COURSE AND OPTIONS SELCTION HANDBOOK

MECHANICAL ENGINEERING

3RD YEAR

Mechanical & Industrial Engineering
UNIVERSITY OF TORONTO

CONTENTS

WHAT IS COURSE AND OPTIONS SELECTION (COS)?

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 ACORN. 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 best interest to submit your selections.

We greatly appreciate your cooperation with this exercise.

It can be completed on Degree Explorer

ALL INFORMATION IN THIS HANDBOOK WAS MOST RECENTLY UPDATED IN JUNE 2022. COURSES, DEGREE REQUIREMENTS, AND DATES MAY CHANGE FROM YEAR TO YEAR. PLEASE REFER TO THE CURRENT YEAR'S ENGINEERING ACADEMIC CALENDAR.

IMPORTANT DATES

DATE	
EARLY FEBRUARY	**3RD YEAR MEC CURRICULUM TALK**
MID FEBRUARY – EARLY MARCH	**COURSE & OPTIONS SELECTION OPENS** Degreeexplorer.utoronto.ca Students may now login and make their curriculum selections for the upcoming academic year
MID JULY	**COURSE SELECTION (ROUND 1) OPENS *ACORN*** Students may now make changes to their timetable. Electives offered by the Faculty of Engineering and Enhanced Enrollment Arts & Science electives are now open for enrollment
MID AUGUST	**COURSE SELECTION (ROUND 2) OPENS *ACORN*** For courses offered by the Faculty of Arts & Science
LATE AUGUST	**LAST DAY TO PAY OR DEFER TUITION FEES**
EARLY SEPTEMBER	**ENGINEERING FALL (F) LECTURES BEGIN**
LATE SEPTEMBER	**FALL (F) & FULL-YEAR (Y) COURSE ADD DEADLINE** Last day to add or substitute Fall (F) or Full-Year (Y) Session courses
EARLY NOVEMBER	**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
EARLY JANUARY	**ENGINEERING WINTER (S) LECTURES BEGIN**
MID JANUARY	**WINTER (S) COURSE ADD DEADLINE** Last day to add or substitute Fall (S)
EARLY MARCH	**WINTER (S) & FULL YEAR (Y) COURSE DROP DEADLINE**

For a complete list of the Sessional Dates click here
For Fee and Refund Schedule information click here

CURRICULUM

FALL SESSION – YEAR 3

REQUIRED CORE COURSES	
MIE301H1	Kinematics and Dynamics of Machines
MIE312H1	Fluid Mechanics
MIE342H1	Circuits with Applications to Mechanical Systems
MIE258H1	Engineering Economics and Accounting
NATURAL SCIENCE ELECTIVE (CHOOSE ONE):	
CHE353H1	Engineering Biology
CIV220H1	Urban Engineering Ecology
CIV300H1	Terrestrial Energy Systems

For further information, visit the Engineering Academic Calendar

CAN I TAKE A NATURAL SCIENCE ELECTIVE OTHER THAN THOSE ON THIS LIST? Yes. The extended list of approved natural science electives is available here

CAN I TAKE MY NATURAL SCIENCE ELECTIVE IN THE WINTER OR SUMMER TERM? If the natural science elective you are interested in taking is only offered in the winter semester, you must first obtain formal approval from the MIE Undergraduate Office to overload. Many natural science electives on the extended list are also available in the summer.

CAN I CHANGE MY STREAMS IN FOURTH YEAR? No. In order to graduate, you must take a course following each of your stream selections in 3W. If you find another 4F stream course interesting, you may take it in place of a technical elective in addition to your two continued stream courses.

WINTER SESSION – YEAR 3

REQUIRED CORE COURSES	
MIE315H1	Design for the Environment
MIE313H1	Heat and Mass Transfer
MIE334H1	Numerical Methods I

STREAM OPTIONS (CHOOSE TWO):	
Manufacturing **MIE304H1**	Introduction to Quality Control
Mechatronics **MIE346H1**	Analog and Digital Electronics for Mechatronics
Solid Mechanics and Design **MIE320H1**	Mechanics of Solids II
Energy and Environment **MIE311H1**	Thermal Energy Conversion
Bioengineering ***(choose one)*** **BME331H1** **CHE354H1**	Physiological Control Systems Cellular and Molecular Biology

For further information visit the Engineering Academic Calendar

CAN I TAKE THREE STREAMS? It is strongly advised that mechanical engineering students do not overload in third year. Only under exceptional circumstances are overloads granted in third year. If you are interested in taking three streams, you must first obtain formal approval from the MIE Undergraduate Office to overload.

