UNIVERSITY OF ALBERTA

2026-2027

MASTER OF **ENGINEERING**

STRUCTURAL ENGINEERING

WELCOME TO THE **M.ENG. PROGRAM**

The University of Alberta's Master of Engineering (M.Eng.) course-based programs are valuable for engineers at any career stage wishing to enhance their technical, managerial, and leadership skills. Our students learn from some of the top academics in their fields and train in internationally renowned facilities. Students participate in practical Alberta-focused projects that prepare them to demonstrate their skills and knowledge to potential employers.

M.Eng. students have access to the University of Alberta's Engineering Employment Center resources (job postings, workshops, networking opportunities, career fairs) and benefit from a dedicated communications support teacher.

DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING

M.ENG.
PROGRAM INFO

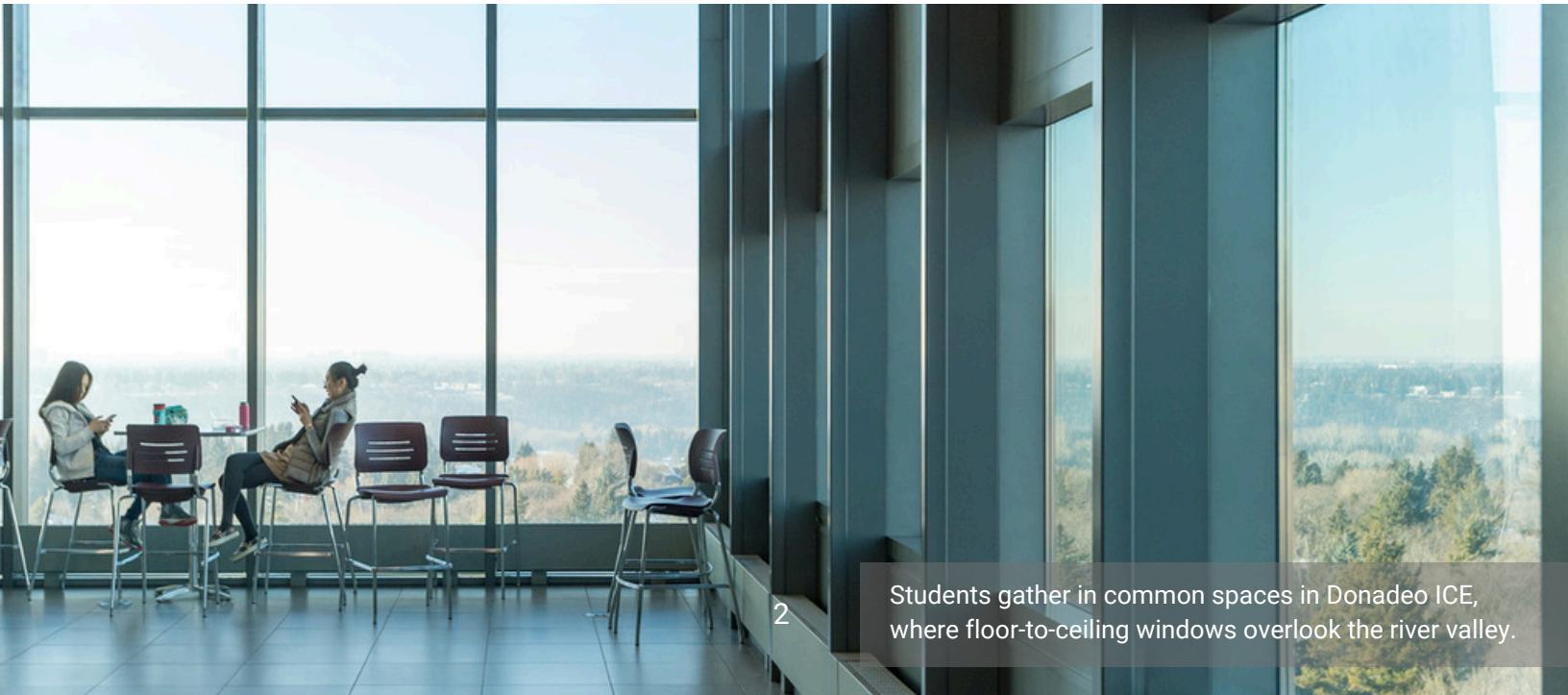
PROGRAM
OBJECTIVES

The M.Eng. Program is designed to prepare students for engineering practice in modern Structural Engineering, involving areas of design, analysis, inspection, monitoring, maintenance, and retrofit of civil structures. It will also equip students with the required knowledge, skills, methods, tools, experience, and professional communication capability to contribute to Civil Engineering industry and society at large.

The program prepares the students for an entry career in the Structural Engineering industry.

