BACHELOR OF ENGINEERING (B.ENG.)

Objectives of the Program

Students in this program obtain a liberal engineering education, which includes a comprehensive core of science, mathematics and engineering science that provides a strong foundation for engineering design and analysis. This enables students to undertake the solution of engineering problems in the areas of biological, biomedical, computer, engineering systems and computing, environmental, mechanical and water resources. Core subjects, combined with elective opportunities, provide an understanding of the connection between engineering and science, coupled with the interdisciplinary skills needed to address the problems and challenges faced by engineers in society today.

The curriculum includes a strong emphasis on engineering design. Students engage in engineering design throughout the program, and gain experience in computer aided design and modeling, conceptual design and physical construction. Emphasis is on teamwork and communications skills, as well as working on interdisciplinary projects.

Career opportunities are open in many segments of the economy. Examples are: consulting services to municipalities, utilities and industry; resource agencies in advisory, regulatory, planning and utilization; service industries of construction, power and water supply and public health; manufacturing, design of computer and control systems, hardware and software development; mechatronics and emerging energy systems; medical devices, pharmaceutical and food industries and industrial ergonomics; academic research and graduate studies within and without the field of engineering.

Many engineers assume management responsibilities after gaining experience in design, development and operations. The balance provided by liberal arts and engineering education allows graduates to enjoy a great deal of career mobility.

Accreditation

The baccalaureate degree programs in all engineering programs are accredited by the Canadian Engineering Accreditation Board of Engineers Canada. Graduates from accredited engineering programs have the educational requirements to apply for membership in the Professional Engineers Ontario (PEO) and other provinces after a number of years of acceptable engineering experience and successful completion of a PEO examination in engineering law and ethics.

Requirements of the Program

Students combine their required courses in mathematics, physical sciences and engineering with additional credits providing the opportunity for specialization in: one of the programs; complementary studies courses; and elective subjects. Complementary studies, consist of courses in the social sciences, arts, management, engineering economics and communication. They complement the technical content of the curriculum. All credits are selected according to the schedule of studies for the student's chosen program. Restrictions apply to the number of non-core credits which may be at the 1000 level. Further information on approved courses may be obtained from the B.Eng. Program Guide available from the director or program counsellor of the School of Engineering

Programs

Entry into a specific B.Eng. program is done two ways. Students can select their desired program of study (major) at the time of application. If accepted, students will be given an offer to their program of choice. Students also have the option of selecting the Undeclared First Year (Undeclared Stream) entry point due to the similarities of first year. Students in the Undeclared Stream then normally select their specific program of study during course selection for Semester II. Students in the Undeclared stream are strongly encouraged to meet with their Program Counsellor during Semester I. The School's Associate Director - Undergraduate Affairs or designate approve program selection during the semester add periods. There are no enrollment caps on any program, so students are free to select their programs of choice. Students wanting to make a switch in majors after the above dates are free to do so with prior approval, but will be off sequence and may be required to take additional courses.

The available programs are:

- Undeclared First Year (p. 2): Students selecting this entry point are required to select one of the B.Eng. Majors at the time of course selection in Semester II.
- Biological Engineering (calendar.uoguelph.ca/undergraduate-calendar/programs-majors-minors/biological-engineering-program-bioe/) - the application of engineering to the control and management of biological processes, environments, and human factors in engineering design.
- Biomedical Engineering (calendar.uoguelph.ca/undergraduate-calendar/programs-majors-minors/biomedical-engineering-program-bme/) - the application of engineering to health and medicine.
- Computer Engineering (calendar.uoguelph.ca/undergraduate-calendar/programs-majors-minors/computer-engineering-program-ceng/) - the application of engineering to the design, fabrication, and testing of computing machines and computer systems.
- Engineering Systems and Computing (calendar.uoguelph.ca/undergraduate-calendar/programs-majors-minors/engineering-systems-computing-program-esc/) - the application of engineering to the design, operation and management of data sensing, transmission and processing systems, and of control systems.
- Environmental Engineering (calendar.uoguelph.ca/undergraduate-calendar/programs-majors-minors/environmental-engineering-program-enve/) - the application of engineering to protect and restore the environment, through the prevention and treatment of gaseous, liquid and solid wastes.
- Mechanical Engineering (calendar.uoguelph.ca/undergraduate-calendar/programs-majors-minors/mechanical-engineering-program-mech/) - The application of engineering to the design, manufacturing and control of mechanical and electro-mechanical equipment, systems and devices.
- Water Resources Engineering (calendar.uoguelph.ca/undergraduate-calendar/programs-majors-minors/water-resources-engineering-program-wre/) - the application of engineering to the control and management of water and soil resources to meet human needs while sustaining the natural environment.

The schedule of studies for each program is provided but guidance in the selection of appropriate courses is available from the program counsellor of the School of Engineering.

Additional Course Requirements

Students lacking specific subject requirements are advised to consult the Recommendations and Notes in Section IV–Admission Information-B.Eng..

Continuation of Study

Students are advised to consult the regulations for continuation of study within the program which are outlined in detail in Section VIII, Undergraduate Degree Regulation & Procedures. Students will be ineligible to continue in the B.Eng. program and will not be readmitted to the degree program if the same course is failed three times.

Normally, students in the B.Eng. program will be permitted only one supplemental privilege during their studies. It will usually be granted for 3000 or 4000 level courses only.

Conditions for Graduation

To qualify for the degree the student must complete the courses required for a B.Eng. program and must achieve an overall minimum cumulative average of at least 60% and a minimum cumulative average of at least 60% in all ENGG courses.