WHAT IF I WANT TO CHANGE MY STREAM CHOICES FROM WHAT I SELECTED ON COS? Please see the Important Dates for more details on opportunities to change your stream selections. Please try to make an informed decision for your COS selections to ensure you have a spot.

STREAMS & MINORS

MANUFACTURING STREAM

Manufacturing, the transformation of materials and information (technology) into useful products for human beings, is the cornerstone to many economic activities. It is a versatile skill, with employment opportunities existing over a wide range of Canadian industry, including automotive, microelectronics, aeronautics, pharmaceutical, etc. It is an exciting, creative field, where engineers get to design from cradle-to-grave. You must understand how an idea can be produced, and at what cost. This design may also include the manner the product should be disposed of or recycled. It is a truly international field, with demand around the world. Within Canada, average earnings of all employees in manufacturing are 22% higher than average earnings across all economic occupations in Canada.

STREAM COURSES

3W - MIE304H1S - INTRODUCTION TO QUALITY CONTROL

In manufacturing and service industries alike, quality is viewed as an important strategic tool for increasing competitiveness. Continuous quality improvement is a key factor leading to a company's success. With more emphasis on quality, the cost and the product cycle time are reduced and the communication between producer and customer is improved.

TOPICS: Introduction to quality engineering. Quality standards and certification. TQM. Modeling processes with simulation. Making inferences about product quality from real or simulation output data. Introduction to statistical process control. Control charts for variables and attributes. Process capability analysis. Lot Acceptance Sampling.

4F - MIE422H1S - AUTOMATED MANUFACTURING

Introduction to Computer Integrated Manufacturing. Definitions, terminology. Organization of manufacturing systems. Introduction to NC machines. Introduction to robotics. Types of robot motion. Robot kinematics. Jacobians, singularities. Robot motion trajectories. Interpolation, spline fits. Robot joint control. Flexible manufacturing systems, justification. Robot cell design. Group technology. Design of group technology cell. Programmable logic controllers. TOPICS: Introduction to Computer Integrated Manufacturing, Introduction to robotics and kinematics, CNC Basics, CNC Programming, Programmable Logic Controllers (PLCs) FMS, Table-top manufacturing, Group technology

SUGGESTED TECHNICAL ELECTIVES (4TH YEAR ONLY)

MIE440H1	Design of Innovative Products
MSE401H1	Materials Selection in Design II
FOR424H1	Innovation and Manufacturing of Sustainable Materials
MIE469H1	Reliability and Maintainability Engineering
MIE506H1	MEMS Design and Microfabrication
MIE519H1	Advanced Manufacturing Technologies
MSE443H1	Polymers and Composite Engineering

FIELDS OF APPLICATION

Automation, Manufacturing Management, Fundamental Technology, Process Design, Machine Programming

LINKS

Canadian Society of Manufacturing Engineers www.sme.org/smecanada

MANUFACTURING MINOR

SAMPLE COURSE SELECTION FOR MINOR (3RD YEAR)

FALL SESSION

REQUIRED CORE COURSES	
MIE301H1	Kinematics and Dynamics of Machines
MIE312H1	Fluid Mechanics
MIE342H1	Circuits with Applications to Mechanical Systems
MIE258H1	Engineering Economics and Accounting

NATURAL SCIENCE ELECTIVE (CHOOSE ONE):	
CHE353H1	Engineering Biology
CIV220H1	Urban Engineering Ecology
CIV300H1	Terrestrial Energy Systems

WINTER SESSION

REQUIRED CORE COURSES	
MIE315H1	Design for the Environment
MIE313H1	Heat and Mass Transfer
MIE334H1	Numerical Methods I
STREAM OPTIONS (CHOOSE TWO):	
Manufacturing **MIE304H1**	Introduction to Quality Control
Mechatronics **MIE346H1**	Analog and Digital Electronics for Mechatronics
Solid Mechanics and Design **MIE320H1**	Mechanics of Solids II
Energy and Environment **MIE311H1**	Thermal Energy Conversion
Bioengineering ***(choose one)*** **BME331H1** **CHE354H1**	Physiological Control Systems Cellular and Molecular Biology

***Note: If you are pursuing any minor please refer to the Academic Calendar for more information on taking the required courses to achieve that minor. This may require overloading. Taking a stream does not mean you will get a minor in that area.**

SAMPLE COURSE SELECTION FOR MINOR (4TH YEAR)

