

CIVIL ENGINEERING, B.SC.

Degree Requirements

Civil Engineering Departmental Program

| Course | Title | Hours |
|--|---|-------|
| Students must complete the Preliminary Engineering Program requirements for graduation. 37.5 | | |
| CHEM 1110 | Introductory Chemistry 2: Interaction, Reactivity, and Chemical Properties ¹ | 3 |
| CHEM 1126 | Introduction to Chemical Techniques for Engineering 2 ¹ | 1.5 |
| CIVL 2770 | Civil Engineering Materials | 5 |
| CIVL 2780 | Civil Engineering Systems | 4 |
| CIVL 2790 | Fluid Mechanics | 4 |
| CIVL 2800 | Solid Mechanics 1 | 4 |
| CIVL 2830 | Graphics for Civil Engineers | 2 |
| CIVL 2840 | Civil Engineering Geomatics | 3 |
| CIVL 3590 | Numerical Methods in Engineering Analysis | 4 |
| CIVL 3690 | Environmental Engineering Analysis | 4 |
| CIVL 3700 | Environmental Engineering Design | 4 |
| CIVL 3730 | Geotechnical Materials and Analysis | 4 |
| CIVL 3740 | Hydraulics | 4 |
| CIVL 3750 | Hydrology | 4 |
| CIVL 3760 | Structural Analysis | 4 |
| CIVL 3770 | Design of Steel Structures | 4 |
| CIVL 3790 | Transportation Engineering 1 | 4 |
| CIVL 4220 | Geotechnical Design | 4 |
| CIVL 4380 | Infrastructure Engineering and Construction Management | 4 |
| CIVL 4390 | Reinforced Concrete Structures | 4 |
| CIVL 4400 | Transportation Engineering 2 | 4 |
| CIVL 4590 | Design Project | 6 |
| ENG 2030 | Engineering Communication: Strategies for the Profession | 3 |
| or ENG 2040 | Engineering Communication: Strategies, Practice and Design | |
| ENG 3000 | Engineering Economics | 3 |
| ENG 3020 | Technology, Society and the Future | 3 |
| GEOL 1340 | The Dynamic Earth | 3 |
| MATH 2130 | Engineering Mathematical Analysis 1 | 3 |
| MATH 2132 | Engineering Mathematical Analysis 2 | 3 |
| STAT 2220 | Contemporary Statistics for Engineers | 3 |
| Options | | |
| One of the following options: | | 3 |
| Civil Engineering: | | |
| Indigenous Knowledge Course ² | | |
| Environmental Option: | | |
| PHIL 2750 | Ethics and the Environment ³ | |
| Electives | | |
| One of the following options: | | 19-20 |
| Civil Engineering Technical Electives ⁴ | | |

| Environmental Option Technical Electives ⁴ | Total Hours |
|---|-------------|
| | 165-166 |

- ¹ The former CHEM 1310 may be used in lieu of the combination of CHEM 1110 and CHEM 1126.
- ² Students are required to take at least one of the courses from the list of Indigenous Knowledge courses. ENG 4100 may be used to meet this requirement when the course content satisfies the requirements for an indigenous course. Students admitted to Civil Engineering in Fall 2021 who have completed two complementary studies elective courses (or 6 credit hours) prior to admission to the program, may use one of those courses in place of the Indigenous Knowledge course. A complementary studies course is any course from the Faculty of Arts or the Faculty of Management at the 1000 level or above, with the exception of ARTS 1110 Introduction to the University which may not be used for credit in the Price Faculty of Engineering.
- ³ Students pursuing the Environmental Option must take PHIL 2750 as their complementary studies elective.
- ⁴ Technical elective courses offered vary from year to year and may have limited enrollment. Courses offered in the current year are listed on the online timetables on the Department website.

Civil Engineering Technical Electives (5 courses) ^{1,2,3,4}

A minimum of 3 courses must be taken from Group A and up to 2 from Group B, with no more than one course from outside the Department of Civil Engineering.

Group A (Select 3 to 5 courses)

| Course | Title | Hours |
|-----------|---|-------|
| CIVL 3710 | Finite Element Analysis | 4 |
| CIVL 4020 | Masonry Design and Construction | 4 |
| CIVL 4022 | Properties and Design of Concrete Mixtures | 4 |
| CIVL 4024 | Sustainable Building Design: Principles of Best Practice ⁴ | 4 |
| CIVL 4030 | Advanced Structural Design | 4 |
| CIVL 4032 | Bridge Engineering | 4 |
| CIVL 4040 | Structural Dynamics | 4 |
| CIVL 4100 | Engineering Management and the Environment | 4 |
| CIVL 4120 | Water Treatment Plant Design | 4 |
| CIVL 4130 | Solid Waste Management | 4 |
| CIVL 4180 | Environmental Systems | 4 |
| CIVL 4200 | Groundwater Contamination | 4 |
| CIVL 4230 | Geotechnical Engineering | 4 |
| CIVL 4232 | Geotechnical Earthquake Engineering | 4 |
| CIVL 4250 | Groundwater Hydrology | 4 |
| CIVL 4300 | Design of Urban Water Systems | 4 |
| CIVL 4350 | Hazardous Waste Treatment | 4 |
| CIVL 4360 | Water Resources Planning and Management | 4 |
| CIVL 4410 | Transportation Systems | 4 |
| CIVL 4420 | Highway Pavement Design | 4 |
| CIVL 4470 | Watershed Processes | 4 |

