



**UNIVERSITY
OF ALBERTA**

2026-2027

MASTER OF ENGINEERING

TRANSPORTATION 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 student coach, who provides communications support.

DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING

M.ENG. PROGRAM INFO

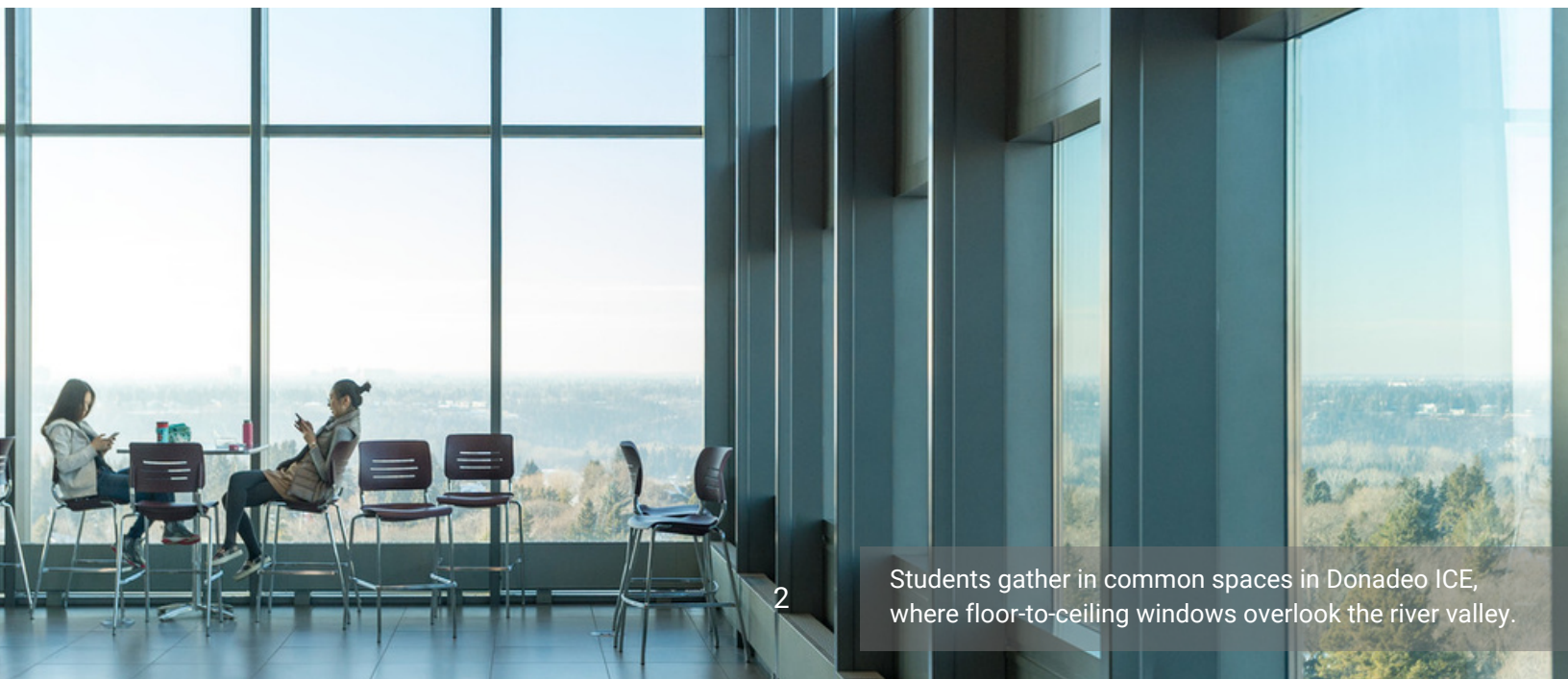
PROGRAM OBJECTIVES

The M.Eng. Program is designed to prepare students for engineering practice in modern Transportation Engineering. 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 Transportation Engineering industry.