FALL SESSION

REQUIRED CORE COURSES	
MIE490Y1	Capstone Design
STREAM OPTIONS (CHOOSE TWO):	
Manufacturing **MIE422H1**	Automated Manufacturing

Solid Mechanics and Design **MIE442H1**	Machine Design
TECHNICAL ELECTIVES (CHOOSE ONE):	
MSE401H1	Materials Selection in Design
COMPLEMENTARY STUDIES OR HUMANITIES AND SOCIAL SCIENCES ELECTIVE	
CS/HSS ELECTIVE	

WINTER SESSION

REQUIRED CORE COURSES	
MIE490Y1	Capstone Design
TECHNICAL ELECTIVES (CHOOSE THREE):	
MIE519H1	*Advanced Manufacturing Technologies
MIE542H1	Human Factors Integration
FOR424H1	Innovation and Manufacturing of Sustainable Materials
COMPLEMENTARY STUDIES OR HUMANITIES AND SOCIAL SCIENCES ELECTIVE	
CS/HSS ELECTIVE	

RED COURSES WILL COUNT TOWARDS YOUR MINOR This is assuming you allocate the second year Manufacturing (MIE221) course to the minor.

MECHATRONICS STREAM

Ten years ago it was comparably easy to explain the functions of a camera to a young engineer, even though the mechanisms were complex. Today, it is nearly impossible since the design of a camera not only involves mechanics and optics, but also electronics and software. The design of such products and processes requires a synergetic combination of mechanical and electrical engineering and computer science.

As with our mechanical engineering program, mechatronics at U of T emphasizes design. You will learn the skills needed to design and build mechatronic systems and that includes mechanical design (mechanical, hydraulic, pneumatic, thermal), electronic design, programming skills and their integration into functional systems.

As Canada's largest and oldest mechatronics program, you will have access to well-established labs where you put theory into action as well as cutting edge technology provided by our outstanding professors, support engineers and graduate students. Remember, U of T is Canada's best research university! You benefit from our established mechatronics graduate studies. As part of the 4th year Mechatronics Principles course (MIE 444F), students are divided into small groups and asked to develop an autonomous vehicle that will navigate through a maze. The class is concluded with a competition.

STREAM COURSES

3W - MIE346H1S - ANALOG AND DIGITAL ELECTRONICS FOR MECHATRONICS

A study of the fundamental behaviour of the major semiconductor devices (diodes, bipolar junction transistors and field effect transistors). Development of analysis and design methods for basic analog and digital electronic circuits and devices using analytical, computer and laboratory tools.

TOPICS: Laplace Transform for Circuit Analysis, Operational Amplifiers, Filters and Tuned Amplifiers, Diodes, Signal Generators and Waveform-Shaping Circuits, MOSFETs, BJTs, OpAmps and Data Converters, Digital Logic Circuits. Lab topics include Voltage Controlled Oscillator, Diode Circuits, Transistors and Relays, Analog Pulse Width Modulations Motor Driver, Digital Logic and Stepper Motor Driver.

4F - MIE404H1F - CONTROL SYSTEMS I

Analysis of stability, transient and steady state characteristics of dynamic systems. Characteristics of linear feedback systems. Design of control laws using the root locus method, frequency response methods and state space methods. Digital control systems. Application examples.

TOPICS: MATLAB & Simulink, Feedback control and PID, Root Locus Design, Frequency Response Analysis, Magnetic Levitation

SUGGESTED TECHNICAL ELECTIVES (4TH YEAR ONLY)

AER307H1	Aerodynamics
AER525H1	Robotics
MIE444H1	Mechatronics Principles
MIE438H1	Microprocessors and Embedded Microcontrollers
MIE443H1	Mechatronics Systems: Design and Integration
MIE505H1	Micro/Nano Robotics

FIELDS OF APPLICATION

Robotics, Sensing and Control Systems, Medical imaging, Computer aided and integrated manufacturing systems, Microcontrollers/PLCs, Mobile Apps

LINKS

Institute for Robotics and Mechatronics irm.utoronto.ca

ROBOTICS AND MECHATRONICS MINOR

SAMPLE COURSE SELECTION FOR MINOR (3RD YEAR)

FALL SESSION

REQUIRED CORE COURSES	
MIE301H1	Kinematics and Dynamics of Machines
MIE312H1	Fluid Mechanics
MIE342H1	Circuits with Applications to Mechanical Systems
MIE258H1	Engineering Economics and Accounting
NATURAL SCIENCE ELECTIVE (CHOOSE ONE):	
CHE353H1	Engineering Biology
CIV220H1	Urban Engineering Ecology
CIV300H1	Terrestrial Energy Systems