Group B (Up to 2 courses, only 1 from outside of Civil Engineering)

| Course | Title | Hours |
|-----------|---|-------|
| BIOE 4560 | Structural Design in Wood | 4 |
| CIVL 4000 | Uncertainty Analysis in Civil Engineering Systems | 4 |

| | | |
|-----------|--|---|
| CIVL 4332 | Civil Engineering Thesis Project | 4 |
| CIVL 4500 | Contemporary Topics in Civil Engineering | 4 |

¹ Technical elective courses offered vary from year to year and may have limited enrollment. Courses offered in the current year are listed on the online timetables on the Department website.

² Students are encouraged to discuss their program of courses with members of the instructional staff to obtain advice concerning the best choice of electives for their needs.

³ Students may take one technical elective course with a significant engineering science and/or design component from another department subject to the approval by the department head (or designate) of Civil Engineering.

⁴ CIVL 4024 can not be held with BIOE 4412 or BIOE 4700.

Environmental Option Technical Electives (5 courses) ^{1,2,3}

A minimum of 3 courses must be taken from Group A and up to 2 from Group B, with no more than one course from outside the Department of Civil Engineering.

Group A (Select 3 to 5 courses)

| Course | Title | Hours |
|-----------|--|-------|
| CIVL 3710 | Finite Element Analysis | 4 |
| CIVL 4100 | Engineering Management and the Environment | 4 |
| CIVL 4120 | Water Treatment Plant Design | 4 |
| CIVL 4130 | Solid Waste Management | 4 |
| CIVL 4180 | Environmental Systems | 4 |
| CIVL 4200 | Groundwater Contamination | 4 |
| CIVL 4250 | Groundwater Hydrology | 4 |
| CIVL 4300 | Design of Urban Water Systems | 4 |
| CIVL 4350 | Hazardous Waste Treatment | 4 |
| CIVL 4360 | Water Resources Planning and Management | 4 |
| CIVL 4470 | Watershed Processes | 4 |

Group B (Up to 2 courses, only 1 from outside of Civil Engineering)

| Course | Title | Hours |
|-----------|---|-------|
| BIOE 4460 | Air Pollution Assessment and Management | 4 |
| CIVL 4000 | Uncertainty Analysis in Civil Engineering Systems | 4 |
| CIVL 4332 | Civil Engineering Thesis Project | 4 |
| CIVL 4500 | Contemporary Topics in Civil Engineering | 4 |
| SOIL 4500 | Remediation of Contaminated Land | 3 |

¹ Technical elective courses offered vary from year to year and may have limited enrollment. Courses offered in the current year are listed on the online timetables on the Department website.

² Students are encouraged to discuss their program of courses with members of the instructional staff to obtain advice concerning the best choice of electives for their needs.

³ Students may take one technical elective course with a significant engineering science and/or design component from another department subject to the approval by the department head (or designate) of Civil Engineering.

Indigenous Knowledge Courses

| Course | Title | Hours |
|-----------|--------------------------------------|-------|
| NATV 1200 | | 6 |
| NATV 1220 | Indigenous Peoples in Canada, Part 1 | 3 |
| NATV 1240 | Indigenous Peoples in Canada, Part 2 | 3 |

| | | |
|--------------|--|---|
| NATV 2012 | | 6 |
| or HIST 2010 | Indigenous History in Canada (C) | |
| NATV 2020 | The Métis in Canada | 3 |
| or HIST 2020 | The Métis in Canada (C) | |
| POLS 2802 | Introduction to Indigenous Politics | 3 |
| POLS 3870 | Politics of Indigenous-Settler Relations | 3 |
| ENG 4100 | Contemporary Topics in Engineering Practice ¹ | 4 |

¹ ENG 4100 may be used to meet this requirement when the course content satisfies the requirements of an Indigenous course (amended July 5, 2021).

Preliminary Engineering Program

Campus Address/General Office: E1-262 EITC

Telephone: (204) 474 9807

Email Address: eng_info@umanitoba.ca (eng_info@%20umanitoba.ca)

Website: umanitoba.ca/engineering/ (<https://umanitoba.ca/engineering/>)

The Preliminary Engineering Program is common to all programs in engineering. Students must complete a minimum of eight (**excluding CHEM 1122**) to be eligible to apply to one of the five degree granting engineering programs. A student must complete the following list of 13 courses as part of their engineering program in order to graduate with a BSc degree in engineering.

