Civil Engineering focuses on the analysis, design, and improvement of the human environment—both natural and constructed. Our students will learn how the world works and will provide improvements in the overall quality of life, make better use of limited resources, develop sustainable technologies, and create attractive and functional places to live and work.

Civil Engineering at Queen's University prepares students to identify emerging issues and develop innovative solutions to the numerous civil engineering, societal, and global challenges of the future.

The core undergraduate curriculum covers the key components of today's Civil Engineering professions. The study of environmental and sustainability issues is integrated throughout the academic plan to better reflect that the assessment of these concerns is integral to all civil engineering projects. The first three years of our plan provide broad-based training in: mathematics; science (physics, chemistry & geology); fluid, structural and soil mechanics; materials (water, concrete, steel, soil & plastics); and engineering problem solving & design. Students in their fourth year are able to either specialize in an area of interest, or further diversify their training. Specialization can be under the themes of buildings & structures, water & the environment, or geoengineering. This student choice arises in the selection of: technical electives, topics for realistic design projects, areas to conduct advanced research, and practical industrial internships.

Courses

CIVL 200 Professional Skills I Units: 2.50
This intensive short-course serves as a kickoff to Civil Engineering at Queen's. Students will be engaged in a design challenge where they are to conceive, design, implement and operate a system to achieve some specified function bounded by constraints. Focus will be placed on development of decision making, team building, communication and engineering design skills.
K2.5(Lec: 0, Lab: 0, Tut: 0)
Requirements: Prerequisites: Must be registered in BSCE or BASC program. Corequisites: Exclusions:
Offering Term: F
CEAB Units:
Mathematics 0
Natural Sciences 0
Complementary Studies 8
Engineering Science 0
Engineering Design 20
Offering Faculty: Fac of Engineering Appl Sci

Programs

- Civil Engineering, B.A.Sc. (Class of 2024) (https://queensu-ca-public.courseleaf.com/engineering-applied-sciences/academic-plans/civil-engineering/civil-engineering-basc-class-2023/)
- Civil Engineering, B.A.Sc. (Class of 2025) (https://queensu-ca-public.courseleaf.com/engineering-applied-sciences/academic-plans/civil-engineering/civil-engineering-basc-class-2024/)
- Civil Engineering, B.A.Sc. (Class of 2026) (https://queensu-ca-public.courseleaf.com/engineering-applied-sciences/academic-plans/civil-engineering/civil-engineering-basc-class-2026/)
- Civil Engineering: Technical Electives (https://queensu-ca-public.courseleaf.com/engineering-applied-sciences/academic-plans/civil-engineering/civil-engineering-technical-electives/)
CIVL 201  Professional Skills  Units: 2.50
Within a team structure potentially involving second, third, and fourth year Civil Engineering students and a faculty advisor, students will engage in a range of exercises designed to promote written and verbal communication, decision making, team building and engineering design skills. Lectures, workshops, design charrettes and both individual and team assignments will be utilized to enhance learning. This course is available only to select students, under exceptional or extenuating circumstances, at the discretion of the Head of the Department and the Undergraduate Chair. (This course may not be offered every year).
(Lec: 0.5, Lab: 1, Tut: 1)
Requirements: Prerequisites: Permission of the Department
Corequisites: Exclusions: CIVL 200
Offering Term: FW
CEAB Units:
Mathematics 0
Natural Sciences 0
Complementary Studies 14
Engineering Science 7
Engineering Design 7
Offering Faculty: Fac of Engineering Appl Sci

CIVL 210  Chemistry For Civil Engineers  Units: 4.50
Application of fundamental chemistry principles with respect to their sources, reactions, effects and fates in civil and environmental engineering systems. Topics will include chemical equilibria, stoichiometry and reaction kinetics; electrochemistry and corrosion; adsorption and ion exchange; solubility and precipitation; coagulation; microbiological reactions and kinetics; biochemical, chemical and theoretical oxygen demand; acidity, alkalinity and hardness; as well as biogeochemical cycles. These concepts will be further developed and applied in tutorial and laboratory modules. A design-based laboratory is conducted as part of this course. Personal Protective Equipment (PPE) will be required for this course at student's cost (see course materials for details).
(Lec: 3, Lab: 1, Tut: 0.5)
Requirements: Prerequisites: APSC 132 Corequisites: Exclusions:
Offering Term: F
CEAB Units:
Mathematics 0
Natural Sciences 12
Complementary Studies 0
Engineering Science 32
Engineering Design 10
Offering Faculty: Fac of Engineering Appl Sci