WINTER SESSION

REQUIRED CORE COURSES	
MIE315H1	Design for the Environment
MIE313H1	Heat and Mass Transfer
MIE334H1	Numerical Methods I
STREAM OPTIONS (CHOOSE TWO):	
Manufacturing **MIE304H1**	Introduction to Quality Control
Mechatronics **MIE346H1**	Analog and Digital Electronics for Mechatronics

*Note: If you are pursuing any minor please refer to the Academic Calendar for more information on taking the required courses to achieve that minor. This may

require overloading. Taking a stream does not mean you will get a minor in that area.

SAMPLE COURSE SELECTION FOR MINOR (4TH YEAR)

FALL SESSION

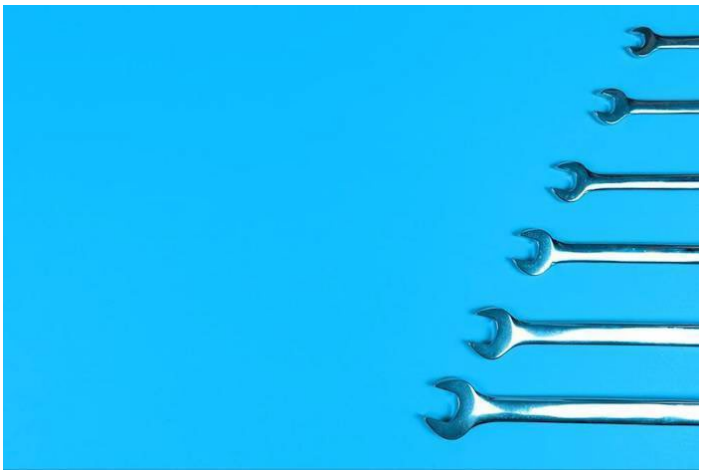
REQUIRED CORE COURSES	
MIE490Y1	Capstone Design
STREAM OPTIONS (CHOOSE TWO):	
Manufacturing **MIE422H1**	Automated Manufacturing
Mechatronics **MIE404H1**	Control Systems I
TECHNICAL ELECTIVES (CHOOSE ONE):	
MSE401H1	Materials Selection in Design
COMPLEMENTARY STUDIES OR HUMANITIES AND SOCIAL SCIENCES ELECTIVE	
CS/HSS ELECTIVE	

WINTER SESSION

REQUIRED CORE COURSES	
MIE490Y1	Capstone Design
TECHNICAL ELECTIVES (CHOOSE THREE):	
MIE443H1	Mechatronics Systems: Design and Integration
MIE438H1	Microprocessors and Embedded Microcontrollers
COMPLEMENTARY STUDIES OR HUMANITIES AND SOCIAL SCIENCES ELECTIVE	
CS/HSS ELECTIVE	

RED COURSES WILL COUNT TOWARDS YOUR MINOR This is assuming you allocate the second year Mechanical Engineering Design (MIE243) course to the minor

SOLID MECHANICS & DESIGN STREAM



Solid mechanics is the analysis of stress, strain and deflection. It is one of the core technical areas of mechanical engineering. Applications of solid mechanics are common in: the design of virtually every product; creating manufacturing processes and equipment; biomechanics as related to medicine and dentistry; many fields of graduate research.

STREAM COURSES

Evaluations & Textbook information accurate as of 2017/2018. Please note that this information is subject to change and should be used as a general guide ONLY

3W - MIE320H1S - MECHANICS OF SOLIDS II

Three-dimensional stress transformation, strain energy, energy methods, finite element method, asymmetric and curved beams, superposition of beam solutions, beams on elastic foundations, buckling, fracture mechanics, yield criteria, stress concentration, plane stress and strain. Finite Element Method.

4F - MIE442H1F - MACHINE DESIGN

Introduction to the fundamental elements of mechanical design including the selection of engineering materials, load determination and failure analysis under static, impact, vibration and cyclic loads. Surface failure and fatigue under contact loads, lubrication and wear. Consideration is given to the characteristics and selection of machine elements such as bearings, shafts, power screws and couplings. In place of your project, you may choose to take two machine shop courses at George Brown College. The courses are Basic Machine Operation plus one of the two advanced courses: Advanced Machining or Basic Welding Operations.