LEARNING
OUTCOMES

- Gain and apply knowledge of mechanics, analysis, design, and data analytics in engineering practice for a variety of civil structures (e.g., concrete, steel, timber, masonry, and composite)
- Understand and follow national or international standards, codes and industry manuals to design safe and economical structural components (e.g., members, joints) or systems (e.g., buildings, bridges)
- Obtain relevant knowledge about emerging technologies and techniques to manage infrastructure assets in modern society
- Collaborate effectively with team members on capstone projects and communicate to team members as well as other target audiences
- Develop the foundational knowledge and awareness for life-long learning to continue professional growth, thus being adaptable to the ever-evolving industry needs
- Understand ethical and professional responsibilities and make informed judgments considering the impact of engineering solutions in global, economic, environmental, and societal contexts



Students gather in common spaces in Donadeo ICE, where floor-to-ceiling windows overlook the river valley.

M.ENG.
PROPOSED COURSE SEQUENCE

The length of the program is two years. Students can accelerate the program or prolong it after approval from the M.Eng. Academic Advisor (see program contacts on page 4).
All general electives must be approved by M.Eng. Academic Advisor. Please refer to the Graduate Handbook for full program policies. For more information about graduate courses offered, visit our Grad Program page at https://civileng-uofa.ca/Grad%20program/

FALL **2026**	One of (CIV E 661, CIV E 664, CIV E 779 Machine Learning) [1] One of (CIV E 662, CIV E 674, CIV E 676) [1] Engg 700 Technical Communication [3]
WINTER **2027**	CIV E 660 OR CIV E 665 [1] CIV E 678 OR CIV E 779 [1] One elective outside Structures discipline [3]
FALL **2027**	3 electives from List 1 and List 2 [2]
WINTER **2028**	CIV E 900 Capstone project (Directed Research – Structures section)

1. Core courses; 2. Discipline-related elective; 3. General elective

STUDENT **SUPPORT**

GRADUATE **PROGRAM ADVISORS**

Trina Cattral – 7-387 Donadeo ICE
Christina Ezekowitz – 7-381 Donadeo ICE
Arlene Figley – 7-389 Donadeo ICE

Email: cgradvis@ualberta.ca

ASSOCIATE DEAN **GRADUATE STUDENTS CEE/MP**

Dr. Zaher Hashisho – 7-241 Donadeo ICE
Email: ad.ceegrad@ualberta.ca

STRUCTURES **GRADUATE COORDINATOR**

Dr. Shay Abtahi – 6-215 Donadeo ICE
Email: abtahi1@ualberta.ca

M.ENG. **ACADEMIC ADVISOR**

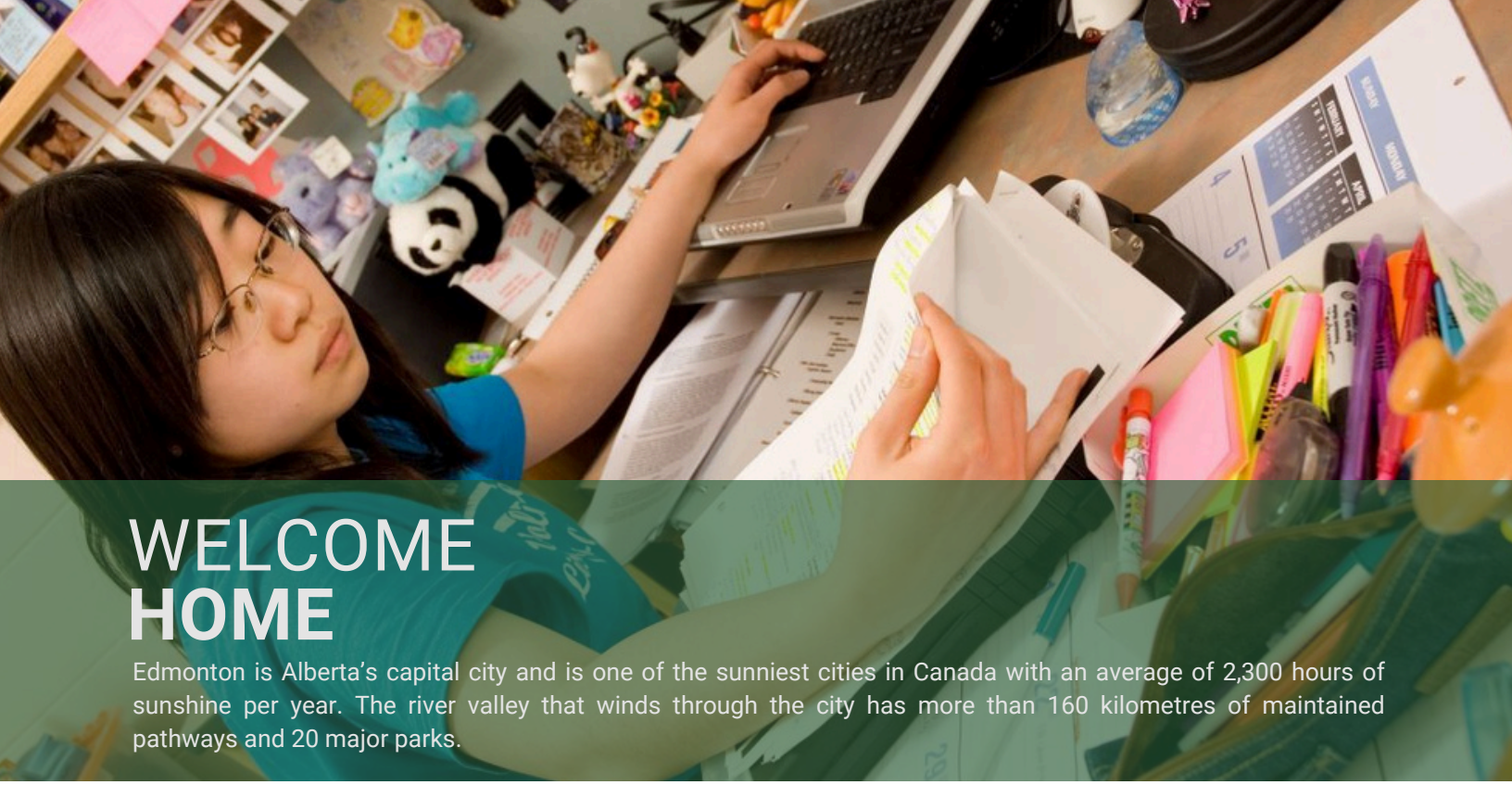
Dr. Lijun Deng – 6-261 Donadeo ICE
Email: civmeng@ualberta.ca