CIVL 215  Materials For Civil Engineers  Units: 4.50
The basic engineering properties, micro/macro structure, behaviour and applications of various civil engineering materials will be studied including materials used in structural engineering, hydrotechnical engineering, geotechnical engineering and environmental engineering. This will include concrete, steel, timber, polymers, composites and soil. Interaction between materials will be examined. Laboratory experiments will be used to demonstrate material behaviour. PPE will be required for this course student's cost (see course materials for details).
(Lec: 3, Lab: 1, Tut: 0.5)
Requirements: Prerequisites: APSC 151 Corequisites: Exclusions:
Offering Term: W
CEAB Units:
Mathematics 0
Natural Sciences 0
Complementary Studies 0
Engineering Science 32
Engineering Design 10
Offering Faculty: Fac of Engineering Appl Sci

CIVL 220  Statics And Solid Mechanics  Units: 4.00
Review of statics, forces and equilibrium, internal forces in simple structures; axial, torsion, shear and moment diagrams; concepts of stress and strain; mechanical properties of materials; centroids and moments of areas; axial stress; flexural stress; shear stress in shafts and beams; calculation of displacement by integration; introduction to combined loading; introduction to column buckling. This course is designed primarily for mechanical engineering students.
COURSE DELETED
(Lec: 3, Lab: 0.25, Tut: 0.75)
Requirements: Prerequisites: APSC 111, APSC 171.
Permission of the department for students not registered in Mechanical Engine Corequisites: Exclusions:
Offering Term: F
CEAB Units:
Mathematics 0
Natural Sciences 0
Complementary Studies 0
Engineering Science 48
Engineering Design 0
Offering Faculty: Fac of Engineering Appl Sci
CIVL 222  Numerical Methods  Units: 5.00
This course introduces the basics of numerical analysis and
the use of computer software (MATLAB) for civil engineering
analysis. Error analysis, numerical differentiation and
integration, root finding, derivation and numerical solution of
partial differential equations using finite difference methods,
and optimization are among the topics covered. All problems
emphasize engineering applications.
(Lec: 4, Lab: 1, Tut: 0)
Requirements: Prerequisites: MTHE 224 (MATH 224) or
MTHE 225 (MATH 225) or MTHE 226 (MATH 226) Corequisites:
Exclusions:
Offering Term: W
CEAB Units:
Mathematics 45
Natural Sciences 0
Complementary Studies 0
Engineering Science 15
Engineering Design 0
Offering Faculty: Fac of Engineering Appl Sci

CIVL 230  Solid Mechanics I  Units: 4.25
Graphic Statics; Definitions of Stress and Strain; Hooke's Law;
Axial Member Analysis and Design; Analysis and Design of
Shafts Subjected to Torsion; Analysis and Design of Beams;
Columns; Inelastic Bending; Introduction to Work and Energy
and the Principle of Virtual Work
(Lec: 3, Lab: 0.5, Tut: 0.75)
Requirements: Prerequisites: APSC 111, APSC 171, APSC 182
Corequisites: Exclusions: MECH 221
Offering Term: F
CEAB Units:
Mathematics 0
Natural Sciences 0
Complementary Studies 0
Engineering Science 50
Engineering Design 0
Offering Faculty: Fac of Engineering Appl Sci

CIVL 231  Solid Mechanics II  Units: 4.50
Shear and bending moment diagrams; Moment-area method;
Introduction to statically indeterminate structures; Virtual
work for beams and frames (determinate and indeterminate);
Stress review, transformed sections, and combined loading;
Stress-strain transformation (including Mohr’s circle); Failure
theories.
(Lec: 3, Lab: 0.5, Tut: 1)
Requirements: Prerequisites: CIVL 230 Corequisites:
Exclusions:
Offering Term: W
CEAB Units:
Mathematics 0
Natural Sciences 0
Complementary Studies 0
Engineering Science 54
Engineering Design 0
Offering Faculty: Fac of Engineering Appl Sci

