
MEMORIAL
UNIVERSITY
engineering
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WHAT ARE THE DEGREE OPTIONS?

BACHELOR OF ENGINEERING: A five-year co-operative education degree program composed of eight full-time academic terms and up to seven full-time co-operative work terms. There are seven majors available (see list below), all of which provide an opportunity to take offshore oil and gas engineering electives.

AVAILABLE MAJORS:

- Civil engineering
- Computer engineering
- Electrical engineering
- Mechanical engineering
- Mechatronics engineering
- Ocean and naval architectural engineering
- Process engineering

Students will have the opportunity to apply engineering concepts and theories learned in classrooms and laboratories to the real world as they embark on a minimum of four (maximum of six) co-operative work terms that will give them the equivalent of up to two years of real engineering work experience prior to graduation.

PROGRAM STRUCTURE:

YEAR	FALL	WINTER	SPRING
1	Engineering One		
2	Academic Term 3	Work Term	Academic Term 4
3	Work Term	Academic Term 5	Work Term
4	Academic Term 6	Work Term	Academic Term 7
5	Work Term	Academic Term 8	

HOW DO I BECOME AN ENGINEERING STUDENT?

ADMISSION REQUIREMENTS TO ENGINEERING ONE: The common first year of the engineering program is known as Engineering One. Students study mathematics, physics, chemistry, English and engineering fundamentals, which are common to all of the majors offered. Students must meet the following minimum requirements to be considered eligible for admission to Engineering One directly from high school.

In general, an average of more than 80 per cent in high school advanced math, chemistry, physics and English can be considered a minimum for consideration. Entry to Engineering One and to the available majors is competitive for a limited number of seats.

Meeting the minimum admission requirements does not guarantee a student's acceptance into the program. Final admission and readmission decisions rest with the Engineering Admissions Committee.

The Engineering Admissions Committee is looking for hard-working students who are ready for a challenge, and who have a strong performance in advanced math and sciences (particularly physics and chemistry). Academically strong students who do not fit this profile should contact the faculty for further advice

MATHEMATICS

Students must be eligible to register for Math 1000 in the fall semester of Engineering One. Applicants from high school should take note of the following requirements:

- In Newfoundland and Labrador, Advanced Math 3200 is required. A minimum grade of 75 per cent or Mathematics Placement Test score of at least 75 per cent is required to register for Math 1000.
- Out-of-province students must complete a Grade 12 level advanced mathematics course and write the Mathematics Placement Test with a score of at least 75 per cent.

For more information on the Mathematics Placement Test, visit mun.ca/math/mpt.

Newfoundland and Labrador high school students who complete Calculus 3208 are eligible to write the Calculus Placement Test (mun.ca/math/cpt). Successful students will receive credit for Math 1000 and can proceed to Math 1001.

Students who complete International Baccalaureate Higher Level Mathematics or Advanced Placement Mathematics (Calculus AB or BC) may be eligible to receive transfer credit for Math 1000.

CHEMISTRY AND PHYSICS

Students must be eligible to register for Chemistry 1050 and Physics 1050 and 1051 in Engineering One.

Students who have completed Chemistry 3202 (or equivalent) in high school, and received at least 65 per cent, will be eligible for admission to Chemistry 1050 in their first semeste .

It is strongly recommended that students complete Physics 3204 (or equivalent) in high school prior to registering for Physics 1050.

CAREERS

Graduates from the Faculty of Engineering and Applied Science have gone on to pursue a variety of careers, including:

- Project/plant managers
- Oil and gas experts
- Consulting engineers
- Design engineers and naval architects
- Technological entrepreneurs
- Global engineers working in international development
- Many more specialized discipline-related field

MAJORS

CIVIL ENGINEERING

Civil engineering is a broad field encompassing several distinct a eas of specialization, including construction; environmental; geotechnical; structural; transportation infrastructure management; natural resources; and many more. The program provides a broad introduction to the scientific principles and engineering knowledge necessary for an understanding of the fundamental problems faced by civil engineers. Students take a variety of courses, including applied mathematics; engineering economics; fluid mechanics and hydraulics; materials; system design; structural analysis; design of concrete and steel structures; geotechnical engineering; construction management; and environmental engineering courses.