STUDENT COACHING **SERVICES**

The Department of Civil and Environmental Engineering and the School of Mining and Petroleum Engineering are committed to fostering the academic and professional success of its M.Eng. students throughout the duration of their program.

To support this goal, students are offered tailored coaching and development services designed to help them clarify academic and career goals, identify and overcome challenges, and build on their personal and professional strengths. Through one-on-one sessions, group workshops, and targeted resources, students are guided in navigating the complexities of graduate studies, enhancing their communication and leadership skills, and preparing for success in the Canadian and global engineering workforce.

These services aim to empower students to take ownership of their academic journey, grow with confidence, and transition effectively into professional roles upon graduation.



WELCOME HOME

Edmonton is Alberta's capital city and is one of the sunniest cities in Canada with an average of 2,300 hours of sunshine per year. The river valley that winds through the city has more than 160 kilometres of maintained pathways and 20 major parks.

HOUSING

You may choose from many housing options for students, both on campus and around Edmonton. International Student Services has online resources for finding a place to live, including temporary accommodations when you first arrive.

EXCEPTIONAL **PUBLIC SCHOOLS**

Our Kindergarten through grade 12 public school system is one of the best in Canada. Alberta's students rank No. 2 in the world for reading and science and in the top 12 for math.

UNIVERSAL **HEALTH CARE**

Alberta Health Services provides health care to all Albertans in hospitals, at the doctor's office, and on the Internet. 811 is a telephone service providing free 24/7 nurse advice and general health information for Albertans.

COMMUNITY

More 150 neighbourhood community leagues provide plenty of opportunities to participate in social and recreational activities and get to know your neighbours.

Plus farmers' markets offer small agricultural producers the opportunity to sell fresh produce, including meat and vegetables that are grown in the Edmonton area. The city supports community gardens for those who want to grow their own food but need the space to do it.

TRANSPORTATION **BUS, BIKE, TRAIN**

Public transit buses and Light Rail Transit (LRT) connect the city along with well-maintained bike lanes and paths.

Maps, schedules and fare info at: edmonton.ca/edmonton-transit-system-ets

WORKING IN **CANADA**

INTERNATIONAL **STUDENT SERVICES**

International Student & Visitor Services (ISVS) provides programs, services and events for U of A international students. Their team of licensed immigration consultants and student advisors supports international students with adjusting to living in Edmonton, immigration and additional support to help international students succeed at the U of A.

You can book time with their team of licensed immigration consultants, who can assist you with study permits and extensions, immigration, and working in Canada. Drop-in appointments are available Monday, Tuesday, and Friday (9 am -12 pm & 1–3 pm) by visiting the International Services Centre (142 Telus Centre) or book an appointment online at: ualberta.ca/international/about-uai/contact-us/international-services-centre

POST GRADUATION **WORK PERMIT**

The Post-Graduation Work Permit Program (PGWPP) allows students who have graduated from eligible Canadian designated learning institutions (DLIs) to obtain an open work permit to gain valuable Canadian work experience. Our program also provides academic credentials that are recognized by Alberta licensing organization (APEGA) for students with an undergraduate program in a foreign engineering program.

To work in Canada after you graduate, you must apply for a work permit under the Post-Graduation Work Permit Program (PGWPP). Check the University's ISVS and the Government of Canada websites for more information about the post-graduation work permit program.

Our program's learning outcomes are in line with Engineers Canada competencies and professional development hours count towards yearly professional requirements.

UNIVERSITY OF ALBERTA **RANKINGS**

	WORLD	CANADA
ACADEMIC RANKING OF WORLD UNIVERSITIES	**101-150**	**5**
QUACQUARELLI SYMONDS	**96**	**4**
TIMES HIGHER EDUCATION	**116**	**5**

LET'S TALK

SAVE THE DATE:
OUR ANNUAL INDUSTRY MIXER HAS BEEN SCHEDULED FOR FEBRUARY 2ND, 2027.