CIVL 250  Hydraulics I  Units: 4.00
Fluid properties, fluid statics, basic equations of fluid flow:
Continuity, Momentum, Euler's Equation of Motion, Linear
Momentum Equation and Bernoulli's Equation. Flow of real
fluid in closed conduits: friction losses and local energy
losses. Pipeline flows in engineering practice. PPE will
be required for this course at student's cost (see course
materials for details)
(Lec: 3, Lab: 0.5, Tut: 0.5)
Requirements: Prerequisites: APSC 172, APSC 174
Corequisites: Exclusions:
Offering Term: W
CEAB Units:
Mathematics 0
Natural Sciences 4
Complementary Studies 0
Engineering Science 22
Engineering Design 22
Offering Faculty: Fac of Engineering Appl Sci
CIVL 300  Professional Skills II  Units: 2.50
Professional skills relating to how engineers interact with, communicate with, and consider the implications of their actions on a wide range of potential stakeholders, ranging from colleagues to clients to society as a whole, will be developed. Students will improve their technical writing and verbal communication skills as they work through case studies intended to: deepen an understanding of the roles and responsibilities of a Professional Engineer; strengthen an ability to apply professional ethics, accountability and equity; and enhance an appreciation of the potential social and environmental impacts of engineering activities. Class discussions will normally occur every second week.
K2.5(Lec: 0.5, Lab: 1, Tut: 1)
Requirements: Prerequisites: CIVL 200 Corequisites:
Exclusions:
Offering Term: F
CEAB Units:
Mathematics 0
Natural Sciences 0
Complementary Studies 28
Engineering Science 0
Engineering Design 0
Offering Faculty: Fac of Engineering Appl Sci

CIVL 331  Structural Steel and Timber Design  Units: 4.00
The objective of this course is to develop an understanding of the fundamentals in the design of steel and timber structures. To develop this understanding, the course focuses in-depth on the behaviour of steel and timber at the material, element, and system levels with specific reference to standards/codes practicing engineers use when designing with steel and timber in Canada, including CSA S16 and CSA O86. Students will learn how to design and analyze steel and timber tension members, columns, beams (laterally supported and laterally unsupported), beam-columns, and connections.
(Lec: 3, Lab: 0, Tut: 1)
Requirements: Prerequisites: CIVL 330 Corequisites:
Exclusions:
Offering Term: W
CEAB Units:
Mathematics 0
Natural Sciences 0
Complementary Studies 0
Engineering Science 12
Engineering Design 36
Offering Faculty: Fac of Engineering Appl Sci

CIVL 330  Structural Analysis  Units: 4.00
Analysis of statically determinate structures such as trusses and plane frames, calculation of deflections by virtual work. Flexibility and stiffness methods for analyzing statically indeterminate structures. Computer applications of the above methods.
(Lec: 3, Lab: 0.5, Tut: 0.5)
Requirements: Prerequisites: CIVL 230, CIVL 231
Corequisites: Exclusions:
Offering Term: F
CEAB Units:
Mathematics 0
Natural Sciences 0
Complementary Studies 0
Engineering Science 48
Engineering Design 0
Offering Faculty: Fac of Engineering Appl Sci

