Program Overview

Memorial University is the largest university in Atlantic Canada. Memorial's Faculty of Engineering and Applied Science has many well-respected academic and research programs in engineering, including civil; computer; electrical; mechanical; ocean and naval architectural; and oil and gas. The faculty offers research-focused graduate programs leading to Master of Engineering (M.Eng.) and Doctor of Philosophy (PhD) degrees. Course-based masters programs in computer engineering, engineering management, environmental systems engineering and management, and oil and gas engineering are also available and are described in a separate brochure.

Course Requirements

M.Eng. students are required to complete four graduate courses, a seminar course and a research thesis, which usually takes two years. The PhD program, which normally takes three years to complete, comprises two courses beyond the master's level and an original research thesis.

Facilities

The Faculty of Engineering and Applied Science at Memorial University offers extensive computing, laboratory and workshop facilities with a dedicated technical support staff. Computers, printers, plotters and specialized software are available for the exclusive use of engineering students. All computers are networked, enabling students to access the powerful workstations available in laboratories provided by Engineering Computing Services. In addition to in-house laboratory and research facilities, students also have access to several acclaimed research centres associated with Memorial University. Adjacent to the university is the Institute for Ocean Technology (IOT) with its large ice tank, wave tank and sea-keeping basin. Also close by is the Centre for Cold Ocean Research Engineering (C-CORE), which houses a large centrifuge for studying the behaviour of loaded soils. Just a short drive from Memorial is the Marine Institute, which has a ship simulator and flume tank.
Fast-Track Option

Students registered in academic Term 7 of a Memorial University of Newfoundland undergraduate engineering program are eligible to apply for admission to the M.Eng. fast-track option. The purpose of the option is to encourage students interested in pursuing graduate studies to begin their research-related activities while still registered as an undergraduate student. Normally, to be considered for admission to the option, students must have achieved at least a 70 per cent average over academic Terms 1 through 6 of their undergraduate engineering program. While enrolled in the option, a student may complete some of the M.Eng. degree requirements and, hence, potentially be able to graduate earlier from the M.Eng. program.

Upon completion of their undergraduate program, students may register in the M.Eng. program on a full-time basis. All courses taken as part of their graduate program while enrolled in the M.Eng. fast-track option are credited towards the M.Eng. degree course credit hour requirements. Courses taken as credit towards a student's undergraduate degree may not be credited towards a student's graduate degree; courses credited towards a student's graduate degree may not be credited towards a student's undergraduate degree.

Industrial Internship Option

The faculty encourages graduate students to undertake work internships in industry. Internships in industry will permit students either to focus on the practicalities of research projects which have been well defined before the student enters an internship, or to develop and define a research project from problems experienced during the internship. Encouragement to undertake an internship will be given only where it is clear that one of these expectations can be met. Students registered in the M.Eng. program may, with the permission of their supervisor, the Dean of the Faculty of Engineering and Applied Science, and the Dean of Graduate Studies select the industrial internship option. Students registered in the option must satisfy the degree regulations for the M.Eng. program in addition to requirements specific to the internship option.

Admission Requirements

Admission is limited and competitive. Applicants should have a second-class bachelor's degree in engineering or a relevant area from a recognized university.

Applications can be submitted online at www.mun.ca/become/graduate/apply. The application deadline for fall admission is November 1 of the previous year. Applicants from institutions where English is not the language of instruction must include proof of English proficiency. Most students begin studies in September. Applicants who wish to enter programs at other times are considered on an individual basis.

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Civil Engineering

Civil engineering graduate studies may be pursued in many areas, including coastal; geotechnical; structural design and analysis; materials; water resources; hydraulics and hydrology; and environmental engineering. Laboratories for studying soils, bitumen, concrete, hydraulics, structures, materials and the environment facilitate student research.

Graduate students in civil engineering can also access specialized facilities including a strength and concrete laboratory and a structural laboratory with a one-metre-thick concrete floor for static and dynamic testing; a hydraulic laboratory with a 58-metre towing tank; environmental laboratories; soil simulator; two wave/soil interaction tanks and a deep tank for acoustic work; an ice structures laboratory with cold rooms and specialized testing equipment; in-house facilities for model fabrication, custom welding and machining services; and a geotechnical centrifuge operated by C-CORE.