WHAT YOU CAN BECOME Construction engineers, structural engineers, design engineers, geotechnical engineers, project managers and cost estimators, site engineers, environmental engineers, piping design engineers, stress analyzers and loss prevention specialists. In addition, civil engineers work in all levels of government and for a wide variety of industries, from consulting firms to construction companies. There are many areas of specialization, including hydrotechnical; environmental; geotechnical; construction; structural; and transportation engineering. There are also many new areas emerging, such as composite materials; environmental risk assessment and management; offshore structural safety and maintenance; infrastructure engineering; and real-time condition monitoring.

COMPUTER ENGINEERING

Computer engineering is a fast-changing discipline concerned with the design and analysis of computer systems applied to the solution of practical problems. It encompasses both computer hardware and software design in applications ranging from telecommunications and information systems (such as the Internet or telephone networks) to instrumentation, robotics and mobile hand-held devices. Modern systems are highly automated, and computer engineering has a part in almost every modern engineering system design, from telecommunications to industrial systems, cars and airplanes. Students take a variety of courses in computer hardware, software and communication systems, and learn about circuit analysis, systems and signals, digital logic design, electronics, computer programming techniques, computer architecture and micro-processors, digital communications, computer networking, concurrent programming and real-time operating systems. Students also have the option to take electives in the biomedical field

WHAT YOU CAN BECOME Software and hardware design engineers, network planning and design engineers and systems managers, digital hardware engineers, microprocessor design engineers and instrumentation engineers.

ELECTRICAL ENGINEERING

Electrical engineering is a diverse discipline concerned with the analysis, design and manufacture of a huge variety of devices, systems and processes involving electricity. It deals with the transfer of electrical energy and information. Students are instructed in circuit analysis, systems and signals, digital logic design, electronics, computer programming techniques, microprocessors, controls, electromagnetic power and telecommunications. Core electrical courses include analog electronics, systems and signals, electro-mechanical devices, control systems and communication principles. Students are introduced to advanced mathematics, electric machines, electromagnetic fields and industrial control and instrumentation. Students also have the option to take electives in the biomedical field

WHAT YOU CAN BECOME Electrical systems design engineers or project managers in electrical power production and distribution, or the communications, aerospace, medical and manufacturing industries, communications design engineers, system engineers and control system designers.

MECHANICAL ENGINEERING

Mechanical engineering is a broad field that involves the application of physica principles for analysis, design, manufacturing and maintenance of mechanical systems. Mechanical engineering encompasses the design, analysis, testing and manufacture of products that are used in every facet of modern society. For this reason, it may be considered the most diverse engineering discipline. Students complete courses in engineering mechanics, solid mechanics, vibrations, automatic control, design, fluid mechanics, thermodynamics, heat transfe , mathematics, materials, mechatronics, mechanical systems and basic electronics.

Students also have the option to take senior electives in one of five technical streams: mechanics/materials, petroleum, mechatronics, thermo-fluids/energy and biomedical.

WHAT YOU CAN BECOME Mechanical engineers can work in the automotive, aerospace, chemical, computer, communication, paper and power generation industries, as well as virtually any manufacturing industry. Mechanical engineers are employed in the design, manufacture and maintenance of mechanical and industrial processes. Mechanical engineers find employment in areas such as mechanical component design, construction and maintenance of air-conditioning, ventilation and heating systems, electronic component cooling and heat transfer for energy generation systems. Mechanical engineers also work in many aspects of the oil industry, designing individual components or systems for exploration, recovery and processing, as well as the maintenance and operations of systems, such as oil rigs, derricks, pumps and refineries. Other careers include operations managers, research engineers and mechanical equipment designers.