INDUSTRY **NETWORKING MIXER**

Academic knowledge is only part of the equation when preparing students for the workforce. Therefore, we commit to helping our students develop communication skills and professional networks.

Since February 2023, the Department of Civil and Environmental Engineering and the School of Mining and Petroleum Engineering at the University of Alberta have hosted an annual networking mixer to support the professional development of Master of Engineering (MEng) students. This initiative is part of a broader program designed to enhance students' communication skills and prepare them for successful careers in engineering.

The three-hour event features guest speakers, professional networking opportunities, and a catered reception. This year, the event will be held in the heart of downtown Edmonton, at the Art Gallery of Alberta.

Distinguished University of Alberta engineering alumni deliver keynote presentations, sharing insights from their professional journeys. Their talks often emphasize practical advice on career growth, lifelong learning, and the value of hands-on experience. A common and compelling theme across all events has been the critical role of effective communication in engineering practice.

To help students maximize the value of this experience, a preparatory networking skills workshop is conducted in advance. This training session covers key topics such as professional attire, networking etiquette, initiating and sustaining conversations, making strong introductions, and post-event follow-up strategies.

Together, the mixer and its preparatory workshop form a vital component of our commitment to supporting graduate students as they develop into well-rounded, professionally prepared engineers in Canada.

BENEFITS OF **NETWORKING**

Career opportunities Networking allows students to connect with potential employers, learn about job opportunities, and gain insights into the engineering profession.

Industry insights By connecting with professionals in their field, students can stay up-to-date with industry news and developments, helping them make informed career decisions.

Mentorship Networking provides students with the opportunity to connect with experienced professionals who can offer guidance and support as they navigate their career path.

Collaboration Working with others can help graduate students develop new skills, gain experience, and expand their engineering knowledge.

Personal development Networking helps students develop essential skills such as communication, teamwork, and interpersonal competence. By attending events, meeting new people, and building relationships, students develop confidence and expand their professional network.

Grad students Aisha Elgarhy, Veronica Wambura, and Syeda Narmeen Zehra at the networking mixer.
Photo: Heather Egger

APEGA PROFESSIONAL DEVELOPMENT SERIES

In collaboration with the Association of Professional Engineers and Geoscientists of Alberta (APEGA) and the U of A Career Centre, our department offers a series of sessions to equip students with the professional tools, knowledge, and confidence they need to thrive after graduation and successfully transition into professional roles. We also provide students with access to job fairs, networking events, and other professional development opportunities to help them build relationships and make valuable industry connections.

A range of workshops are offered (in-person and online) which cover topics including:

- APEGA's Work Readiness Program
- Post-program Insights from a Graduate
- Upgrading your Resume
- Rapid Resume Review
- How to Have a Great Interview
- Mock Interviews
- Intercultural Competency
- Personal Branding
- Leveraging LinkedIn
- Mixer Preparation and Networking skills
- APEGA Requirements for Registration
- Breaking Down Job Postings
- Flourishing in the Workplace

A **minimum attendance of 8 distinct sessions** (over the duration of the program) is a graduation requirement for MEng students in CEE+MP. Some students may be eligible for an exemption. MEng Students will be automatically enrolled.

PD CREDIT: Students who attend a session AND complete the corresponding mini quiz will receive 1 hr of PD credit (per session). QUIZ + PD Credit component is OPTIONAL. The mini quizzes are not part of the graduation requirement.

About the Career Centre

The Career Centre is the source for career and employment information and expertise at the University of Alberta. We strive to empower the talented people of the U of A in developing the skills, knowledge, experiences, and connections they need to confidently manage their careers.

About APEGA

Created on April 10, 1920, the Association of Professional Engineers and Geoscientists of Alberta (APEGA) regulates the practices of engineering and geoscience in Alberta on behalf of the Government of Alberta through the Engineering and Geoscience Professions Act. They are the largest regulator of self-regulated professionals in Western Canada. Their main regulatory function is licensing individuals and companies that want to practise engineering and geoscience in Alberta. Applicants and companies that meet APEGA's standards for ethical, professional, and technical competency earn the right to practise and use reserved titles and designations.

M.Eng. Capstone Course Site Visit 2024
Photo: Cam Franchuk

CREATIVITY THROUGH COLLABORATION
M.ENG. DESIGN CAPSTONE

The Capstone course encourages teamwork and problem-solving skills, equipping students for success as they transition from academia to industry.

Our Capstone design-build course offers MEng in Structural and Construction Engineering a unique, hands-on learning experience under the guidance of experienced industry professionals. Through this course, students form interdisciplinary teams and engage with real-world challenges that reflect the complexity and dynamics of professional engineering projects.

