

**MASTER OF ENGINEERING**  
**Mechanical 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, section 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 with the listed pre-requisites.
- Registering for the M.Eng. Projects – ENGR 6971, ENGR 6981, ENGR 6991.
- Registering for ENGR 7011, Graduate Seminar in Mechanical and 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:**

Link to Engineering Courses.

Students must specialize in one of the following branches:

- a. Industrial Control Systems;
- b. Materials and Composites;
- c. Mechanical Systems;
- d. Thermofluid Engineering.

A minimum of 4 courses (16 credits) chosen from the courses listed in one of the following specialization areas.

1. Industrial Control Systems: MECH 6021, 6061, 6621, 6631, ENGR 6301, 6411, ENGR 6071 (replaces MECH 6071)
2. Materials and Composites: MECH 6441, 6501, 6511, 6521, 6541, 6561, 6581.
3. Mechanical Systems: MECH 6431, 6481, 6751, 7711, 6761, ENGR 6301, 6311.
4. Thermofluids: MECH 6111, 6121, 6131, 6171, 6181, ENGR 6201, 6261.

A minimum of 20 credits 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, ENGR 6991 with permission of 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 go to [the program website](#):

## **3. TOPIC AREAS IN MECHANICAL & INDUSTRIAL ENGINEERING**

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 Probabilistic Methods in Design  
ENCS 6161 Probability and Stochastic Processes  
ENCS 6181 Optimization Techniques (\*)  
ENCS 6191 Fuzzy Sets and Fuzzy Logic

**E02 – DEVELOPMENTS IN ENGINEERING**

MECH – 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)

(\*) Cross-listed courses