Computer Engineering

Computer engineering graduate studies may be pursued in a wide variety of areas, including digital and image processing; software design and verification; error control codes; real-time discrete event systems; multimedia communications; image and video coding; cryptography; and digital systems.

Electrical Engineering

Electrical engineering graduate studies are available in a wide variety of areas, including antennas; applied electromagnetics; broadband communications networks; industrial automation; robotics; electric machines; autonomous vehicles; power systems and electronics; wind and alternative energy; distributed power generation; intelligent control; controllers and sensors in harsh environments and wireless communications.

Computer and Electrical Engineering

For both computer and electrical engineering, students have access to a wide variety of engineering software for tasks, such as mathematical analysis (MAPLE and MATLAB); electric circuit simulation (SPICE, PSPICE, electronics workbench); VLSI and FPGA design (Synopsys, Cadence and Xilinx); software design (Rational Rose, Visual Paradigm and Microsoft development tools). Special facilities include the Instrumentation Control and Automation (INCA) Centre, the Computer Engineering Research Laboratories (made up of the Centre for Digital Hardware Applications Research, the Software Engineering Research Laboratory, the Multimedia Communications and Remote Sensing Laboratory, the Computer-Aided Design Laboratory for Analog and Mixed Signal VLSI Systems), and the Advanced Wireless Communications Research Laboratory (AWCRL) and the Power Devices and Systems Laboratory. In addition, research facilities from industrial and government collaborations are available.
Ocean and Naval Architectural Engineering

The ocean and naval architectural engineering program is the only one of its kind in Canada. It is renowned for its unique approach, diverse research projects and exceptional faculty. Graduate studies can be pursued in areas such as marine hydrodynamics, marine structures, underwater vehicles, Arctic engineering, ocean environmental engineering and offshore safety and marine simulation. Students have access to a 58 metre towing tank and a structures laboratory with cold rooms and specialized testing equipment.

Research in ocean and naval architectural engineering is complemented by several research groups on campus, providing opportunities for field work and graduate research projects. Memorial University’s Ocean Engineering Research Centre (OERC), which is located in the Faculty of Engineering and Applied Science, is involved in research, development and consulting in most areas of ocean engineering, including the offshore petroleum and shipping industries. Scale model experiments, numerical modelling, software development and structural testing are some of the activities within the OERC.

Oil and Gas Engineering

Graduate studies and research in oil and gas engineering are multidisciplinary to reflect the complexity and multidisciplinary nature of the oil and gas industry. The program is offered by the process engineering discipline with participation from the civil, mechanical, computer, electrical and ocean and naval architectural engineering disciplines. Students in oil and gas engineering may take courses and pursue research in downstream oil and gas processing, environmental protection, risk, reliability and safety engineering, drilling engineering, pipeline engineering, sub-sea geotechnical engineering, reservoir simulation and modelling, green and clean engineering, design of offshore production facilities, compact design of production facilities, as well as structural design of offshore structures. Graduates of the program will be safety- and environmentally-conscious engineers, who will contribute towards sustainable engineering development – a priority for the oil and gas, and allied industries.

Research facilities for the oil and gas program include reservoir modelling and simulation laboratories; health, safety and risk; environmental; hydromet processing; corrosion; unit operation; drilling; process modelling and advanced process control and instrumentation laboratories. The university also offers excellent centralized facilities in 3D visualization for reservoir characterization, chemical analysis, and exploration.

Research in oil and gas engineering is supported by the oil and gas industries and also by national and provincial research grants. Faculty members in oil and gas engineering have active collaboration with industry and their research is directed towards solving real-life problems.

Mechanical Engineering

Students may pursue graduate studies in mechanical engineering in areas such as controls, corrosion, fatigue and fracture mechanics, fluid dynamics, heat transfer, materials, mechanical design, mechatronics, product development, resource utilization, robotics, structural dynamics and vision systems.

Mechanical engineering research facilities include automation and control, computer, fluids, heat transfer and structures laboratories. Specialized facilities include a low-speed wind tunnel, SEM and XRD material characterization equipment, a multiphase flow loop, cold rooms, wave/tow tank, machine vision and x-ray imaging, and a mechatronics laboratory. There is also a manufacturing technology and rapid prototype development centre. The laboratories are supported by on-site technical services, which include a large machine shop and numerically-controlled machining facilities.