CEE Graduate Course Descriptions – Fall 2024

GENG-8020-35, 36: Engineering Project Management
This course will expose students to principles, concepts, and tools utilized in project management activities. This course will include topics such as defining project scope, and time, cost, risk, procurement and stakeholder management. The students will be engaged in working on a major project to develop proficiency in project management activities and tools. (Open to Masters of Engineering and Masters of Engineering Management students, excluding students in the MEng Auto Program. Open to engineering MASc/PhD students on permission of the department/faculty as a qualifying course only. Will not count for credit towards MASc/PhD degree.
Instructor: TBA

CIVL 8020-1: Building Information Modeling
Practical and theoretical applications of building information modeling (BIM) in civil and environmental engineering projects. Understand BIM standards (e.g., ISO), use BIM software for buildings, and conduct BIM-based analysis (e.g., solar analysis, structural analysis, and energy analysis). Enhance the efficiency of project management with the aid of BIM.
(Antirequisite: CIVL 8900-50.)
Instructor: TBA

CIVL 8210-1: Finite Element Methods for Solids and Structures
Structural idealization; stress analysis of 2-D and 3-D solids; error estimation and mesh adaptivity; elastic formulations and uses of beam, plate and shell elements; nonlinear formulations; structural stability; introduction to finite element methods in structural design optimization. (3 lecture hours a week.)
Instructor: Dr. F. Gherib

CIVL 8310-1: Prestressed Concrete
Materials, principles of prestressing systems; prestressing losses; analytical treatment of the effect of shrinkage, creep of concrete, and cable friction on stresses; analysis and design of statically determinate and indeterminate structures; design codes; research background; introduction to prefabricated concrete structures. (3 lecture hours a week.)
Instructor: TBA

CIVL 8620-1: Contaminants Fate and Transport in the Environment (See ENVE 8620-1)

CIVL 8900-7: Special Topics: Advanced ITS Methods
The course will focus on discussing the vehicle-to-vehicle and vehicle-to-infrastructure communications and sensing technologies, and various transportation-based applications on Connected and Autonomous Vehicles (CAVs). The course will provide students with a concrete understanding of the transportation side of the CAVs-based system. The goal of this course is to bring the awareness of the emerging technologies and applications in CAVs. State-of-the-art theories and methodologies developed as well as case studies will be integrated into the curriculum.
Instructor: Dr. Y. H. Kim

CIVL 8900-23: Special Topics: Wind Engineering
This course is designed to expose students to the field of wind engineering by covering the key aspects in this subject: Historical development of wind engineering. Wind Climate, atmospheric boundary layer, wind turbulence. Statistics of mean wind climate, mathematical models for wind statistics, estimation of extreme winds. Basic bluff-body aerodynamics, flow around bluff bodies, pressure and force coefficients, fluctuating forces and pressures. Wind-induced response of structures, static wind load, dynamic wind

load, vortex-induced vibration, galloping, torsional divergence, flutter, buffeting. Wind Tunnel Testing, basic similarity requirements, wind tunnel testing techniques.
Instructor: Dr. S. Cheng

CIVL 8900-33: Special Topics: Advanced Masonry Design
Elements in masonry structures; experimental approach to testing masonry prisms, beams and walls; concept of Ultimate Limit State (ULS); masonry beam and masonry wall design (unreinforced and reinforced); load stress in different elements of masonry beams and walls; stability in masonry beams and walls; concept of general safety factor; computer software and design of masonry structural elements; basics of fine element modeling; ethical and professional responsibilities of a structural engineer.
Instructor: TBA

CIVL 8900-36: Special Topics: Road Safety Analysis
This course focuses on quantitative analysis and modeling of road safety. Topics include driver, vehicle, road geometric, traffic and environmental characteristics related to safety, motor vehicle crashes at road segments and intersections, crash risk and exposure, statistical methods, identification and evaluation of countermeasures, surrogate safety measures, and human factors of road safety.
Instructor: Dr. C. Lee

CIVL 8900-41/41A: Special Topics: Design Structure Using Canadian Codes & Modern Tools
This course covers the design of concrete and steel structures using modern software tools (STAAD.Pro). It builds knowledge on of analysis of various structures such as buildings and bridges. Students will gain proficiency in structural conceptualization and induced load determination, modeling and analysis. The course will cover also graphical communication. Approximate method of analyzing frames will be included to interpret and verify the output from computer-based structural analysis software. Students must have a computer with at least Windows 10, 2 GB RAM, 1 GB available hard drive space and dependable internet connection.
Instructor: TBA

CIVL 8900-47: Special Topics: Design, Deterioration & Repair of Concrete
Design of concrete; normal concrete, high and ultra-high-performance concrete, self-compacting concrete, fibre reinforced cementitious composites, sprayable, and overlay cement based cementitious composites, textile fibre reinforced composites. Curing methods, long term performance, quality assurance (QA) and quality control (QC) of concrete materials. Relevant concrete materials specifications. Types and causes of concrete deterioration; errors during construction, scaling and disintegration, freeze-thaw, corrosion of embedded steel, cracking, shrinkage, chemical attack, alkali-silica reaction, spalling, erosion, effloresces, exposure to fire. Experimental and non-destructive testing. Repair of concrete; repair materials, repair techniques, challenges with conventional repair techniques, patch repair and materials compatibility with existing concrete, horizontal, vertical, and overhead repair methods.
Instructor: TBA

ENVE 8300-1: Water Pollution Control
Water quality criteria; methods of wastewater disposal and their effects on ecology; theory and design of different unit operations and processes for water purification; theory and design of different design operations and processes of wastewater treatment; reuse and recycling of wastewater. (3 lecture hours a week.)
Instructor: Dr. N. Biswas

ENVE 8620-1: Contaminants Fate and Transport in the Environment
Key environmental media and properties, persistent organic pollutants – chemical classes and properties, real and evaluative environments, partition coefficients and multimedia partitioning calculations, chemical loss processes, multimedia chemical fate and transport mass balance models of varying complexities, model application to contaminant fate and transport in natural and engineered environmental systems. (3 lecture hours a week.)
(Cross-listed with CIVL 8620-1)
Instructor: Dr. R. Seth

ENVE 8900-28: Special Topics: Energy and Sustainability
Sustainability basics; energy basics; past, present and future fossil fuels; environmental consequences of fossil fuel use; nuclear energy; solar energy; wind energy; hydroelectric energy; wave energy; tidal energy; biomass energy, geothermal, ocean thermal energy conversion and ocean salinity gradient energy, energy and climate change and energy conservation and storage.
Instructor: Dr. J. Lalman