CIVIL ENGINEERING (CIVE)

College of Engineering

Civil Engineering at the University of Guelph prepares graduates to work in interdisciplinary teams to provide the holistic design and operation of infrastructure needed to ensure that urban, rural and industrial areas continue to thrive into the future. Infrastructure systems provide safe and healthy spaces, energy, communication, drinking water, food and materials, as well as mobility for social interaction and economic opportunities. Civil Engineering graduates address challenges such as aging infrastructure, climate change and social inequality. Civil Engineering at Guelph equips students to use interconnected systems analysis, modern sensors and computational techniques to design and operate infrastructure with enhanced resilience to future conditions. It prepares graduates to incorporate new green materials, design for future rehabilitation or disassembly and resource recovery, and ensure that the needs of all members of society are met.

Co-op Requirements (Honours)

This is a major within the degree: Bachelor of Engineering.

The Co-op program in Civil Engineering is a five-year program, including five work terms. Students must follow the academic work schedule as outlined below (also found on the Co-operative Education website: https://www.uoguelph.ca/experiential-learning/current-students/co-op/). All students are admitted into the Co-op stream. Speak with a Program Counsellor for information about moving out of the Co-op stream.

Civil Engineering Academic and Co-op Work Term Schedule

Year	Fall	Winter	Summer
1	Academic Semester 1	Academic Semester 2	Off
2	Academic Semester 3 COOP*1100	Academic Semester 4	COOP*1000 Work Term I
3	COOP*2000 Work Term 2	Academic Semester 5	Academic Semester 6
4	COOP*3000 Work Term 3	COOP*4000 Work Term 4	COOP*5000 Work Term 5
5	Academic Semester 7	Academic Semester 8	

Please refer to the Co-operative Education program policy with respect to work term performance grading, work term report grading and program completion requirements.
For additional program information students should consult with their Co-op Coordinator and Co-op Faculty Advisor, listed on the Co-operative Education web site.

Credit Summary

(24.50 Total Credits)

Code	Title	Credits
Required Core Courses		18.00
Technical Electives (including Area of Emphasis if selected) [1]		2.50
Complementary Studies Electives		1.50
Co-op Work Terms		2.50
Total Credits		**24.5**

[1] Technical Elective credits can include 2.00 credits in an Area of Emphasis.

This major also allows for the completion of one of two Areas of Emphasis as listed. Students are encouraged to speak with a Program Counsellor when choosing an Area of Emphasis. If pursuing an Area of Emphasis, it must be declared prior to the commencement of Semester 5. Students who do not choose an Area of Emphasis must choose electives from the Technical Electives list.

Recommended Program Sequence

Code	Title	Credits
Semester 1 - Fall		
CHEM*1040	General Chemistry I	0.50
ENGG*1100	Engineering and Design I	0.75
ENGG*1500	Engineering Analysis	0.50
MATH*1200	Calculus I	0.50
PHYS*1130	Physics with Applications	0.50
Semester 2 - Winter		
CHEM*1050	General Chemistry II	0.50
CIS*1500	Introduction to Programming	0.50
ENGG*1210	Engineering Mechanics I	0.50
MATH*1210	Calculus II	0.50
PHYS*1010	Introductory Electricity and Magnetism	0.50
Semester 3 - Fall		
COOP*1100	Introduction to Co-operative Education	0.00
ENGG*2160	Engineering Mechanics II	0.50
ENGG*2440	Earth Systems Engineering	0.50
ENGG*2800	Civil Engineering Sustainability and Design	0.75
ENGG*2820	Material Science for Civil Engineers	0.50
MATH*2270	Applied Differential Equations	0.50
Semester 4 - Winter		
ENGG*2230	Fluid Mechanics	0.50
ENGG*2400	Engineering Systems Analysis	0.50
ENGG*3670	Soil Mechanics and Site Characterization	0.50
STAT*2120	Probability and Statistics for Engineers	0.50
ENGG*2540	Water and Climate Justice	0.50
or HIST*1250	Science and Technology in a Global Context	
0.50 restricted electives		
Summer Semester		
COOP*1000	Co-op Work Term I (Summer Semester)	0.50
Fall Semester		
COOP*2000	Co-op Work Term II	0.50
Semester 5 - Winter		
ENGG*3100	Engineering and Design III	0.75
ENGG*3650	Hydrology and Hydraulics	0.50
ENGG*3770	Physics of Livable Buildings	0.50
ENGG*3910	Structural Analysis	0.50
MATH*2130	Numerical Methods	0.50
Semester 6 - Summer		
ENGG*3240	Engineering Economics	0.50