LEARNING OUTCOMES

- Plan, design, analyze, and evaluate a wide range of transportation systems and operations
- Understand and apply fundamentals of transportation engineering including: traffic control, demand analysis, transportation facility design, geomatic analysis, safety evaluations, and pavement design
- Understand and apply traditional and emerging concepts and goals in transportation including: accessibility, safety, efficiency, sustainability, resilience, and equity
- Communicate technical transportation engineering analyses, results, and ideas to broader and non-technical audiences
- Conduct and oversee practice-oriented projects using learned concepts in a collaborative and team-oriented setting
- Guide the development and operations of transportation systems toward the public good for the benefit of society
- Apply transportation engineering knowledge across a wide range of professions and careers in the transportation field, including those beyond engineering such as technology, policy, and planning



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	CIV E 612 Transportation Planning ¹ CIV E 614 Traffic Operation and Control ¹ CIV E 615 Traffic Flow and Network Modeling ²
WINTER 2027	CIV E 613 Transportation Systems and Demand Analysis ¹ CIV E 616 Traffic Safety ² One of (CIV E 618, CIV E 719) ²
FALL 2027	Engg 700 Technical Communication ³ CIV E 779 Machine Learning ² One elective course: any 500-, 600-, or 700-level Engineering or Science course, as approved by the MEng Academic Advisor ³
WINTER 2028	CIV E 900 Capstone project (Directed Research)

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

STUDENT SUPPORT

GRADUATE PROGRAM ADVISORS

Trina Catral – 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

M.ENG. ACADEMIC ADVISOR

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

TRANSPORTATION GRADUATE COORDINATOR

Dr. Stephen Wong – 6-269 Donadeo ICE
Email: stephenwong@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.

COURSE INFO



CIV E 612 TRANSPORTATION PLANNING: METHODOLOGY AND TECHNIQUES

COURSE OBJECTIVES

The objective of this course is to provide students an in-depth discussion on the fundamental concepts and methodologies applied in the urban transportation planning process. The primary focus of the course is on the development of various models applied in the urban demand forecasting process, including traditional four-step models and activity-based models (ABM). Important methodologies that will be covered in this course include linear (logistic) regression, categorical analysis, random utility maximization (RUM) theory, maximum likelihood (ML) estimation, shortest path algorithm, equilibrium assignment methods.

LEARNING OUTCOMES

- More in-depth introduction to transportation planning and real-world issues
- In-depth introduction to transportation demand modelling
- Training on how to write papers and deliver presentations

COURSE INFO

CIV E 613 HUMAN BEHAVIOUR IN TRANSPORTATION

COURSE OBJECTIVES

This course focuses on behavioral theories, quantitative methods, and qualitative methods to analyze human behaviour in the transportation engineering field. The course will cover microeconomic and discrete choice analysis techniques with applications for modeling travel behaviour and demand in networks. Specific topics will include: survey design, utility theory, discrete choice models, alternative decision rules, forecasting, qualitative interviewing, focus groups, and emerging data analysis methods. Course content will address a variety of human-centred transportation problems through practical application. The primary objectives of the course are for students to gain a fundamental understanding of behaviour in transportation, learn and apply methods for assessing and analyzing human behaviour, and obtain modelling experience for their future careers.

LEARNING OUTCOMES

- Design stated and revealed preference surveys, qualitative interview guides, and focus group moderation guides
- Define, describe, and provide examples of utility theory and utility equations
- Identify appropriate variables for discrete choice models
- Estimate a variety of discrete choice models for transportation problems using existing software
- Critically analyze models throughout their transportation careers
- Communicate human behaviour concepts, methods, and results to a variety of audiences
- Understand methods for community engagement and human behaviour while considering ethics and equity

CIV E 614 TRAFFIC OPERATION AND CONTROL

COURSE OBJECTIVES

Human factors, traffic control devices, signal warrants, principles of signalized intersections, signal timing, signal optimization and coordination, capacity, traffic delay, left turn, diamond interchange, unsignalized intersection, roundabouts, actuated control, incident management, freeway control.