Co-operative Education

Students studying for the B.Eng. degree may participate in a Co-operative Education program following the completion of the first 4 semesters of study. The Co-operative Education program consists of five semesters of experience in industry with employers who participate in the program. Work Term Reports are graded by a faculty supervisor. Evaluations of Co-op semesters are recorded on the student's academic record. The Co-operative Education program provides an excellent opportunity for students to obtain work experience in industry directly related to their field of study. Interested students should consult their program counsellor.

Students wishing to participate in the Co-operative Education program should indicate their intention to do so by applying for admission to the Co-op program on entrance. Following the completion of semester 2, in-course applicants will be considered for admission to the Co-op program if space permits.

Successful applicants will:

1. have a minimum cumulative average of 70% in semesters 1 and 2
2. have successfully completed all of the credits required in the schedule of studies for semesters 1 and 2
3. be employable in Canada (international co-op students will need to apply and obtain a co-op work permit if accepted into the co-op program)
4. have obtained the approval of their Co-op advisor in the school to participate in the program. The Co-op advisor's approval will signify that the schedule of work semesters in the Co-op program as planned by the student is compatible with the schedule of studies in the program in which the student is enrolled.
5. completion of COOP*1100 Introduction to Co-operative Education is a requirement for entry into the first work term.

Please refer to Co-operative Education Program for Admission requirements into the Co-op Program.

B. Eng. Co-op Work Term Schedule

Semester	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5
Fall	1	3	5	6	work
Winter	2	4	work	7	8
Summer		work	work	work	

Undeclared First Year Entry - B.Eng. Program

School of Engineering, College of Engineering and Physical Sciences

Code	Title	Credits
Semester 1- Fall		
CHEM*1040	General Chemistry I	0.50
ENGG*1100	Engineering and Design I	0.75
MATH*1200	Calculus I	0.50
PHYS*1130	Physics with Applications	0.50
CIS*1300	Programming [1]	0.50
or CIS*1500	Introduction to Programming	
Semester 2 - Winter		
(for students planning to declare one of: Biological Engineering, Biomedical Engineering, Environmental Engineering, Water Resources Engineering)		
CHEM*1050	General Chemistry II	0.50
ENGG*1210	Engineering Mechanics I	0.50
ENGG*1500	Engineering Analysis	0.50
MATH*1210	Calculus II	0.50
PHYS*1010	Introductory Electricity and Magnetism	0.50
Semester 2 - Winter		
(for students planning to declare one of: Computer Engineering, Engineering Systems and Computing)		
CIS*2500	Intermediate Programming	0.50
ENGG*1210	Engineering Mechanics I	0.50
ENGG*1500	Engineering Analysis	0.50
MATH*1210	Calculus II	0.50
PHYS*1010	Introductory Electricity and Magnetism	0.50
Semester 2 - Winter		
(for students planning to declare Mechanical Engineering)		
ENGG*1210	Engineering Mechanics I	0.50
ENGG*1500	Engineering Analysis	0.50
MATH*1210	Calculus II	0.50
PHYS*1010	Introductory Electricity and Magnetism	0.50
0.50 restricted electives		0.50

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Students planning to declare one of Computer Engineering or Engineering Systems and Computing should take CIS*1300 Programming.
This course is required for progression into CIS*2500 Intermediate Programming in Semester 2

B.Eng. Programs

- Biological Engineering Program (BIOE) (calendar.uoguelph.ca/undergraduate-calendar/programs-majors-minors/biological-engineering-program-bioe/)
- Biological Engineering Program Co-op (BIOE:C) (calendar.uoguelph.ca/undergraduate-calendar/programs-majors-minors/biological-engineering-program-co-op-bioec/)

- Biomedical Engineering Program (BME) (calendar.uoguelph.ca/undergraduate-calendar/programs-majors-minors/biomedical-engineering-program-bme/)
- Biomedical Engineering Program Co-op (BME:C) (calendar.uoguelph.ca/undergraduate-calendar/programs-majors-minors/biomedical-engineering-program-co-op-bmec/)
- Computer Engineering Program (CENG) (calendar.uoguelph.ca/undergraduate-calendar/programs-majors-minors/computer-engineering-program-ceng/)
- Computer Engineering Program Co-op (CENG:C) (calendar.uoguelph.ca/undergraduate-calendar/programs-majors-minors/computer-engineering-program-co-op-cengc/)
- Engineering Systems and Computing Program (ESC) (calendar.uoguelph.ca/undergraduate-calendar/programs-majors-minors/engineering-systems-computing-program-esc/)
- Engineering Systems and Computing Program Co-op (ESC:C) (calendar.uoguelph.ca/undergraduate-calendar/programs-majors-minors/engineering-systems-computing-program-co-op-escc/)
- Environmental Engineering Program (ENVE) (calendar.uoguelph.ca/undergraduate-calendar/programs-majors-minors/environmental-engineering-program-enve/)
- Environmental Engineering Program Co-op (ENVE:C) (calendar.uoguelph.ca/undergraduate-calendar/programs-majors-minors/environmental-engineering-program-co-op-envec/)
- Food Engineering (FENG) (calendar.uoguelph.ca/undergraduate-calendar/programs-majors-minors/food-engineering-feng/)
- Mechanical Engineering Program (MECH) (calendar.uoguelph.ca/undergraduate-calendar/programs-majors-minors/mechanical-engineering-program-mech/)
- Mechanical Engineering Program Co-op (MECH:C) (calendar.uoguelph.ca/undergraduate-calendar/programs-majors-minors/mechanical-engineering-program-co-op-mechc/)
- Water Resources Engineering Program (WRE) (calendar.uoguelph.ca/undergraduate-calendar/programs-majors-minors/water-resources-engineering-program-wre/)
- Water Resources Engineering Program Co-op (WRE:C) (calendar.uoguelph.ca/undergraduate-calendar/programs-majors-minors/water-resources-engineering-program-co-op-wrec/)