ENGG*3820	Sustainable Materials in Civil Engineering	0.50
ENGG*3880	Field Methods in Civil, Environmental and Water Resources Engineering	0.25
ENGG*3920	Structural Design	0.50
ENGG*4960	Water Infrastructure Design for Cities	0.50
0.50 restricted electives		
Fall Semester		
COOP*3000	Co-op Work Term III	0.50
Winter Semester		
COOP*4000	Co-op Work Term IV	0.50
Summer Semester		
COOP*5000	Co-op Work Term V	0.50
Semester 7 - Fall		
ENGG*3950	Sustainable Transportation Systems	0.50
ENGG*4670	Geotechnical and Geoenvironmental Design	0.50
ENGG*4911	Civil Engineering and Design IV	0.50
1.50 restricted electives		
Semester 8 - Winter		
ENGG*4850	Humanitarian Engineering	0.50
ENGG*4912	Civil Engineering and Design IV	0.50
1.50 restricted electives		

Restricted Electives

(see Program Guide for more information)

The Engineering Program requires Civil Engineering students to complete the following combination of elective credits to complete their program:

- 2.50 Technical Electives from the CIVIL list including 2.00 credits from an Area of Emphasis if selected
- 1.50 credits from Complementary Studies electives

Consult the Program Guide for further information on the prerequisite requirements specific to each elective.

Areas of Emphasis

Students may choose to complete one of the following Areas of Emphasis. Each Area of Emphasis is 2.00 credits in a single field of study.

Urban Water Infrastructure

Code	Title	Credits
ENGG*3220	Groundwater Engineering	0.50
ENGG*4250	River Hydraulic Design for Sustainability and Resiliency	0.75
ENGG*4630	Asset Management and Infrastructure Rehabilitation	0.50
ENGG*4970	Green Infrastructure Design for Stormwater Management	0.50

Smart Systems

Code	Title	Credits
ENGG*3680	Introduction to AI for Civil Engineering	0.50
ENGG*4830	Modelling Complex Systems for Civil Engineering	0.50
ENGG*4840	Sensor Networks and Internet of Things for Civil Engineering	0.50
ENGG*4950	Remote Sensing and Spatial Data Analysis	0.50

Major Requirements (Honours)

All Civil Engineering students are admitted into the Co-op stream. Students who withdraw from the Co-op stream must speak with their Program Counsellor about completing the other program requirements. At least one summer academic semester will be required for students who complete the non-Co-op stream.

This major also allows for the completion of one of two Areas of Emphasis as listed. Students are encouraged to speak with a Program Counsellor when choosing an Area of Emphasis. If pursuing an Area of Emphasis, it must be declared prior to the commencement of Semester 5. Students who do not choose an Area of Emphasis must choose electives from the Technical Electives list.

Credit Summary

(22.00 total credits)

Code	Title	Credits
Required Core Courses		18.00
Technical Electives (including Area of Emphasis if selected) [1]		2.50
Complementary Studies Electives		1.50
Total Credits		**22**

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Core Courses

Code	Title	Credits
CHEM*1040	General Chemistry I	0.50
CHEM*1050	General Chemistry II	0.50
CIS*1500	Introduction to Programming	0.50
ENGG*1100	Engineering and Design I	0.75
ENGG*1210	Engineering Mechanics I	0.50
ENGG*1500	Engineering Analysis	0.50
ENGG*2160	Engineering Mechanics II	0.50
ENGG*2230	Fluid Mechanics	0.50
ENGG*2400	Engineering Systems Analysis	0.50
ENGG*2440	Earth Systems Engineering	0.50
ENGG*2540	Water and Climate Justice	0.50
or HIST*1250	Science and Technology in a Global Context	
ENGG*2800	Civil Engineering Sustainability and Design	0.75
ENGG*2820	Material Science for Civil Engineers	0.50
ENGG*3100	Engineering and Design III	0.75
ENGG*3240	Engineering Economics	0.50
ENGG*3650	Hydrology and Hydraulics	0.50
ENGG*3670	Soil Mechanics and Site Characterization	0.50
ENGG*3770	Physics of Livable Buildings	0.50
ENGG*3820	Sustainable Materials in Civil Engineering	0.50
ENGG*3880	Field Methods in Civil, Environmental and Water Resources Engineering	0.25
ENGG*3910	Structural Analysis	0.50

ENGG*3920	Structural Design	0.50
ENGG*3950	Sustainable Transportation Systems	0.50
ENGG*4670	Geotechnical and Geoenvironmental Design	0.50
ENGG*4850	Humanitarian Engineering	0.50
ENGG*4911	Civil Engineering and Design IV	0.50
ENGG*4912	Civil Engineering and Design IV	0.50
ENGG*4960	Water Infrastructure Design for Cities	0.50
MATH*1200	Calculus I	0.50
MATH*1210	Calculus II	0.50
MATH*2130	Numerical Methods	0.50
PHYS*1010	Introductory Electricity and Magnetism	0.50
PHYS*1130	Physics with Applications	0.50
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