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 foundation enables students to identify and solve 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, and 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 both within and outside 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 professional practice 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 B.Eng. program; majors, including complementary studies and elective subjects. Complementary studies, consist of courses in the humanities and social sciences; sustainable development and environmental stewardship; project management and economics, including engineering economics; and communication. Complementary studies complement the technical content of the curriculum by enhancing an understanding of the role of engineering in society. All credits are selected according to the schedule of studies for the student's chosen B.Eng. 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 on the School of Engineering website.

Programs

Students admitted to the Bachelor of Engineering (B.Eng.) program may choose to transfer between majors once enrolled. Students in the Undeclared Stream normally select their specific major before the commencement of Semester 3. Students in the Undeclared stream are strongly encouraged to meet with their Program Counsellor during their first year of study.

Students in all other majors who wish to change another major in the program submit an application to the School of Engineering Program Counselling Office. The application must be submitted by the last day of classes in the semester preceding the change. Admission is competitive based on available space in each major. Normally, only those applicants who meet the minimum admission requirements for internal transfer are considered. Applications are assessed by the B.Eng. Admission Committee and decisions regarding applications are made no later than one week before the add deadline of the following semester. Students who change majors may be off sequence and may be required to take additional courses.

The available programs are:

- Undeclared First Year (p.): Students selecting this entry point are required to select one of the B.Eng. Majors before the commencement of Semester 3.
- 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 systems related to data sensing, transmission, processing, and of control.
- 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, reclamation, 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.

Guidance in the selection of appropriate courses is available from the School of Engineering Program Counselling Office.

Additional Course Requirements

Students lacking specific subject requirements are advised to consult the Recommendations and Notes in Chapter IV–Admission Information - Bachelor of Engineering (B.Eng.)

Letter of Permission

A maximum of 1.50 credits#of core (required) courses#may be taken by Letter of Permission#for their degree. This cap does not apply to restricted or free electives. Approval of the request for Letter of Permission depends on good standing in the program with a minimum cumulative average of 60%.

Normally, requests for#Letter of#Permission#of a core course will#be denied#if:

- The core course being requested is offered at Guelph in the same semester.
- The core course being requested is#less than 75%#equivalent to the Guelph B.Eng. requirement.
- The core course being requested is at least 75% equivalent to the Guelph B.Eng. requirement, buta core learning outcome or topic is missing.

Some courses are not eligible for LOP — for a list of courses, please see the Engineering program guide.

Requests must be accompanied by a full course outline from the host institution, relevant to the offering being requested.

Exceptions to the above terms and conditions will be considered in consultation with the Associate Director Undergraduate Studies for students with documented extenuating circumstances.

Continuation of Study

Students are advised to consult the regulations for continuation of study within the program which are outlined in detail in Chapter 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 assessment 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 major and approved elective courses 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

The Co-operative Education program provides an excellent opportunity for students to obtain work experience in industry directly related to their field of study. Students wishing to participate in the Co-operative Education program are encouraged to apply for admission to the Co-op program on entrance. In-course applicants will be considered for admission to the Co-op program following the completion of Semester 2, if space permits.

Students registered in a B.Eng. Co-operative Education program may participate in work-term experience following the completion of the first 4 semesters of study. The Co-operative Education program consists of 5co-op work term semesters of experience in industry with employers who participate in the program. Co-op Work Term Reports are graded by a Co-op Faculty Advisor and the Work Performance Evaluation is completed by the co-op employer supervisor rating the student's work performance during the co-op work term. Evaluations of Co-op semesters are recorded on the student's academic record.

Students interested in applying for admission to the Co-op program should refer to the Co-operative Education Program for Admission requirements and contact a program counsellor and co-op advisor for the B.Eng.

B. Eng. Academic and Co-op Work Term Schedule

Semester	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5
Fall	Academic Semester 1	Academic Semester 3	Academic Semester 5	Academic Semester 6	Co-op Work Term V
Winter	Academic Semester 2	Academic Semester 4	Co-op Work Term II	Academic Semester 7	Academic Semester 8
Summer	off	Co-op Work Term I	Co-op Work Term III	Co-op Work Term IV	

Undeclared First Year Entry - B.Eng. Program

All students must follow the academic work schedule as outlined in the Academic Calendar.

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
ENGG*1410	Introductory Programming for Engineers [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)		
ENGG*1210	Engineering Mechanics I	0.50
ENGG*1420	Object-Oriented Programming for Engineers	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

1

Students planning to declare one of Computer Engineering or Engineering Systems and Computing should take ENGG*1410 Introductory Programming for Engineers. This course is required for progression into ENGG*1420 Object-Oriented Programming for Engineers in Semester 2.

B.Eng. Programs

- Biological Engineering (BIOE) (calendar.uoguelph.ca/undergraduate-calendar/programs-majors-minors/biological-engineering-program-bioe/)
- Biomedical Engineering (BME) (calendar.uoguelph.ca/undergraduate-calendar/programs-majors-minors/biomedical-engineering-program-bme/)
- Computer Engineering (CENG) (calendar.uoguelph.ca/undergraduate-calendar/programs-majors-minors/computer-engineering-program-ceng/)
- Engineering Systems and Computing (ESC) (calendar.uoguelph.ca/undergraduate-calendar/programs-majors-minors/engineering-systems-computing-program-esc/)
- Environmental Engineering (ENVE) (calendar.uoguelph.ca/undergraduate-calendar/programs-majors-minors/environmental-engineering-program-enve/)
- Mechanical Engineering (MECH) (calendar.uoguelph.ca/undergraduate-calendar/programs-majors-minors/mechanical-engineering-program-mech/)
- Water Resources Engineering (WRE) (calendar.uoguelph.ca/undergraduate-calendar/programs-majors-minors/water-resources-engineering-program-wre/)