Throughout the term, students assume roles similar to those of contractors and consultants, navigating technical, logistical, and collaborative aspects of project delivery. The weekly three-hour sessions combine lectures on essential topics—including design thinking, quality and risk management, sustainability, and professional communication—with dedicated time for team collaboration. Emphasis is placed on developing the ability to communicate technical concepts to non-technical audiences, a skill critical to success in the workplace.

For example, in Winter 2024, the final project involved preparing comprehensive proposals for installing a solar array over the iconic Butterdome. This was not a hypothetical assignment—the request for proposals (RFP) was developed in consultation with the University of Alberta's Project Management Office, presenting a genuine opportunity for students to influence potential implementation on campus. Student feedback underscores the course's real-world relevance and educational value:

"The guest speakers were especially beneficial. They shared real-world experiences and showcased their projects, which helped us apply these processes to our own projects."
— Goldy Thevaruparambil Raju

"The collaboration in this course provided a rich learning environment and equipped me with valuable skills in working with construction engineers. It was truly enlightening to witness how our diverse perspectives complemented each other, leading to more comprehensive project outcomes."
— Belal Abdelbaky Elshal, Structural Engineering

This course exemplifies our commitment to providing MEng students with applied, interdisciplinary learning experiences that prepare them for the challenges and expectations of the engineering profession.

M.Eng. Capstone Class Winter 2024

ADVANTAGES OF CAPSTONE DESIGN COURSE AND WORKING AS A TEAM

- ***Diverse Perspectives:*** Teams consist of individuals with different backgrounds, skills, and experiences, fostering creativity and innovation through unique viewpoints in problem-solving. Additionally, the course is designed with a well-defined timeline, ensuring everyone stays on track while contributing to the collective goals.
- ***Division of Tasks:*** Tasks are divided among team members based on their strengths and expertise, increasing efficiency and productivity. With clearly defined expectations and problem formulations, individuals can focus on their areas of strength, leading to better outcomes and effective time management.
- ***Support and Collaboration:*** Team members provide mutual support, share knowledge, and collaborate, leading to better decision-making and problem-solving as ideas are discussed collectively. The structured timeline and clear milestones further enhance collaboration, ensuring the team progresses cohesively toward the final goal.
- ***Learning Opportunities:*** Teamwork offers a chance to learn from others through acquiring new skills or understanding different approaches. A clear problem formulation helps guide this learning process, allowing individuals to focus on tackling well-defined challenges efficiently and effectively.
- ***Personal Growth:*** Working in a team enhances interpersonal skills such as communication, collaboration, and conflict resolution, which are valuable both personally and professionally. Additionally, a well-structured course timeline helps individuals practice and improve time management and goal-setting skills, further contributing to their professional development.

COURSE INFO

CIV E 660
ADVANCED STRUCTURE ANALYSIS

COURSE OBJECTIVES

This course provides the students with advanced skills in structural analysis.

LEARNING OUTCOMES

- Describe the general procedure for computer-aided structural modeling and analysis
- Derive element stiffness matrix using the strong form formulation for frame-type elements
- Analyze statically determinate and indeterminate structures subjected to loads, thermal effects, and support movement using direct stiffness method
- Handle special constraints (e.g., from member rigidity assumptions) in structural analysis
- Analyze structures using energy methods and derive element stiffness matrix using the weak form formulation
- Analyze building frame structures using some approximate methods
- Implement simple structural analysis programs

CIV E 661
DYNAMICS OF STRUCTURES

COURSE OBJECTIVES

This course introduces the students to the dynamics of single and multiple degrees of freedom systems, Time step methods, Modal and response spectrum analysis for earthquake loading, Random vibration analysis, Dynamic wind loading analysis, and Dynamics of foundations.

LEARNING OUTCOMES

- Formulate the Equation of Motion (EoM) of Single Degree of Freedom (SDOF) systems and solve it using various methods (e.g. classical solution, Fourier series, and Duhamel's Integral) for simple loading cases (e.g., free vibration, harmonic loading, periodic loading, and simple arbitrary loading)
- Apply the SDOF system concepts to formulate various applications (e.g., eccentric mass shakers, vibration measurement devices, force transmission and base excitation)
- Apply numerical methods for numerical response evaluation of linear/nonlinear systems under more complex loading
- Formulate earthquake response of linear systems and analyze them using response spectra
- Formulate the EoM of Multi Degree of Freedom Systems (MDOFs) and solve it using modal analysis for various loading cases (e.g., free vibration, harmonic loading, and seismic loading)

COURSE INFO

CIV E 662
STRUCTURAL TIMBER DESIGN

COURSE OBJECTIVES

This course provides the students with the required skills and tools to analyze and design timber structures.

LEARNING OUTCOMES

- Describe how physical and mechanical properties of wood are affected by environmental factors and growth characteristics in wood
- Recognize and understand the attributes of various traditional and modern structural wood products and systems
- Design timber members and timber-concrete composite members under bending action
- Design timber members subjected to axial load and combined axial and bending actions
- Design light and heavy timber connections with mechanical fasteners
- Design light wood frame and mass timber lateral load resisting systems

CIV E 665
INTRODUCTION TO THE FINITE ELEMENT METHOD

COURSE OBJECTIVES

This course provides the students with the required skills to use and apply the finite element analysis method to linear and nonlinear problems of elastic structures. Students will use Python and ABAQUS for their analysis.