CIVL 336  Structural Steel/Concrete Des  Units: 4.00
Requirements: CIVL226 OR CIVL228 OR CIVL226
Offering Term: F
CEAB Units:
Mathematics 0
Natural Sciences 0
Complementary Studies 0
Engineering Science 8
Engineering Design 40
Offering Faculty: Fac of Engineering Appl Sci
CIVL 340  Geotechnical Engineering 1  Units: 4.00
An introductory course focussing on the fundamental mechanics of soil materials (gravel, sand, silt and clay) applied to geotechnical engineering problems. Topics studied include: phase relationships; index properties of coarse and fine grained soils; one-dimensional steady state seepage; effective stress; one-dimensional compression and consolidation; drained and undrained shear strength; and lateral earth pressure. Theoretical material is applied to examine real engineering issues with a particular focus on developing design skills and engineering judgement. Students will conduct physical experiments to explore soil behaviour. The important role of geology on the mechanics of geotechnical materials is emphasized through classroom discussions and problem sets. PPE will be required for this course at student's cost (see course materials for details).
(Lec: 3, Lab: 0.5, Tut: 0.5)
Requirements: Prerequisites: CIVL 215 or GEOE 281 (GEOL 281), CIVL 230 Corequisites: Exclusions:
Offering Term: F
CEAB Units:
Mathematics 0
Natural Sciences 0
Complementary Studies 0
Engineering Science 36
Engineering Design 12
Offering Faculty: Fac of Engineering Appl Sci

CIVL 341  Geotechnical Engineering 2  Units: 4.00
A course focusing on design issues and methods of analysis for practical geotechnical engineering problems. Topics studied include: site investigation; capacity and settlement of shallow and deep foundations; two-dimensional steady state seepage; landslides and slope stability. Commercial software will be introduced to perform stability, deformation and seepage analyses. Students will conduct physical experiments to explore how design methods compare with real soil behaviour. The important role of geology in geotechnical design is emphasized through classroom discussions and problem sets. PPE will be required for this course at student's cost (see course materials for details).
(Lec: 3, Lab: 0.5, Tut: 0.5)
Requirements: Prerequisites: CIVL 340 Corequisites: Exclusions:
Offering Term: W
CEAB Units:
Mathematics 0
Natural Sciences 0
Complementary Studies 0
Engineering Science 36
Engineering Design 12
Offering Faculty: Fac of Engineering Appl Sci

CIVL 342  Geotechnical Design  Units: 4.00
A study of foundation design methods including stress distribution, slope stability, lateral earth pressure, retaining walls, braced walls, anchors, ultimate bearing capacity, foundation design, and piles. (0/0/0/12/36)~ COURSE DELETED IN 2008/09 ~
Requirements: CIVL340
Offering Term: W
CEAB Units:
Mathematics 0
Natural Sciences 0
Complementary Studies 0
Engineering Science 12
Engineering Design 36
Offering Faculty: Fac of Engineering Appl Sci

CIVL 350  Hydraulics 2  Units: 4.00
Topics in open channel flow including friction, specific energy, free-surface profiles, culverts and hydraulic-jump energy dissipaters. Lake dynamics and environmental hydraulics will be introduced. The basic underlying concepts of water resources and hydrology will be discussed.
(Lec: 3, Lab: 0.5, Tut: 0.5)
Requirements: Prerequisites: CIVL 250 Corequisites: Exclusions:
Offering Term: F
CEAB Units:
Mathematics 0
Natural Sciences 0
Complementary Studies 0
Engineering Science 18
Engineering Design 30
Offering Faculty: Fac of Engineering Appl Sci

CIVL 355  Introd. Hydraulic Engineering  Units: 4.00
Topics in open channel flow including friction, specific energy, free-surface profiles, culverts and hydraulic-jump energy dissipaters. Turbomachinery including pump characteristics, pump selection and analysis of combinations of pumps and piping systems. Fluid measurement, lift and drag, cavitation and water hammer, dispersion and diffusion are also discussed. (0/5/0/10/33) ~ COURSE DELETED IN 2008/09 ~
Requirements: CIVL354
Offering Term: W
CEAB Units:
Mathematics 0
Natural Sciences 5
Complementary Studies 0
Engineering Science 10
Engineering Design 33
Offering Faculty: Fac of Engineering Appl Sci

queensu.ca/academic-calendar
CIVL 360 Civil Engineering Design and Practice III Units: 4.00
Students will develop and employ Engineering Design and Practice skills to resolve a complex, open-ended design task. This will involve the iterative application of Civil Engineering technical knowledge to identify and evaluate design options. The economic, environmental and societal implications of the preferred solution(s) will be assessed. Students will select, detail and communicate their final design in a logical, traceable and defendable manner. Ethical, legal and other relevant professional issues will be studied and discussed through case studies. Students will also develop and enhance written, graphical and oral communications skills.
Requirements: Prerequisites: APSC 200 Corequisites: Exclusions:
Offering Term: W
CEAB Units:
Mathematics 0
Natural Sciences 0
Complementary Studies 12
Engineering Science 0
Engineering Design 36
Offering Faculty: Fac of Engineering Appl Sci

