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 Chemistry 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	Fundamentals of Transportation and Traffic Engineering	4
CIVL 4220	Geotechnical Design	4
CIVL 4380	Infrastructure Engineering and Construction Management	4
CIVL 4390	Reinforced Concrete Structures	4
CIVL 4400	Transportation Engineering Design	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
Five Technical Electives [2]		19-20
One course from the list of Indigenous Knowledge Courses [3]		3-4
Total Hours		**165-167**

1. The former CHEM 1310 may be used in lieu of the combination of CHEM 1110 and CHEM 1126.
2. Technical electives completed as part of a Stream take the place of these general technical electives. 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.
3. 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.

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 [3]	4
CIVL 4028	Building Information Modeling in Construction	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 4412	Design and Operation of Public Transportation Systems	4
CIVL 4420	Pavement Engineering	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] CIVL 4024 can not be held with BIOE 4412 or BIOE 4700.

Indigenous Knowledge Courses

Course	Title	Hours
INDG 1200	Indigenous Peoples in Canada	6
INDG 1220	Indigenous Peoples in Canada, Part 1	3
INDG 1240	Indigenous Peoples in Canada, Part 2	3
INDG 2012	Indigenous History in Canada	6
or HIST 2010	Indigenous History in Canada (C)	
INDG 2020	The Métis in Canada	3
or HIST 2020	The Métis in Canada (C)	
POLS 2802	Introduction to Indigenous Politics	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.

Concentrations [1,2,3,4]

Students wishing to pursue more focused studies in a Civil Engineering subject or research area have the choice to complete one of the following streams. Students can complete only one stream. Courses taken towards a stream take the place of the Technical Electives required in the Civil Engineering program.

Environmental and Water Resources Stream

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

LIST A (select 3 to 5 courses)

Course	Title	Hours
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

LIST B (up to 2 courses, only 1 from ouside 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 [3]	4
SOIL 4500	Remediation of Contaminated Land	3

Geotechnical and Geo-environmental Stream

Five courses are required. Select 5 courses from below.

LIST A

Course	Title	Hours
CIVL 3710	Finite Element Analysis	4
CIVL 4130	Solid Waste Management	4
CIVL 4200	Groundwater Contamination	4
CIVL 4230	Geotechnical Engineering	4
CIVL 4232	Geotechnical Earthquake Engineering	4
CIVL 4250	Groundwater Hydrology	4

LIST B

Course	Title	Hours
CIVL 4332	Civil Engineering Thesis Project [3]	4

Structures and Construction Stream

Five courses are required. A minimum of 3 courses must be taken from List A and up to 2 from List B.

LIST 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 [5]	4
CIVL 4028	Building Information Modeling in Construction	4
CIVL 4030	Advanced Structural Design	4
CIVL 4032	Bridge Engineering	4
CIVL 4040	Structural Dynamics	4

LIST B (up to 2 COURSES)

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 [3]	4

Transportation Stream

Five courses are required. A minimum of 3 courses must be taken from List A and up to 2 from List B.

LIST A (SELECT 3 TO 5 COURSES)

Course	Title	Hours
CIVL 3710	Finite Element Analysis	4
CIVL 4022	Properties and Design of Concrete Mixtures	4
CIVL 4032	Bridge Engineering	4
CIVL 4410	Transportation Systems	4
CIVL 4412	Design and Operation of Public Transportation Systems	4
CIVL 4420	Pavement Engineering	4

LIST B (Up to 2 courses)

Course	Title	Hours
CIVL 4000	Uncertainty Analysis in Civil Engineering Systems	4
CIVL 4332	Civil Engineering Thesis Project [3]	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] Subject to approval of Faculty Advisor.
[4] Current students already admitted to Civil Engineering prior to the introduction of the streams will be eligible to declare a stream.
[5] CIVL 4024 can not be held with BIOE 4412 or BIOE 4700.

Preliminary Engineering Program

Campus Address/General Office: E2-262 EITC
Telephone: (204) 474 9167
Email Address: eng.info@umanitoba.ca (eng_info@umanitoba.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 Chemistry Techniques for Engineering 1 [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 1524 is not an acceptable equivalent to MATH 1510.
[4] PHIL 1290 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.
[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.

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 Preliminary Engineering Program courses before their first work term.
- Completed 42 credit hours towards your degree by the end of the Fall term. Students must return for at least one academic term following the completion of their final work term placement. (Application early in a student's degree program 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

Work placements must be confirmed to be appropriate by the Co-op/IIP office in order 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.

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 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/).