LEARNING OUTCOMES

- Basic knowledge for traffic engineering, data analysis skill, professional presentation

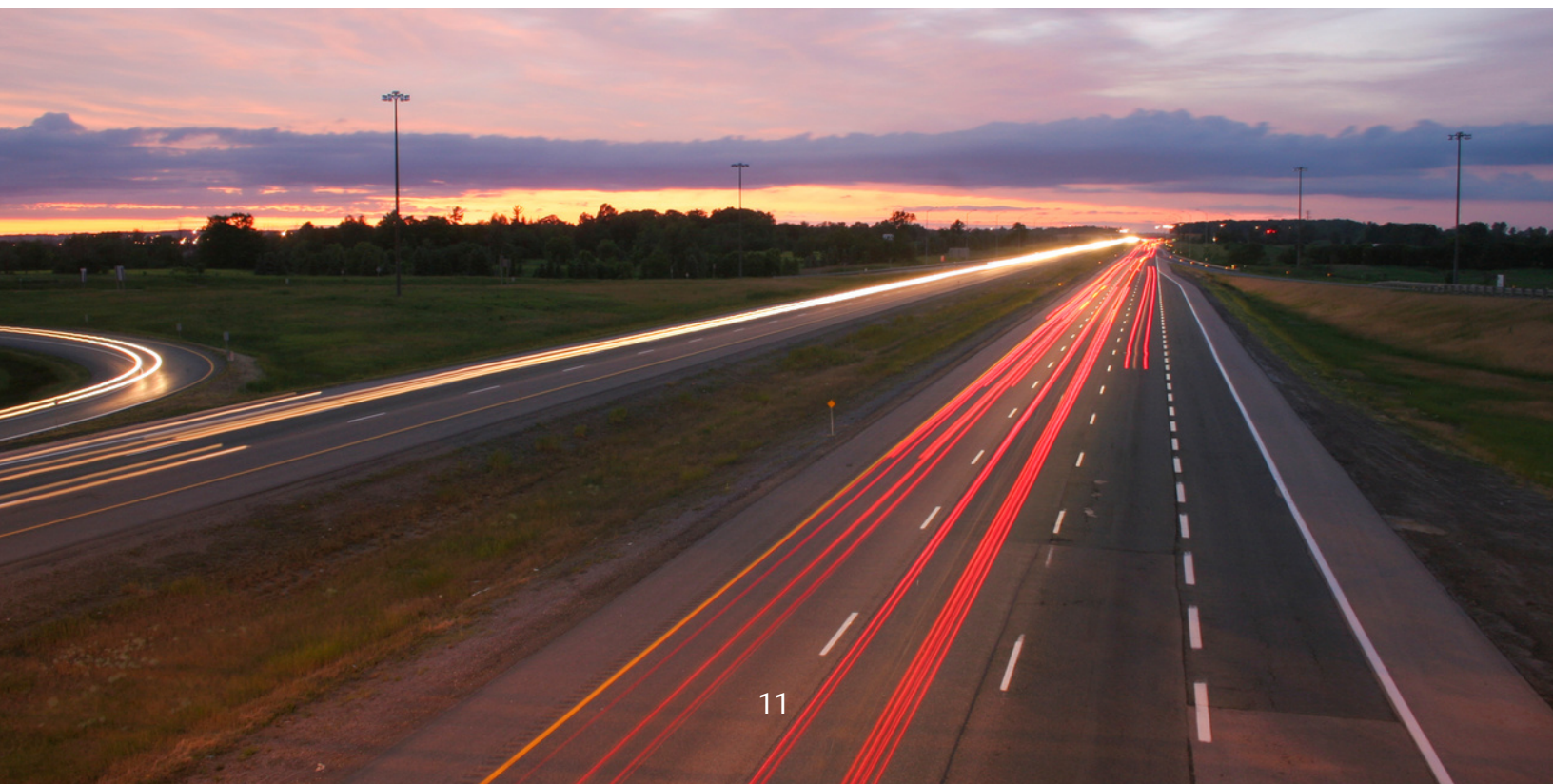
COURSE INFO

CIV E 615 TRAFFIC FLOW AND NETWORK MODELING

COURSE OBJECTIVES AND DESCRIPTION

Traffic flow and network modeling are two major approaches in the field of transportation engineering, and can be applied in the research studies of traffic operation, traffic safety and transportation planning. This course will develop students' knowledge and ability to analyze dynamic traffic flow and traffic network management in an urban transportation network.

This course will address and answer the questions of what the characteristics of traffic flow in an urban transportation network are, how traffic flow patterns can be determined over a long time horizon, and how traffic flow can be forecasted and managed in a short time horizon. The static analysis aims to provide traffic predictions for long-term planning purposes, and the dynamic analysis is used to generate short-term predictions and optimization strategies for advanced traffic management and information systems. This course will provide a comprehensive education in the fundamentals of traffic flow and network modeling, and provide experiences to develop professionalism in advanced transportation demand and supply analysis.



COURSE INFO

CIV E 616 TRAFFIC SAFETY

COURSE OBJECTIVES

Introduction to traffic safety. Focus on collisions and exposure. Safety management process. Collision modeling, theory and applications. Safety evaluation techniques, challenges, opportunities, influence of confounding factors and regression to the mean bias. The following topics will be covered:

- Introduce traffic safety: Overview of safety in Canada and the world. Fundamentals of traffic safety. Extent and nature of problem. Historical, national, and global perspectives.
- Understanding the Safety Management Process: Different stages and processes, screening tools, collision data analysis, problem identification, recommendation of countermeasures to correct safety problems, and procedure to conduct an economic appraisal of any proposed countermeasure.
- Provide an overview of the different Safety Analysis Methods: conventional and Bayesian analysis techniques including strengths and weaknesses. Collision modeling theory and applications (linear, Poisson, negative binomial, zero-inflated, etc.)