CIVL 377 Water and Wastewater Units: 4.00
The focus of this course is to introduce water and wastewater engineering systems through active learning strategies and hands-on lab experiences. Students will have the opportunity to learn about environmental indicators/measurements/guidelines, reactors, engineered and natural systems, biological and chemical reactions, mass and energy balances, risk assessment, life cycle assessment, and environmental and human health impact assessment. These concepts will allow students to assess a variety of aspects of environmental engineering and design.
(Lec: 3, Lab: 1, Tut: 0)
Requirements: Prerequisites: CIVL 210 Corequisites: Exclusions:
Offering Term: W
CEAB Units:
Mathematics 0
Natural Sciences 12
Complementary Studies 0
Engineering Science 20
Engineering Design 16
Offering Faculty: Fac of Engineering Appl Sci

CIVL 372 Groundwater Engineering Units: 4.00
This course introduces students to the fundamentals of groundwater systems with an emphasis on the engineering design of extraction systems for water supply, site dewatering, and parameter estimation tests. Source water protection methods will be discussed. Equations governing the flow of groundwater, flownets, and capture zones are presented. Detailed case histories are presented. Laboratories make extensive use of commercial grade software for surface and groundwater flow simulation.
(Lec: 3, Lab: 0.5, Tut: 0.5)
Requirements: Prerequisites: MTHE 224 or MTHE 225 or MTHE 232 Corequisites: Exclusions:
Offering Term: F
CEAB Units:
Mathematics 0
Natural Sciences 0
Complementary Studies 0
Engineering Science 34
Engineering Design 14
Offering Faculty: Fac of Engineering Appl Sci

CIVL 400 Professional Skills III Units: 2.50
Professional skills relating to how engineers interact with, communicate with, and consider the implications of their actions on a wide range of potential stakeholders, ranging from colleagues to clients to society as a whole, will be developed. Students will improve their technical writing and verbal communication skills as they work through case studies intended to: deepen an understanding of the roles and responsibilities of a Professional Engineer; strengthen an ability to apply professional ethics, accountability and equity; and enhance an appreciation of the potential social and environmental impacts of engineering activities. Class discussions will normally occur every second week.
K2.5(Lec: 0.5, Lab: 1, Tut: 1)
Requirements: Prerequisites: CIVL 300 Corequisites: CIVL 460 Exclusions:
Offering Term: F
CEAB Units:
Mathematics 0
Natural Sciences 0
Complementary Studies 28
Engineering Science 0
Engineering Design 0
Offering Faculty: Fac of Engineering Appl Sci
CIVL 430 Reinforced Concrete Design Units: 4.00
Flexural design of reinforced concrete beams including singly reinforced sections, doubly reinforced sections, T-sections, and one-way slabs. Control of cracking in reinforced concrete beams as specified for design. Design of continuous beams and one-way slabs; short and slender columns; footings deflections; development of reinforcement. A laboratory design project is undertaken in this course. PPE will be required for this course at student’s cost (see course materials for details).
(Lec: 3, Lab: 0.5, Tut: 0.5)
Requirements: Prerequisites: CIVL 215, CIVL 330, CIVL 331
Corequisites: Exclusions:
Offering Term: F
CEAB Units:
Mathematics 0
Natural Sciences 0
Complementary Studies 0
Engineering Science 12
Engineering Design 36
Offering Faculty: Fac of Engineering Appl Sci