SUGGESTED TECHNICAL ELECTIVES (4TH YEAR ONLY)

MIE440H1	Design of Innovative Products
MSE401H1	Materials Selection in Design II
MIE402H1	Vibrations
MIE408H1	Thermal and Machine Design of Nuclear Power Reactors
MIE550H1	Advanced Momentum, Heat and Mass Transfer
CHE475H1	Biocomposites: Mechanics and Bioinspiration
MIE439H1	Biomechanics I
MIE441H1	Design Optimization
MIE469H1	Reliability and Maintainability Engineering
MIE506H1	MEMS Design and Microfabrication
MIE540H1	Product Design
MSE442H1	Surgical and Dental Implant Design

FIELDS OF APPLICATION

Geomechanics (Modeling the shape of planets, tectonics, and earthquake prediction), Infrastruction (Designing foundations or structures), Mechanical Design (Desiging load bearing components for vehicles, powertrain design), Manufacturing (Metal and polymer forming processes, machining), Biomedical (Implant design, bone mechanics, modeling stress phenomena controlling cellular and molecular processes), Materials Science (Composite design, allow microstructions, material processing design), Microelectronics (Failure resistant packaging)

LINKS

The Canadian Society for Mechanical Engineering www.csme-scgm.ca The Society of Automotive Engineers www.sae.org

ENERGY AND ENVIRONMENT STREAM

The energy industry is one of the biggest in Canada, dominated by oil and gas, nuclear power and electricity. Environmental engineers play a pivotal role in improving polluted environments, designing facilities that directly affect our modern economy, public health and safety, and designing environmentally-responsible products and processes. Their knowledge of physics, chemistry, and biological processes allows them to address problems such as protecting air, water and land

quality; providing safe drinking water; treating and disposing of industrial wastes; preventing environmental problems by designing “cleaner” manufacturing processes; and developing alternative energy sources. Mechanical engineers in this field have a strong foundation in thermal dynamics and fluid mechanics. Engineers with a firm knowledge of environmental processes and solutions are widely sought after by employers in both industry and government.

STREAM COURSES

3W - MIE411H1F - THERMAL ENERGY CONVERSION

Engineering applications of thermodynamics in the analysis and design of heat engines and other thermal energy conversion processes within an environmental framework. Steam power plants, gas cycles in internal combustion engines, gas turbines and jet engines. Refrigeration, psychrometry and air conditioning. Fossil fuel combustion and advanced systems includes fuel cells.

TOPICS: Vapor Power Cycles, Gas Power Cycles, Refrigeration and Heat pumps, Psychrometry and ideal Gas Mixture, Efficient Energy Utilization

4F - MIE515 - ALTERNATIVE ENERGY SYSTEMS

This course covers the basic principles, current technologies and applications of selected alternative energy systems. Specific topics include solar thermal systems, solar photovoltaic systems, wind, wave, and tidal energy, energy storage, and grid connections issues.

SUGGESTED TECHNICAL ELECTIVES (4TH YEAR ONLY)

MIE407H1	Nuclear Reactor Theory and Design
MIE516H1	Combustion and Fuels
CIV440H1	Environmental Impact and Risk Assessment
FOR424H1	Innovation and Manufacturing of Sustainable Materials
MIE408H1	Thermal and Machine Design of Nuclear Power Reactors
MIE507H1	Heating, Ventilating, Air Conditioning (HVAC) Fundamentals
MIE517H1	Fuel Cell Systems

FIELDS OF APPLICATION

Power generation, Automotive (engine design, intake, exhaust, and cooling system design), Aerodynamics (Wind power systems, car body design), Fluid pumping systems (Oil and gas pipelines), Manufacturing (Die-casting, metal processing), Electronics (electronics cooling, ink-jet printing), MEMS systems (microfluidics), Environmental assessment (pollution control).

LINKS

Association of Energy Engineers www.aeecenter.org
Institute for Sustainable Energy energy.utoronto.ca

BIOENGINEERING STREAM

Biomedical engineers design and develop products for the most complex system on earth – the human body. Artificial organs, medical imaging devices, drug delivery systems are innovative and lifesaving solutions that arise from applying engineering principles to medical problems. Biomedical engineering jobs are expected to increase by 31.4% over the next seven years, more than double the average predicted rate in other fields.

STREAM COURSES

Students may choose to take either BME331 OR CHE354 for their 3W stream Course.