- Provide an overview of the different Safety Evaluation Techniques: Cross-sectional vs. time series studies to evaluate safety countermeasures, strengths and weakness, challenges and opportunities, target crashes, influence of confounding factors. Regression to the mean. Empirical Bayes' and Bayes' techniques. Applications and Case Studies.

LEARNING OUTCOMES

- Explain the main paradigm shifts in traffic safety
- Understand the fundamentals of traffic safety
- Explain and apply the safety management process
- Understand and apply conventional analysis safety techniques
- Understand and apply Bayesian analysis safety techniques
- Develop and apply safety performance functions
- Understand the different safety evaluation methods
- Design a safe roadside environment



COURSE INFO

CIV E 617 HIGHWAY GEOMETRIC DESIGN

COURSE OBJECTIVES

The overall objective of this course is to introduce graduate students to the process of highway design. Specific objectives include: introduction to the application of current road design guidelines in Canada and Alberta; examination of tradeoffs between level of service, capital and maintenance costs, environmental impact and safety.

LEARNING OUTCOMES

- Describe and apply the basic design principles for highway engineering
- Understand and design the basic alignment elements for a typical North American highway
- Define and design the cross-section as well as the roadside elements of a highway
- Design at-grade intersections and local roads
- Apply 3R/4R guidelines to maintain existing highways
- Apply principles of access management to control the flow on the highway
- Use AutoCAD to generate design drawings



COURSE INFO

CIV E 618

ADVANCED PAVEMENT MATERIAL AND DESIGN

COURSE OBJECTIVES

The objective of the course is to introduce graduate students the main concepts of design and construction of asphalt pavement systems. The first part of the course refreshes students' knowledge of the pavement structure, materials and testing. Also, introducing Superpave classification for asphalt binders. The second part of the course addresses the advanced analysis/design of flexible pavement structures, including Empirical and Mechanistic-Empirical methods considering climate and environmental impacts. The students will have the opportunity to interact with professionals in the pavement industry who will serve as guest speakers during the course.

