MASTER OF ENGINEERING
Industrial Engineering Program

Note*: On-line registration is available to **CURRENT** M.Eng. students only. **NEW students are NOT permitted to register on-line for their first semester**. For Program Requirements, see Section 2 and 3 below.*

1.ADVISING INFORMATION FOR ON-LINE REGISTRATION

- Go to MyConcordia Portal and make a link to Registration. Follow the instructions.
- Link to School of Graduate Studies On-Line Registration Advising.

M.Eng. Students Registering On-Line are allowed to:

- Register for courses in Mechanical and Industrial Engineering ONLY.
- New students can register for a Maximum of 2 courses (8 credits) in the first semester.
- Current students can register for a Maximum of 3 courses (12 credits).

M.Eng. Students Registering On-Line are NOT allowed to:

- Register a course for Audit.

Prior Departmental Permission is required for: (Go to EV04.150)

- All NEW M.Eng. students in the first semester.
- Registering for Qualifying Program courses (example: English courses, Undergraduate courses) before being permitted to register for Engineering courses.
- Registering for Courses Outside of the Department (example: ELEC, INSE).
- Registering for courses without the listed pre-requisites.
- Registering for the M.Eng. Projects – ENGR 6971, ENGR 6981, ENGR 6991.
- Registering for ENGR 7011, Graduate Seminar in Mechanical & Industrial Engineering (1 credit course).
- Registering for ENCS 6931, Industrial Training (9 Credit Elective Option).

You will be BLOCKED from registering if you have:

- An **Academic Block** – GPA is below 3.00, F grade on record, more than one C grade on record. Permission to Register is required, Go to EV04.150.
- An **Accounts Block** – outstanding balance of fees due. Go to Birk's Student Service Centre, LB-185.
- A **CAQ Block** – expired Study Permit. Go to the International Students Office, H-653.

Contact: Charlene Wald, Graduate Program Coordinator, Room EV04.150, Tel: 514-848-2424 Ext. 3131 (cwald@encs.concordia.ca)

2. PROGRAM REQUIREMENTS

Students must complete 45 credits distributed as follows:

Specialization Courses: A minimum of nine courses (36 credits) chosen as follows:

1. **Core Courses:** The following 3 INDU courses (12 credits) in Topic Area E12 must be completed:

    INDU 6111 - Theory of Operations Research,
    INDU 6211 – Production Systems and Inventory Control
    INDU 6311 – Discrete Systems Simulation

2. **Area Electives:** A minimum of 4 courses (16 credits) must be completed from the courses listed below:

    INDU courses in Topic area E12 excluding the core courses.
    ENCS 6191 – Fuzzy Sets and Fuzzy Logic
    MECH 6421 – Metal Machining and Surface Technology
    MECH 6611 – Numerically Controlled Machines
    MECH 6631 – Industrial Automation
    MECH 6941 – Concurrent Engineering in Aerospace Systems

3. **Department Electives:**

    Up to 2 courses (8 credits) can be chosen from Topic Areas E01, E03, E04, E05, E06, E10, E11, E12, E51, E52, E53, E54, E56, E57, MECH courses in E02, E63
    (ENCS 6931,ENGR 6971, ENGR 6981 and ENGR 6991 permission from department)

General Electives:
Up to 9 credits may be chosen from courses listed under the Topic Area E72. The student must obtain permission of the Department.

The remaining credits may be chosen from:
1. Graduate Seminar in Mechanical and Industrial Engineering ENGR 7011 (1 credit).
2. Courses chosen from other Topic Areas in the Engineering Course section (with permission of Department

Project Courses:
Project courses (ENGR 6971, ENGR 6981, ENGR 6991) can be taken with permission of the Department.

Students may apply for the **Industrial Experience Program** (ENCS 6931 - 9 credits) with permission of the Department. For information on the Industrial Experience Program, go to the program website:

3. TOPIC AREAS IN MECHANICAL & INDUSTRIAL ENGINERING

Link to Engineering Courses section of the Graduate Calendar.

Note: Courses marked with (*****) cannot be taken for credit by students who have completed the undergraduate equivalent at Concordia University.