3W - MIE331H1S - PHYSIOLOGICAL CONTROL SYSTEMS

The purpose of this course is to provide undergraduate engineering students with an

introduction to physiological concepts and selected physiological control systems present in the human body. Due to the scope and complexity of this field, this course will not cover all physiological control systems but rather a selected few. This course will combine linear control theory, physiology, and neuroscience with the objective of explaining how these complex systems operate in a healthy human body.

TOPICS: Homeostasis, modeling physical systems (Laplace transform), transfer functions & block diagrams, endocrine system, cardiovascular system, system response in time and frequency domains, stability analysis, nervous system, design of PID controllers, controllability and observability, system identification.

3W - CHE354H1S- CELL & MOLECULAR BIOLOGY

Prerequisite: CHE353H1F. To introduce students to concepts and techniques relevant to bioengineering research, including cell cultivation, molecular biology, protein biochemistry, and genetic engineering. In addition to opportunities for hands-on learning and application of bioengineering techniques and instrumentation, this course will explain fundamental aspects of biomolecular chemistry that govern bioengineering practice.

4F - MIE520H1F - BIOTRANSPORT PHENOMENA

Application of conservation relations and momentum balances, dimensional analysis and scaling, mass transfer, heat transfer, and fluid flow to biological systems, including: transport in the circulation, transport in porous media and tissues, transvascular transport, transport of gases between blood and tissues, and transport in organs and organisms.

TOPICS: Control Volume Approach (Reynold's Transport Theorem - mass and momentum), Differential Approach (Fluid Statics, Rheology, NavierStokes, Euler, Bernoulli), Dimenional Analusis, Real Flows, Mass Transfer, Heat Transfer

SUGGESTED TECHNICAL ELECTIVES (4TH YEAR ONLY)

MIE414H1	Applied Fluid Mechanics
MIE508H1	Fluids of Biological Systems
BME520H1	Imaging Case Studies in Clinical Engineering
BME595H1	Medical Imaging
CHE475H1	Biocomposites: Mechanics and Bioinspiration
MIE533H1	Non-destructive Evaluation
MIE439H1	Biomechanics I
MIE504H1	Applied Computational Fluid Dynamics
MSE440H1	Biomaterials Processing and Properties

MIE448H1	Engineering Psychology and Human Performance

FIELDS OF APPLICATION

Bioinformatics (software for bio modelling), Biotechnology (products related to agriculture & environment), Instrumentation and Diagnostics (tools for research, hospital diagnostic equipment), Medical Devices (prosthetics, pace makers), Therapeutics (Pharmaceuticals), Biomedical Suppliers (development of lab and medical equipment)

LINKS

Institute of Biomaterials and Biomedical Engineering (IBBME) ibbme.utoronto.ca
Club for Undergraduate Biomedical Engineering (CUBE) cube.skule.ca

BIOENGINEERING MINOR

SAMPLE COURSE SELECTION FOR MINOR (3RD YEAR)

FALL SESSION

REQUIRED CORE COURSES	
MIE301H1	Kinematics and Dynamics of Machines
MIE312H1	Fluid Mechanics
MIE342H1	Circuits with Applications to Mechanical Systems
MIE258H1	Engineering Economics and Accounting
NATURAL SCIENCE ELECTIVE (CHOOSE ONE):	
CHE353H1	Engineering Biology
CIV220H1	Urban Engineering Ecology
CIV300H1	Terrestrial Energy Systems

WINTER SESSION

REQUIRED CORE COURSES	
MIE315H1	Design for the Environment
MIE313H1	Heat and Mass Transfer
MIE334H1	Numerical Methods I
STREAM OPTIONS (CHOOSE TWO):	

Bioengineering **CHE354H1**	Cellular and Molecular Biology
Solid Mechanics and Design **MIE320H1**	Mechanics of Solids II

*Note: If you are pursuing any minor please refer to the Academic Calendar for more information on taking the required courses to achieve that minor. This may require overloading.

Taking a stream does not mean you will get a minor in that area.