CIVL 431 Infrastructure Rehabilitation Units: 4.00
This course deals with evaluation of the deterioration of the infrastructure and the design of rehabilitation measures. Items discussed include corrosion of reinforcement in concrete, microbiological corrosion of buried pipelines, asphalt deterioration and repair, deterioration of timber in buildings, and issues of sustainability of infrastructure. Design techniques to reduce deterioration in new construction are also discussed. The laboratory portion involves some of the test methods used to evaluate deterioration and field trips to observe some common forms of deterioration. PPE will be required for this course at student’s cost (see course materials for details).
(Lec: 3, Lab: 0.5, Tut: 0.5)
Requirements: Prerequisites: CIVL 430 Corequisites: Exclusions:
Offering Term: W
CEAB Units:
Mathematics 0
Natural Sciences 0
Complementary Studies 0
Engineering Science 24
Engineering Design 24
Offering Faculty: Fac of Engineering Appl Sci

CIVL 436 Prestressed Concrete Units: 4.00
Behaviour, analysis and design of pretensioned and post-tensioned concrete systems including simply-supported and continuous beams, and two-way slabs. Considerations of prestress losses, cracking and deflection. A design project is undertaken in this course. Three term-hours, winter; lectures and tutorials.
(Lec: 3, Lab: 0, Tut: 1)
Requirements: Prerequisites: CIVL 430 Corequisites: Exclusions:
Offering Term: W
CEAB Units:
Mathematics 0
Natural Sciences 0
Complementary Studies 0
Engineering Science 24
Engineering Design 24
Offering Faculty: Fac of Engineering Appl Sci

CIVL 442 Geotechnical Design Units: 4.00
A design-based course where geotechnical principles are applied to study the design of a variety of geotechnical engineering structures. Topics studied include: design of a site investigation program, interpretation of site stratigraphy, estimation of soil parameters, design of shallow and/or deep foundations, design of earth retaining structures, and construction issues such as dewatering schemes or temporary excavations. Students will conduct practical design tasks to experience a range of aspects of the geotechnical design process, to utilize common models used in geotechnical design, and to communicate with project partners such as structural consultants, site investigation companies, and construction contractors. The important role of geology in geotechnical problems is emphasized through classroom discussions, planning a site investigation and constructing a geologic model.
(Lec: 3, Lab: 0, Tut: 1)
Requirements: Prerequisites: CIVL 341 Corequisites: Exclusions:
Offering Term: F
CEAB Units:
Mathematics 0
Natural Sciences 0
Complementary Studies 0
Engineering Science 12
Engineering Design 36
Offering Faculty: Fac of Engineering Appl Sci
CIVL 443  Geoenvironmental Design  Units: 4.00
A design-based course where geotechnical and hydrogeologic principles are applied to study environmentally sustainable disposal of solid waste. Topics studied include: source and nature of waste: disposal options; environmental legislation and regulations; public impact and perception; contaminant transport; use of geosynthetic materials; and design issues and tradeoffs. Students will conduct practical design tasks to investigate the planning, design, construction, operation and post-closure of phases of an engineered waste disposal facility. The important role of geology in geoenvironmental problems is emphasized through classroom discussions, planning a site investigation and constructing a geologic model.
(Lec: 3, Lab: 1, Tut: 0)
**Requirements:** Prerequisites: CIVL 340 or permission of the department Corequisites: Exclusions:
**Offering Term:** W
**CEAB Units:**
Mathematics 0
Natural Sciences 0
Complementary Studies 0
Engineering Science 12
Engineering Design 36
**Offering Faculty:** Fac of Engineering Appl Sci

CIVL 450  Municipal Hydraulics  Units: 4.00
The course will present concepts and tools to analyze and design water services, including storm sewers, sanitary sewers, and water mains, at the site- and sub-division level. Many of the concepts and tools are used in the fields of land-development engineering and municipal engineering. The course will provide an introduction to hydrological processes, design rainfall prediction with intensity-duration-frequency curves, estimation of time of concentration, peak runoff prediction in small drainage areas with the Rational Method and the unit hydrograph method, reservoir routing and storm water management tank and pond design, storm sewer analysis and design with Manning’s equation, wastewater flow prediction, sanitary sewer analysis and design, water demand prediction, sanitary sewer analysis and design, water demand prediction, steady-state analysis of pressurized pipes, water main design, and designing water services according to municipal design standards.
(Lec: 3, Lab: 0, Tut: 1)
**Requirements:** Prerequisites: CIVL 350 Corequisites:
Exclusions:
**Offering Term:** F
**CEAB Units:**
Mathematics 12
Natural Sciences 0
Complementary Studies 0
Engineering Science 24
Engineering Design 12
**Offering Faculty:** Fac of Engineering Appl Sci