MECHATRONICS ENGINEERING

Mechatronics engineering is an interdisciplinary program combining electrical, computer and mechanical engineering fundamentals to analyze and design intelligent electro-mechanical systems. Mechatronics is a diverse field that can include design, automation and precision control of integrated electro-mechanical systems. This includes, but is not limited to, advanced manufacturing systems, robotics, autonomous driving, navigation of unmanned vehicles, intelligent systems, remote diagnostic and telesurgery, machine vision, advanced sensing, instrumentation and communications and artificial intelligence. Students take courses in or related to: circuit analysis, digital designs, electronic circuits, electrical machines, programming, production technology, dynamic systems, mechatronic systems modeling, sensors and actuators, industry automation, digital design, mechanisms and machines, mechanics of solids, power electronics, vibrations, control systems and computer aided engineering applications. Students will also have options to take electives in all three disciplines such as biomedical, micro electro-mechanical systems and computer aided engineering.

WHAT YOU CAN BECOME After completing the program, students will have a sound knowledge in electrical, computer and mechanical engineering geared for the specific purpose of highly integrated electro-mechanical system engineering. This is in demand in many industries where one can work as a robotic engineer, automation engineer, instrumentation and control engineer, electronic design engineer, software engineering and data scientist.

OCEAN AND NAVAL ARCHITECTURAL ENGINEERING

The ocean and naval architectural engineering program is unique in that it is the only mandatory co-operative education program of its kind in Canada. The program covers two broad areas. Ocean engineering includes the design and analysis of equipment and structures that allow people to operate on or beneath the ocean in order to develop and utilize marine resources.

Naval architecture involves the design and construction of ships and other floating or submersible structures to serve the needs of the ocean-going community. Ocean and naval architectural engineering requires knowledge of structures, hydrodynamics, marine systems and their design. Students take courses in fluid mechanics, hydrostatics, resistance and propulsion of ships, seakeeping, manoeuvring, marine structural design, submersibles design, marine hydrodynamics, ocean systems design and advanced marine vehicles.

WHAT YOU CAN BECOME Ocean engineers and naval architects find careers in ship design, offshore engineering, shipbuilding, small craft design, marine consulting, fleet operations with shipping companies, underwater vehicle and equipment design, marine and offshore inspection and certification, project management or research.

PROCESS ENGINEERING

Process engineering is concerned with the transformation of raw materials into valuable products. It's a diversified discipline, analogous to chemical engineering, designed to satisfy the needs of various processing industries. It encompasses new development, design, optimization and operation of sustainable processes for human needs, ensuring safety and protection of the environment. Process engineers design, operate and optimize biological; chemical; and physical processes to produce useful products such as petrochemicals; gasoline; diesel; metals; and alloys. Students in process engineering take courses in engineering thermodynamics, reactions, process equipment design, mass transfer, mathematical methods, modelling and analysis, dynamics and control, safety and risk engineering, simulation and plant designs and economics.

WHAT YOU CAN BECOME Process engineers work with the design and operation of process equipment in process industries; biochemical engineers develop safer pest control products and find ways to dispose waste more efficiently; food engineers improve the quality and extend the life of food products and make crops safer to eat; metal and mineral engineers find better ways to extract minerals and find greener methods for mining and processing; petroleum and petrochemical engineers find better ways to extract oil and natural gas; chemical engineers process different raw materials into value products; safety engineers develop new methods to assess and improve safety. Other career options include environmental engineers, engineering consultants, pharmaceutical engineers, operations managers, plant engineers, research engineers and mill and plant superintendents.

For more information on each major, as well as a short video, visit ***www.mun.ca/engineering/prospective***.

FAST FACTS

Graduates of Memorial's Faculty of Engineering and Applied Science have been enjoying the benefits of full acc editation with the Canadian Engineering Accreditation Board (CEAB) since 1975. This accreditation places our programs among the very best in Canada.

The Faculty of Engineering and Applied Science is one of the first engineering schools in Canada to o fer an accredited major in process engineering. It is also the only engineering school in North America to offer a major at the undergraduate level in ocean and naval architectural engineering and the only engineering school in the world to offer such a program following a co-operative education model.

CONTACT

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