SAMPLE COURSE SELECTION FOR MINOR (4TH YEAR)

FALL SESSION

REQUIRED CORE COURSES	
MIE490Y1	Capstone Design
STREAM OPTIONS (CHOOSE TWO):	
Bioengineering **MIE520H1**	Biotransport Phenomena
Solid Mechanics and Design **MIE442H1**	Machine Design
TECHNICAL ELECTIVES (CHOOSE ONE):	
MIE343H1	Industrial Ergonomics and the Workplace
COMPLEMENTARY STUDIES OR HUMANITIES AND SOCIAL SCIENCES ELECTIVE	
CS/HSS ELECTIVE	

WINTER SESSION

REQUIRED CORE COURSES	
MIE490Y1	Capstone Design
TECHNICAL ELECTIVES (CHOOSE THREE):	
MIE439H1	Biomechanics I
FOR424H1	Innovation and Manufacturing of Sustainable Material
MIE441H1	Design Optimization
COMPLEMENTARY STUDIES OR HUMANITIES AND SOCIAL SCIENCES ELECTIVE	
CS/HSS ELECTIVE	

RED COURSES WILL COUNT TOWARDS YOUR MINOR

DEGREE REQUIREMENTS

For official and up-to-date information on the Mechanical Engineering Degree Requirements visit the Engineering Academic Calendar

DEGREE EXPLORER

Degree Explorer is a planning tool designed to help students and advisors evaluate academic progress towards completion of requirements for graduation. It is not a transcript. It 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 ACORN does not mean it will fulfill your degree requirements.

TO GRADUATE, YOU NEED

- All Core and Stream Courses
- 2.0 CS Credits (1.0 or more must be HSS)
- 2.0 Technical Elective Credits
- 0.5 Natural Science Credits
- 600 hours of professional experience, or PEY credit
- At least one design course

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

WHAT IS A CS ELECTIVE? 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 requirement. Additionally, the Rotman School of Management does not typically permit students outside of their faculty to take their courses (i.e. RSM courses).

WHAT IS AN HSS ELECTIVE? Humanities and Social Sciences (HSS) courses explore the central issues, thought processes and scholarly methods found in these disciplines. Please note HSS electives are a subset of Complementary Studies (CS) courses; they can be used to satisfy CS elective requirements.

To graduate, you must take 2.0 credits in complementary studies, of which at least 1.0 credits are HSS courses. 0.5 credits = 1 half year course. These are typically

taken in second and fourth year, or in the summer (have to pay extra tuition). Students must complete 4 CS/HSS electives, including 2 mandatory HSS. For a list of faculty approved elective lists, please consult the following links. You can also request other A&S courses to act as a substitute:

For approved HSS electives click here

For approved CS electives click here

TECHNICAL ELECTIVES

- One in each semester in 4th year, three in second semester in 4th year
- Select from list of approved electives
- Can apply for another course to substitute for a Technical Elective
- Can substitute at most two technical electives

PRACTICAL EXPERIENCE REQUIREMENT (PER)

- Minimum of 600 hours to graduate
- Work should support professional career of student
- Must contain a good measure of responsibility
- Form must be filled out and submitted to MIE Undergrad Office
- If you do PEY, you do not need to submit PER form

NATURAL SCIENCE ELECTIVES

The curriculum has 3 pre-approved Natural Science electives which are: CHE353, CIV220, and CIV300. There is also an extended list of approved natural science electives here

To view a complete list of the MIE UG Forms click here

ENGINEERING MINORS & CERTIFICATES

CONTACT INFORMATION

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. A certificate requires three (3) courses. There are many minors and certificates and enrolling for a minor puts it on your Degree Explorer, which can help you plan. You can de-enrol at any point.

Minors and Certificates are managed by the Cross-Disciplinary Programs (CDP) Office and all inquiries associated with the minors should be addressed to **engineering.minors@utoronto.ca**. For further information on the types of minors available etc. click here

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 note that enrolling in a minor does not guarantee you a spot in any of the engineering minor electives, as they are open to everyone. To avoid disappointment, plan ahead and select courses 6 AM on course selection days. You are responsible for making sure you fulfill the requirements.

I DIDN'T GET INTO THE COURSES I WANTED TO, AND I'M WORRIED I WONT 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.

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 its required courses.

I'M NOT SURE WHICH ELECTIVES TO TAKE.

The Arts & Science Student's Union puts together a publication called the Anti-Calendar, which provides honest student feedback about many Arts & Science elective courses offered. http://assu.ca/anti-calendar.