CIVL 451  Lake, Reservoir and Coastal  Units: 4.00
The fundamental hydraulic processes affecting coastal engineering and water reservoir operation are discussed. Topics include wave theory, wave measurement, wave record analysis, wave transformation, seiches, tides, storm surges, turbulent mixing and transport of pollutants. Student projects are assigned on computational water reservoir modelling, analysis of field data and reservoir operation as well as the design of breakwaters and ocean structures and the use of hydraulic and numerical coastal models.
(Lec: 3, Lab: 0.5, Tut: 0.5)
**Requirements:** Prerequisites: CIVL 350, or permission of the department Corequisites: Exclusions:
**Offering Term:** F
**CEAB Units:**
Mathematics 0
Natural Sciences 0
Complementary Studies 0
Engineering Science 26
Engineering Design 22
**Offering Faculty:** Fac of Engineering Appl Sci
CIVL 455 River Engineering Units: 4.00
A course in the basics of river engineering including the study of alluvial processes, the prediction and consequences of sediment transport, the design of measures to control erosion and accretion, and the design of dams, spillways and diversions. Critical aspects in the design of river engineering structures and assessment of environment impact of river engineering projects are discussed. The use of physical and numerical models in the practice of river engineering is illustrated. The principles of natural channel design, stream restoration, and bioengineering in river environments are also addressed.
(Lec: 3, Lab: 0.5, Tut: 0.5)
Requirements: Prerequisites: CIVL 350 Corequisites:
Exclusions:
Offering Term: W
CEAB Units:
Mathematics 0
Natural Sciences 0
Complementary Studies 24
Engineering Design 24
Offering Faculty: Fac of Engineering Appl Sci

CIVL 460 Civil Engineering Design and Practice IV Units: 6.00
This fourth year design capstone course has student teams undertake a comprehensive engineering design project which involves the creative, interactive process of designing a structure/system to meet a specified need subject to economic, health, safety and environmental constraints. The teams will work in collaboration with an industry partner. Each team will submit an engineering report and make an oral presentation PPE will be required for this course at student’s cost (see course materials for details)
K6(Lec: Yes, Lab: No, Tut: Yes)
Requirements: Prerequisites: APSC 200, APSC 293, CIVL 360, CIVL 330, CIVL 340, CIVL 350, CIVL 371 or in final 16 months of CIVL program. Corequisites: Exclusions:
Offering Term: FW
CEAB Units:
Mathematics 0
Natural Sciences 0
Complementary Studies 12
Engineering Science 0
Engineering Design 60
Offering Faculty: Fac of Engineering Appl Sci

CIVL 471 Subsurface Contamination Units: 4.00
This course deals with subsurface contamination by hazardous industrial liquids such as PCB oils, gasoline, jet fuel, chlorinated solvents and coal tars. The fundamentals of multiphase/multicomponent flow and transport in soil and groundwater are outlined followed by specific treatment of both dense and light non-aqueous phase liquids. The course will examine the subsurface distribution of these liquids, site characterization methods, indoor air intrusion, regulatory aspects, remediation technologies, and selected case histories.
(Lec: 3, Lab: 0, Tut: 1)
Requirements: Prerequisites: CIVL 371, or GEOE 343 (GEOL 343), or permission of the department Corequisites:
Exclusions:
Offering Term: F
CEAB Units:
Mathematics 0
Natural Sciences 0
Complementary Studies 24
Engineering Science 34
Engineering Design 14
Offering Faculty: Fac of Engineering Appl Sci