LEARNING OUTCOMES

- Define and describe the finite element analysis method
- Differentiate between solid, beam, and shell elements
- Describe the use of isoparametric formulation
- Differentiate between linear, quadratic, full and reduced integration solid elements
- Compare the stiffness matrix of simple elements between hand calculations and those of a finite element analysis software
- Model a physical problem using a finite element analysis software

COURSE INFO

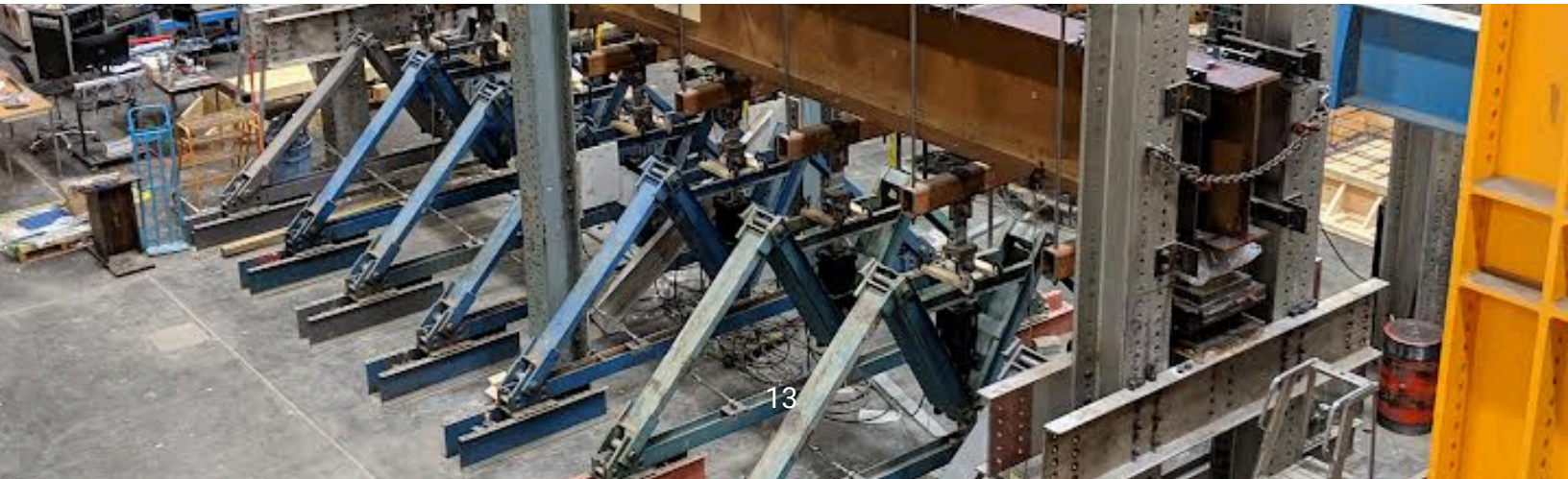
CIV E 670
BEHAVIOUR AND DESIGN OF STEEL MEMBERS

COURSE OBJECTIVES

This course covers several of the same topics covered in undergraduate structural design courses in civil engineering degree programs. However, the emphasis is on the true structural behaviour to provide insight into the assumptions and limitations of the provisions of design standards. This allows student to gain a better understanding of the performance objectives of the standard and avoid the pitfalls of using it simply as a checklist of requirements to fulfill. It also allows the development of skills to address situations that are beyond the limits of what is explicitly covered by the standard. The course ties regularly into Standard S16 of the Canadian Standards Association, the national standard of Canada for the design of steel buildings, although other codes and standards are also referenced as needed.

LEARNING OUTCOMES

- Account for probability and utilize the philosophy of limit states design in the establishment of appropriate resistance factors for specific steel design scenarios, and estimate the probability of failure of a structural component when given sufficient data
- Design steel tension members by assessing the capacities of potential failure modes
- Evaluate the elastic torsional capacity and understand the torsional behaviour of thin-walled open steel sections
- Determine the design capacity of steel columns and other compression members for a variety of cross-sectional shapes
- Understand lateral-torsional buckling behaviour of steel beams for a variety of geometries and bracing conditions, and utilize the concepts of interaction buckling when evaluating lateral-torsional buckling capacity
- Determine the design loads on steel frame members, accounting for second-order effects, and the capacity of steel beam-columns (under combined compression and flexure) with doubly-symmetric cross-sections



COURSE INFO

CIV E 672
BEHAVIOUR AND DESIGN OF CONCRETE MEMBERS

COURSE OBJECTIVES

This course help students understand the fundamental behaviour of reinforced concrete as well as the processes used in reinforced concrete design according to CSA A23.3:19 (Design of Concrete Structures), including strength and behaviour of simple reinforced concrete members, relation between results of research and current design specifications, material properties, as well as members subjected to flexure, axial compression, combined flexure and axial load, combined flexure and shear, torsion.