| Course | Title | Hours |
|---------------------------------------|--|-------------|
| CHEM 1100 | Introductory Chemistry 1: Atomic and Molecular Structure and Energetics ¹ | 3 |
| CHEM 1122 | Introduction to Chemical Techniques for Engineering ¹ | 1.5 |
| COMP 1012 | Computer Programming for Scientists and Engineers | 3 |
| ENG 1430 | Design in Engineering | 3 |
| ENG 1440 | Introduction to Statics | 3 |
| ENG 1450 | Introduction to Electrical and Computer Engineering | 3 |
| ENG 1460 | Introduction to Thermal Sciences | 3 |
| MATH 1210 | Techniques of Classical and Linear Algebra ² | 3 |
| MATH 1510 | Applied Calculus 1 ³ | 3 |
| MATH 1710 | Applied Calculus 2 ³ | 3 |
| PHIL 1290 | Critical Thinking ⁴ | 3 |
| PHYS 1050 | Physics 1: Mechanics | 3 |
| Written English Course ^{5,6} | | 3 |
| Total Hours | | 37.5 |

¹ The former CHEM 1300 may be used in lieu of the combination of CHEM 1100 and CHEM 1122.

² MATH 1300 is not an acceptable equivalent to MATH 1210

³ Students intending to obtain a degree in Engineering are strongly advised to complete MATH 1510 and MATH 1710. However, MATH 1500 or MATH 1230 may be taken in lieu of MATH 1510; MATH 1700 or MATH 1232 may be taken in lieu of MATH 1710. MATH 1690 fulfills the requirement of both MATH 1510 and MATH 1710.

⁴ PHIL 1290 Critical Thinking is the recommended complementary studies elective. Students may, however, select any course from the Faculties of Arts or Management (Asper School of Business) at the 1000 level or above, except for ARTS 1110 Introduction to University.

- ⁵ Course selected from the list of approved Written English Courses for Engineering students.
- ⁶ Three credit hours are required to satisfy the written English course requirement. Should a student complete a six credit hour course, the additional three credit hours may be used to satisfy general complementary studies requirements within a student's program.
- ⁷ Equivalent courses offered through Université de Saint-Boniface may be used to satisfy program requirements.

Students who are unable to maintain the standards of the Co-op/IIP will be transferred back into the regular program.

The course and grade requirements for completion of the Co-op/IIP are the same as those required for the regular program. However, in order to satisfy course prerequisite requirements, timetables may differ from the regular program. Co-op/IIP students are evaluated in the same manner as regular students and all rules and regulations of the Price Faculty of Engineering apply.

Students who are placed on Academic Warning or Academic Probation may either be removed from Co-op/IIP or have their acceptance deferred until they have completed two consecutive terms with an Academic Standing of "Satisfactory".

Students who are Required to Withdraw will immediately become ineligible for Co-op/IIP and will remain ineligible after re-instatement to the Price Faculty of Engineering.

Written reports must be completed at the end of each four month work term. Each successfully completed four month work term and its corresponding report receives a Pass/Fail grade and is rated at one credit hour. Graduates who successfully complete at least three work terms and the required work term reports will have the Co-operative Education Option acknowledged on their B.Sc. graduation parchment.

For more information regarding the Co-op/IIP rules, benefits, regulations and requirements, please refer to the web site (<https://umanitoba.ca/engineering/co-operative-education/>).

Co-operative Education and Industrial Internship Programs

Contact and Program Information

Director: Carolyn Geddert, P.Eng., Engineer-in-Residence

Tel. 204 474 8948

Email: carolyn.geddert@umanitoba.ca

Cooperative Education Administrator: Megan Johnson

Telephone: 204 480 1069

Email: megan.johnson@umanitoba.ca

The Price Faculty of Engineering offers a Co-operative education and Industrial Internship Program (Co-op/IIP) designed to complement and enrich the academic program with work experience. The work terms provide students with practical experience, assistance in financing their education, and guidance for future career specialization.

Applications are accepted for Co-op/IIP every fall. Co-op/IIP supports the application and participation of all students who meet the requirements and wish to apply. Application to Co-op/IIP is a process. The Co-op/IIP Office will work with you. Please connect with our staff via email: engineeringcoop@umanitoba.ca and refer to the web site (<https://umanitoba.ca/engineering/co-operative-education/>) for the benefits of Co-op/IIP.

Successful applicants to Co-op/IIP have:

- Attended an information session.
- Been accepted as an undergraduate student into an Engineering Department.
- Completed all 13 first year Engineering courses before their first work term.
- Completed 42 but not more than 90 credit hours towards your degree by the end of the Fall term. (This will support the completion of 3 work terms.)
- Been assessed as in Good Academic standing (GPA above 2.0). I.E. not on Probation or Academic Warning.
- Agree to follow all rules and regulations of the program as detailed in the Rules and Regulations

In addition to students following regular departmental programs, Internationally Educated Engineers Qualification (<http://umanitoba.ca/engineering/ieeq/>) (IEEQ) Program participants may also be approved for participation in Co-op/IIP upon written approval of the IEEQ Director.

Work placements must be confirmed to be appropriate by the Co-op/IIP office in order to be credited as a Co-op/IIP work term.

Upon securing a job placement, Engineering students enroll in the course ENG 4800 and subsequently the specific work term of employment ENG 4810, ENG 4820, ENG 4830, ENG 4840.