CIVL 472 Water Treatment Units: 4.00
This course describes the physical-chemical treatment processes for water treatment. Students in this course will learn about the chemical and microbiological constituents in source water that determine downstream treatment requirements. Students will explore the fundamental physical, chemical and biological principles that govern unit operations (e.g. coagulation and flocculation; screening, sedimentation, and flotation; filtration; disinfection) and their applications in water treatment plants. Students will learn about plant optimization and apply systems thinking to analyze and design water treatment scenarios. The responsibilities of a professional engineer in ensuring safe drinking water will also be discussed.
(Lec: 3, Lab: 0.5, Tut: 0.5)
Requirements: Prerequisites: CIVL 372 Corequisites:
Exclusions:
Offering Term: W
CEAB Units:
Mathematics 0
Natural Sciences 0
Complementary Studies 0
Engineering Science 36
Engineering Design 12
Offering Faculty: Fac of Engineering Appl Sci
CIVL 473  Water Resources Systems  Units: 4.00  
This course will present concepts and tools for designing and modelling large-scale water resources systems in urban catchments. Focus will be placed on the design and analysis of urban drainage systems and urban water supply/distribution systems at the catchment level. Hydrologic, hydraulic, and statistical modelling tools used in industry will be used to evaluate the performance of water resources systems. Topics will include: the urban water cycle, environmental considerations in master planning of drainage and water supply systems, climate change impacts on water resources systems, floodplain analysis and flood control, statistical analysis of rainfall and stochastic hydrology, continuous simulation modelling, planning and modelling of large-scale urban drainage systems, planning and modelling of large-scale water distribution systems, reliability analysis and water quality analysis of water distribution systems, and the master planning process for urban drainage and drinking water systems.  
(Lec: 3, Lab: 0, Tut: 1)  
**Requirements:** Prerequisites: CIVL 350  
**Offering Term:** W  
**CEAB Units:**  
Mathematics 12  
Natural Sciences 0  
Complementary Studies 0  
Engineering Science 24  
Engineering Design 12  
**Offering Faculty:** Fac of Engineering Appl Sci  

CIVL 490  Selected Topics in Civil Engineering  Units: 4.00  
Providing advanced study and application of selected topics in Civil Engineering, this course will be offered periodically by visiting faculty and professionals. Consult the department homepage for opportunities.  
(Lec: 3, Lab: 0, Tut: 1)  
**Requirements:** Prerequisites: Successful completion of 3rd year Civil Engineering and permission of the Department.  
**Offering Term:** W  
**CEAB Units:**  
Mathematics 0  
Natural Sciences 0  
Complementary Studies 0  
Engineering Science 48  
Engineering Design 0  
**Offering Faculty:** Fac of Engineering Appl Sci  

CIVL 491  Selected Topics in Civil Engineering  Units: 4.00  
Providing advanced study and application of selected topics in Civil Engineering, this course will be offered periodically by visiting faculty and professionals. Consult the department homepage for opportunities.  
(Lec: 3, Lab: 0, Tut: 1)  
**Requirements:** Prerequisites: Successful completion of 3rd year Civil Engineering and permission of the Department.  
**Offering Term:** W  
**CEAB Units:**  
Mathematics 0  
Natural Sciences 0  
Complementary Studies 0  
Engineering Science 48  
Engineering Design 0  
**Offering Faculty:** Fac of Engineering Appl Sci  

CIVL 500  Civil Engineering Thesis  Units: 4.00  
Working closely with a faculty member, students will conduct research on a civil engineering or related applied science topic. Students will: identify a problem; formulate a research question; and devise and implement a research plan. The nature of the research may involve obtaining experimental measurements, performing field testing and/or numerical analysis, and analyzing and interpreting research results. Students will prepare a comprehensive, written technical report and will defend their research in an oral examination. Registration is limited to a maximum of twenty (20) students PPE will be required for this course at student's cost (see course materials for details).  
K4(Lec: Yes, Lab: Yes, Tut: Yes)  
**Requirements:** Prerequisites: successful completion of 3rd year civil engineering with a minimum sessional average of 70%  
**Offering Term:** FW  
**CEAB Units:**  
Mathematics 0  
Natural Sciences 0  
Complementary Studies 24  
Engineering Science 24  
Engineering Design 0  
**Offering Faculty:** Fac of Engineering Appl Sci