LEARNING OUTCOMES

- Use first principle approaches to develop moment-curvature responses for flexural members and use these responses to evaluate deflections
- Use provisions and understand some limitations of CSA A23.3 for the flexural, shear, axial, and torsion design of concrete elements
- Use strut-and-tie models to design common disturbed regions in concrete elements
- Link research outcomes to design standards with attention to CSA A23.3

CIV E 674
BEHAVIOR AND DESIGN OF PRESTRESSED CONCRETE STRUCTURES

COURSE OBJECTIVES

The design and analysis of prestressed concrete (PC) elements under flexural, shear, and axial stresses is investigated in this course. The emphasis of the course is on fundamental behaviour from a point of view of mechanics and strength of materials.

LEARNING OUTCOMES

- Describe the principles that govern the behaviour of prestressed concrete, namely the interaction between prestressing steel and the concrete in the member.
- Describe the behaviour and governing failure modes of prestressed and post-tensioned beams, columns, and slabs.
- Analyze and design prestressed concrete members to satisfy serviceability and ultimate limit states criteria.
- Analyze and design anchorage zones.

COURSE INFO

CIV E 676
BEHAVIOR AND DESIGN OF MASONRY STRUCTURES

COURSE OBJECTIVES

This course provides the students with the required skills and tools to analyze and design masonry structures.

LEARNING OUTCOMES

- Define reinforced and unreinforced masonry, and their advantages and limitations for infrastructure applications
- Identify the masonry material properties that are relevant for a civil engineer
- Discuss the different testing standards used for masonry materials
- Proportion blocks, mortar, grout, and reinforcing bars in masonry elements to resist axial loads, bending moments, and shear forces, while meeting serviceability conditions such as cracking and deflections
- Explain the seismic provisions in the NBCC and apply them to the design of masonry materials and systems
- Design lateral load resisting systems for wind and earthquake forces using reinforced masonry

COURSE INFO

CIV E 678
BEHAVIOUR AND DESIGN OF STEEL SEISMIC FORCE RESISTING SYSTEMS

COURSE OBJECTIVES

Lecture notes give the basics of seismic design for steel structures including general earthquake engineering concepts and associated requirements of the National Building Code of Canada, introduction to seismology, dynamics of structures and modal analysis, failures observed in steel structures in past earthquakes, seismic loading as per the National Building Code (NBC) of Canada, capacity design principals, analysis and design of seismic force resisting systems. Design requirements are given in accordance with the current Canadian steel design standard (CSA S16) and research studies that support the seismic design guidelines are highlighted. Each seismic force resisting system is followed by a practical example to illustrate the concepts covered and highlight the code provisions.

LEARNING OUTCOMES

- Apply seismic hazard analysis
- Compute seismic loads on building structures using static and dynamic procedures in accordance with the National Building Code of Canada
- Identify and describe seismic load paths in steel seismic force resisting systems
- Identify the behaviour and governing failure modes of steel seismic force resisting systems and their connections
- Analyze steel seismic force resisting systems under gravity and seismic loads
- Design the members and connections of steel seismic force resisting systems in accordance with the capacity design principles prescribed by the Canadian steel design standard
- Analyze steel seismic force resisting systems using nonlinear static procedure
- Apply the principals of performance-based design

COURSE INFO

CIV E 779
MACHINE LEARNING FOR CIVIL ENGINEERS

COURSE OBJECTIVES

The course will give engineering students the necessary knowledge to develop and implement machine learning algorithms to solve their engineering problems. The course content includes: fundamentals of machine learning; supervised learning and unsupervised learning; regression and classification; practical application of machine learning to engineering problems.

LEARNING OUTCOMES

- Understand the fundamentals of machine learning
- Implement machine learning algorithms in Python
- Apply machine learning techniques to engineering problems

CIV E 779
FUTURE INFRASTRUCTURE SYSTEMS IN SMART, SUSTAINABLE, AND RESILIENT CITIES

COURSE OBJECTIVES

This highly interdisciplinary course is intended for senior year undergraduate students and graduate students. The course will introduce various emerging concepts and technologies in the context of smart and sustainable cities and provide an overview of future cities and their main components, such as Future Infrastructure Systems, Future Energy Systems, and Future Mobility Systems. With a particular emphasis on the Future Infrastructure Systems and their sustainability and resiliency, this course will cover various related topics in the context of such as sensing technologies, data analytics, AI, as well as interdependencies, operation, management, and decision-making for/of Future Infrastructure Systems.