E01 - MATHEMATICAL METHODS
ENCS 6021 Engineering Analysis
ENCS 6111 Numerical Methods
ENCS 6141 Probabalistic Methods in Design
ENCS 6161 Probability and Stochastic Processes
ENCS 6181 Optimization Techniques (*)
ENCS 6191 Fuzzy Sets and Fuzzy Logic

E02 – DEVELOPMENTS IN ENGINEERING
INDU 691 Topics in Mechanical Engineering I
MECH 791 Topics in Mechanical Engineering II

E03 - SYSTEMS AND CONTROL
ENGR 6071 Switched and Hybrid Control Systems (PreReq: ENGR 6131 or equivalent)
ENGR 6131 Linear Systems (*)
ENGR 6141 Nonlinear Systems (PreReq: ELEC 6831)
ENGR 7121 Analysis and Design of Linear Multivariable Systems (PreReq: ENGR 6121)
ENGR 7131 Adaptive Control (PreReq: ELEC 6061; ENGR 6131)
ENGR 7181 Digital Control of Dynamic Systems (PreReq: ELEC 6061; ENGR 6131)
MECH 6681 Dynamics and Control of Nonholonomic Systems

E04 - FLUID MECHANICS
ENGR 6201 Fluid Mechanics
ENGR 6221 Microfluidic Systems (PreReq: ENGR 6201)
ENGR 6241 Hydrodynamics (PreReq: ENGR 6201)
ENGR 6251 The Finite Difference Method in Computational Fluid Dynamics (PreReq: ENGR 6201)
ENGR 6261 The Finite Element Method in Computational Fluid Dynamics (PreReq: ENGR 6201)
ENGR 6281 Modeling Turbulent Flows
ENGR 6291 Rheology

E05 - DYNAMICS AND VIBRATIONS OF MECHANICAL AND BIOMECHANICAL SYSTEMS
ENGR 6191 Introduction to Biomedical Engineering
ENGR 6301 Advanced Dynamics
ENGR 6311 Vibrations in Machines and Structures (*)
MECH 6301 Vibration Problems in Rotating Machinery (PreReq: ENGR 6311)
MECH 6311 Noise and Vibration Control (PreReq: ENGR 6311)
MECH 6321 Optimum Design of Mechanical Systems
MECH 6351 Modal Analysis of Mechanical Systems (PreReq: ENGR 6311)
MECH 6361 Mechanics of Biological Tissues
ENGR 7331 Random Vibrations (PreReq: ENGR 6311)

E06 - STRUCTURAL MECHANICS

ENGR 6501 Applied Elasticity
ENGR 6511 Matrix Analysis of Structures (*)
ENGR 6531 The Finite Element Method in Structural Mechanics (PreReq: ENGR 6511)
ENGR 6541 Structural Dynamics (PreReq: ENGR 6511)
ENGR 6551 Theory of Elastic and Inelastic Stability
ENGR 6561 Theory of Plates and Shells
ENGR 6571 Energy Methods in Structural Mechanics (PreReq: ENGR 6511)
ENGR 6581 Introduction to Structural Dynamics (*)
ENGR 7521 Advanced Matrix Analysis of Structures (PreReq: ENGR 6511)

E10 - ROBOTICS
ENGR 6411 Robotic Manipulators I: Mechanics (*)
ENGR 7401 Robotic Manipulators II: Control (PreReq: ENGR 6411)

E11 - AERONAUTICS AND ASTRONAUTICS
ENGR 6421 Standards, Regulations and Certification
ENGR 6441 Materials Engineering for Aerospace
ENGR 6461 Avionic Navigation Systems
ENGR 6471 Integration of Avionics Systems (*) (PreReq: ENGR 6461)
ENGR 6951 Seminar on Space Studies
ENGR 7201 Micro-gravity Fluid Dynamics (PreReq: ENGR 6201)
ENGR 7461 Avionic Systems Design (PreReq: ENGR 6461)
ENGR 7961 Industrial "Stage" and Training
MECH 6091 Flight Control Systems (PreReq: ENGR 6101 or equivalent)
MECH 6111 Gas Dynamics (*)
MECH 6121 Aerodynamics (*) (PreReq: ENGR 6201)
MECH 6161 Gas Turbine Design (*) (PreReq: MECH 6171)
MECH 6171 Turbomachinery and Propulsion (*) (PreReq: ENGR 6201)
MECH 6231 Helicopter Flight Dynamics (PreReq: ENGR 6311 and MECH 6121, previously or concurrently)
MECH 6241 Operational Performance of Aircraft (PreReq: MECH 6121)
MECH 6251 Space Flight Mechanics and Propulsion Systems (PreReq: MECH 6111 or permission of the instructor
MECH 6471 Aircraft Structures (PreReq: MECH 6441 or equivalent)
MECH 6941 Concurrent Engineering in Aerospace Systems