ENROLLMENT & REGISTRATION

OVERLOADS

• To take more than 5 courses in a semester, must receive approval from undergrad office
• Need to have a 2.7 CGPA

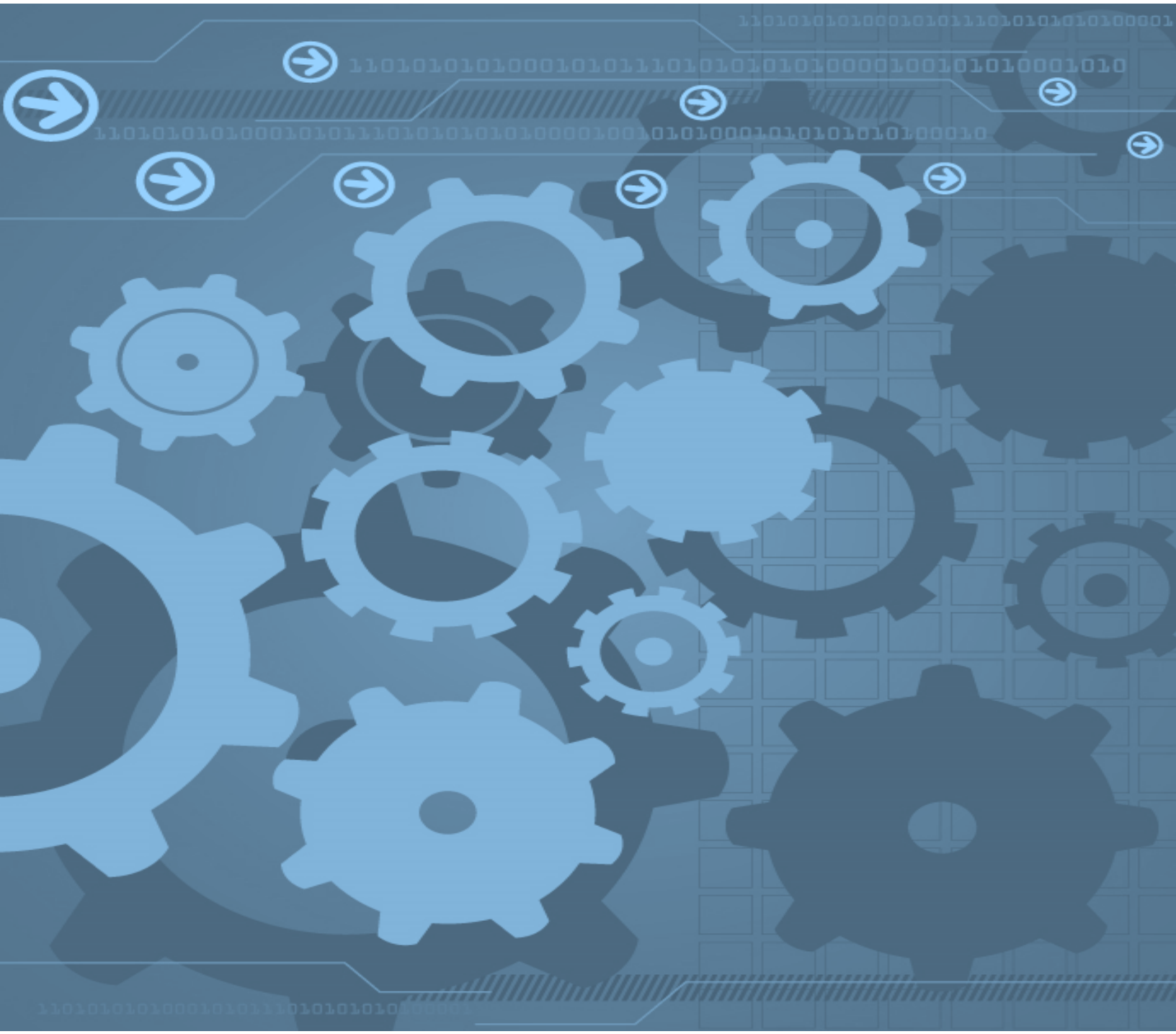
"EXT" OR EXTRA COURSES

• If taking a course not needed for your degree, you can apply to designate it as EXT.
• All courses that are above and beyond a students' degree requirements MUST be marked as Extra
• Mark will not count towards your GPA, but till shows up on transcript
• Credit can be used for minors/certificates
• Deadline to designate EXT is the same as drop deadline

FAILED COURSES

If you have failed a core curriculum course, you must re-take it at the next available opportunity. Many first year engineering courses are offered during the summer. If you were unsuccessful in a second or third year course that is a pre-requisite for an upper level course, you must retake the pre-requisite course first. To add a core curriculum course, submit the Course Request Form (https://www.mie.utoronto.ca/programs/ undergraduate/forms-policies/) to the Undergraduate Office by one week before the add course deadline. To add a failed stream course or CS/HSS elective, you may do so yourself on the course selection dates.

To view a complete list of the MIE UG Forms click here



MIE UG OFFICE CONTACT INFORMATION

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