LEARNING OUTCOMES

- Identify the main components of future infrastructure systems and their roles in smart, sustainable, resilient cities
- Apply recent advances in emerging technologies such as sensing, data analytics, and AI for FIS
- Monitor, assess, and manage the next generation infrastructure systems
- Describe interdependencies and the requirements of resiliency of FIS
- Adapt existing infrastructure structure systems to future cities in the context of sustainability and resiliency in the face of climate change

COURSE INFO

CIV E 668
FUNDAMENTALS OF BUILDING PHYSICS

COURSE OBJECTIVES

The fundamentals of building science, mainly the basic concepts and applications of heat and mass (moisture and air) transfer in a built environment, will be covered in this course. Exterior and interior influences on the interior environmental qualities (temperature and relative humidity) will be considered. Topics include: heat, air and moisture transfer, vapour flow, air leakage, ventilation and indoor comfort conditions, selection of building materials and systems. By taking this course, students will be able to understand the fundamentals of building engineering, analyze and simulate the indoor environmental qualities of buildings, and apply the knowledge for better building design and operation.

LEARNING OUTCOMES

- Be able to apply numerical methods to calculate 1D steady-state or transient heat transfer in building components
- Apply the theories of vapor diffusion to analyze 1D steady-state vapor diffusion in building assemblies
- Evaluate the hydrothermal properties of opaque building assemblies, and select proper designs for given building conditions
- Determine the psychometric conditions of an indoor space for different climatic and building operational conditions
- Interpret the movement of the sun relative to a building and calculate the solar radiation incident on a given surface at a given time
- Calculate the thermal and optical properties of windows, and select the proper designs for a given climate
- Interpret the metrics of occupant thermal comfort and evaluate the thermal comfort conditions in a given room
- Perform simple whole-building performance simulations

COURSE INFO

ENGG 700
TECHNICAL AND PROFESSIONAL COMMUNICATION

COURSE OBJECTIVES

Engineers spend much of their professional lives communicating—working with colleagues, leading teams, negotiating ideas, presenting recommendations, engaging stakeholders, and producing technical documents that inform important decisions. This course develops the communication competencies required for professional engineering practice. Students will explore interpersonal, team, and organizational communication alongside written, visual, and oral communication in engineering contexts. Topics include communication strategies for collaboration and leadership, giving and receiving feedback, conflict management, communicating with diverse audiences, presentations, visual communication, professional identity, ethical and inclusive communication, and the effective use of AI to support engineering communication.

LEARNING OUTCOMES

- Analyze and adapt communication strategies to suit different audiences, occasions, and purposes across interpersonal, organizational, and professional contexts.
- Explain and demonstrate concepts such as impression management, disclosure, perception, listening, conflict resolution, and relational maintenance in diverse interpersonal scenarios.
- Apply communication strategies for professionalism, ethical awareness, boundary setting, and workplace messaging, including email, instant messaging, social media, and internal communications.
- Develop and present engaging, audience-centered speeches using appropriate delivery methods, anxiety management techniques, and verbal and nonverbal strategies.
- Compose resumes and related documents (e.g., cover letters, thank you notes) that reflect audience needs, professional tone, and job-specific language and achievements.
- Write technical and business communication documents (e.g., reports, proposals, instructions) using appropriate formats, tone, style, and structure, while integrating feedback and revision practices.
- Design documents and presentations that combine clear prose with meaningful, ethically constructed visuals to effectively convey data and technical content.
- Demonstrate understanding of rhetorical situation, genre conventions, and audience expectations to shape message content, organization, and tone.
- Participate in group and team projects using appropriate interpersonal and organizational communication strategies, including leadership, feedback, and consensus-building techniques.
- Assess your own communication strengths and challenges, recognize the role of identity and culture in communication, and implement strategies for ongoing personal and professional growth.

COURSE INFO

CIV E 900
CAPSTONE DIRECTED RESEARCH PROJECT
STRUCTURES SECTION

COURSE OBJECTIVES

The Department of Civil and Environmental Engineering offers the capstone project course to graduate students in the Structural Engineering stream. The course gives advanced topics on the design of steel and reinforced concrete under gravity and lateral loads using the limit states design method. Furthermore, the introduction to structural design in accordance with the National Building Code of Canada (NBCC) and CSA S6 is given.

Students are expected to complete design projects as part of this course using the knowledge they have gained throughout their undergraduate and graduate program. The project may involve the detailed design of a building, a bridge, or an industrial structure, which will be completed in a group of three to four students. Each group will submit a professional report on the structural design of the structure together with design drawings at the end of the term and make an oral presentation to a group of industry leaders.

The detailed design of structures requires teamwork, creativity, making design assumptions and completing the structural design based on a synthesis of technical knowledge acquired in structural engineering courses. Course lectures focus on structural systems, seismic load calculation, bridge design, and advanced structural steel design.

Please see the M.Eng. Academic Advisor for information about the directed research project.

LEARNING OUTCOMES

- Participate and contribute effectively to team activities
- Understand various structural systems and load-resisting of a structure (vertical and horizontal)
- Compute loads on structures based on the National Building Code of Canada and CSA S16 and other relevant codes and standards
- Introduction to structural analysis and design, detailing, and construction software (capabilities and limitations)
- Identify and describe seismic load paths and load-resisting systems in structures
- Design structure(s) to meet defined specifications based on information synthesized from advanced analyses and relevant codes and standards
- Identify the governing failure modes and design of members and their connections
- Understand construction engineering and installation sequence based on codes and standards