis Enrollment Form:** Form required for enrolling in a MIE undergraduate half-year or full-year thesis

### WHAT FORM DO I USE IF I WANT A COURSE TO BE CONSIDERED FOR AN HSS/CS ELECTIVE THAT'S NOT ON THE APPROVED LISTS?

If an elective you are interested in taking is not on those lists and you feel it meets the criteria described on page 30, you may submit a proposal to the faculty to approve an HSS/CS course <http://uoft.me/proposecs>

It is good practice to select an approved HSS/CS elective as back-up, in the event your proposed course is not approved.

### I'M PLANNING TO OVERLOAD BUT I CAN'T ADD THE COURSE ON ROSI, WHAT DO I DO?

Complete an Overload Request Form and submit it to the MIE Undergraduate Office. If it's an MIE course, we can manually add you to the course provided that there is space after course selection dates. If it's not an MIE course (JRE300 for example) please contact the administering department of that course for help adding it to your timetable.

# ENGINEERING EMPLOYMENT RESOURCES

## JOB SEARCH SUPPORT

University of Toronto Engineering Career Centre  
[engineeringcareers.utoronto.ca](http://engineeringcareers.utoronto.ca)

University of Toronto Career Centre  
[www.careers.utoronto.ca](http://www.careers.utoronto.ca)

## WEBSITES

EngineeringJobs.com  
[www.engineerjobs.com/jobs/canada/ontario/toronto.php](http://www.engineerjobs.com/jobs/canada/ontario/toronto.php)

EngineeringCareers  
[www.engineeringcareers.ca/engineering-jobs/index.htm](http://www.engineeringcareers.ca/engineering-jobs/index.htm)

Careerbuilder  
[www.careerbuilder.ca/Jobs/Toronto/Keyword/Engineering](http://www.careerbuilder.ca/Jobs/Toronto/Keyword/Engineering)

UofT Career Centre Graduating Students Employment Service  
[www.careers.utoronto.ca/gradBeyond/gses.aspx](http://www.careers.utoronto.ca/gradBeyond/gses.aspx)

LinkedIn  
[www.linkedin.com/job/guest](http://www.linkedin.com/job/guest)

Talent Egg  
[talentegg.ca/career-guides/engineering](http://talentegg.ca/career-guides/engineering)

Internships for New Grads  
(monthly stipend of \$2,016.67 before required deductions)  
[www.careeredge.ca](http://www.careeredge.ca)

## RECRUITING AGENCIES FOR ENGINEERS

Randstad  
[www.randstad.ca/engineering](http://www.randstad.ca/engineering)

Hays  
[www.hays.ca/enhance-your-career](http://www.hays.ca/enhance-your-career)

# NOTES

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