E12 - INDUSTRIAL ENGINEERING
INDU 6111 Theory of Operations Research
INDU 6121 Advanced Operations Research (*)
INDU 6131 Graph Theory with System Applications
INDU 6211 Production Systems and Inventory Control
INDU 6221 Lean Enterprise
INDU 6231 Scheduling Theory
INDU 6241 Lean Manufacturing
INDU 6311 Discreet System Simulation
INDU 6331 Advanced Quality Control
INDU 6341 Advanced Concepts in Quality Improvement (*)
INDU 6351 System Reliability
INDU 6411 Human Factors Engineering (*)
INDU 6421 Occupational Safety Engineering (*)

E51 - INDUSTRIAL CONTROL AND AUTOMATION

MECH 6011 Analysis and Design of Pneumatic Systems
MECH 6021 Design of Industrial Control Systems (*) (PreReq: ENGR 6101 or equivalent)
MECH 6041 Virtual Systems Engineering (PreReq: Permission of the instructor)
MECH 6051 Process Dynamics and Control (*)
MECH 6061 Analysis and Design of Hydraulic Control Systems (*)
MECH 6081 Fuel Control Systems for Combustion Engines (PreReq: ENGR 6201)
MECH 6611 Numerically Controlled Machines (PreReq: MECH 6451 or equivalent)
MECH 6621 Microprocessors and Applications (*) (PreReq: A course in industrial electronics or permission of the instructor)
MECH 6631 Industrial Automation
MECH 7011 Dynamics of Hydraulics Control Systems (PreReq: MECH 6021, MECH 6061)

E52 - THERMODYNAMICS AND HEAT TRANSFER

MECH 6101 Kinetic Theory of Gases
MECH 6131 Conduction and Radiation Heat Transfer
MECH 6141 Heat Exchanger Design
MECH 6181 Heating, Air Conditioning and Ventilation (*)
MECH 6191 Combustion (PreReq: MECH 6111)
MECH 7101 Convection Heat Transfer (PreReq: ENGR 6201)

E53 - MACHINE DESIGN AND PRODUCTION

ENGR 6161 Sensors and Actuators
ENGR 6371 Micromechatronic Systems and Applications
MECH 6421 Metal Machining and Surface Technology
MECH 6431 Introduction to Tribology (Wear, Friction and Lubrication)
MECH 6441 Stress Analysis in Mechanical Design
MECH 6451 Computer-Aided Mechanical Design
MECH 6481 Aeroelasticity
MECH 6491 Engineering Metrology and Measurement Systems
MECH 6641 Engineering Fracture Mechanics and Fatigue
MECH 6671 Finite Element Method in Machine Design (PreReq: MECH 6441)
MECH 6691 Optical Microsystems

E54 - MATERIALS ENGINEERING AND PROCESSING

MECH 6511 Mechanical Forming of Metals (*)
MECH 6531 Casting
MECH 6541 Joining Processes and Nondestructive Testing
MECH 6551 Fracture
MECH 6561 High Strength Materials
MECH 6571 Corrosion and Oxidation of Metals
MECH 6661 Thermodynamics and Phase Equilibria of Materials

E56 - GROUND VEHICLE DYNAMICS

MECH 6741 Mechatronics (*)
MECH 6751 Vehicle Dynamics (*)
MECH 6761 Vehicular Internal Combustion Engines (*)
MECH 6771 Driverless Ground Vehicles (*)
MECH 6781 Guided Vehicle Systems (*)

MECH 7511 Vehicle Vibration and Control
MECH 7711 Handling and Stability of Road Vehicles (PreReq: MECH 6751 or equivalent)

E57 - COMPOSITE MATERIALS
MECH 6501 Advanced Materials
MECH 6521 Manufacturing of Composites
MECH 6581 Mechanical Behaviour of Polymer Composite Materials
MECH 6601 Testing and Evaluation of Polymer Composite Materials and Structures
MECH 6651 Structural Composites
MECH 7501 Design Using Composite Materials (PreReq: MECH 6581)

E63 – PROJECT, REPORT AND INDUSTRIAL TRAINING
ENCS 6931 Industrial Stage and Training (PreReq: Permission from Department
ENGR 7011 Graduate Seminar in Mechanical and Industrial Engineering (PreReq: Permission from Department)
ENGR 6971 Project and Report I   (PreReq: Permission from Department)
ENGR 6981 Project and Report II (PreReq: Permission from Department)
ENGR 6991 Project and Report III (PreReq: Permission from Department)