LEARNING OUTCOMES

- Describe pavement material specifications (soil and asphalt binder) and design factors of flexible pavements
- Define materials requirements and characteristics for pavement construction and rehabilitation
- Analyze stresses and strains in flexible pavements layers using computer software
- Design of flexible pavement using Empirical and Mechanistic-Empirical Methods
- Identify pavement failures and maintenance methods
- Evaluate pavement load bearing capacity and layers stiffness using non-destructive testing methods

CIV E 779

MACHINE LEARNING FOR ENGINEERS

COURSE OBJECTIVES

The main objective of this course is to present the basic pillars of sustainability, the concepts of multidimensional thinking and rational decision-making in order to enable the students to make the most sustainable decisions in the construction industry.

LEARNING OUTCOMES

- Understand the three pillars of sustainability: Economic, Environmental & Social and the United Nations (UN) 17 Sustainable Development Goals (SDG)
- Comprehend the basic techniques utilized to transfer data to useful knowledge, which can be used for timely decision-making
- Use Multiple Criteria Decision Making (MCDM) methods to develop Knowledge-Based Decision Support Systems (KBDSS)
- Utilize KBDSS to obtain the most sustainable: engineering designs, project procurement practices, construction methods and building materials



CIV E 719 SUSTAINABLE AND RESILIENT TRANSPORTATION

COURSE OBJECTIVES

The course will provide an introduction and overview of transportation sustainability, resilience, and equity, including their connections to engineering design, policy, and land use. The sustainability section of the class will survey a variety of strategies used to reduce the impact of transportation on climate change, pollution, and environmental degradation. Topics will include: public transit, shared mobility, walking, cycling, intelligent transportation systems, freight/logistics, and pricing. The resilience section of the class will focus on strategies to safely protect infrastructure and populations from hazards (both natural and man-made). Topics will include: resilient infrastructure, street design, community design, evacuations, transportation responses in disasters, and recovery mechanisms. The course will focus on written and oral communication, prepare transportation engineers for a diverse range of professions, and encourage the adoption of emerging and innovative engineering strategies and ideas.

LEARNING OUTCOMES

- Define, describe, and provide examples of sustainable, resilient, and equitable transportation systems, infrastructure, and plans
- Understand the effects of transportation systems on climate change and the environment
- Understand the effects of hazards on transportation systems
- Describe and apply different transportation modes and strategies to reduce greenhouse gas emissions and environmental impact
- Describe and apply different transportation concepts and strategies to increase infrastructure, operational, and community resilience to chronic disruptions and acute shocks
- Communicate sustainability, resilience, and equity ideas in written and oral forms
- Guide transportation planning and operations toward more sustainable and resilient outcomes in their work

COURSE INFO

CIV E 719

GEOMATICS APPLICATIONS IN TRANSPORTATION ENGINEERING

COURSE OBJECTIVES

Current applications of Geographic Information System (GIS) and Remote Sensing (RS) in Transportation Engineering and related technologies in geographic research are examined through lectures, tutorials (labs), and term projects. The course will cover the principles and operations of GIS software through computer-based exercises using various spatial mapping and (geo)statistical methods. This course will also introduce selected spatial analysis techniques and provide an opportunity to acquire statistical computing skills using Esri's ArcGIS.

LEARNING OUTCOMES

- Gain an understanding of fundamental principles and methods of GIS/RS
- Familiarize with current issues pertaining to the application of GIS/RS
- Learn and apply spatial statistical methods to solve various transportation-related problems involving regionalized (random) variables
- Develop spatial interpolation models (e.g., kriging) to predict unknown values and their estimation uncertainty
- Solve common network problems using shortest distance and route, location-allocation, closest facility, service areas and accessibility analyses via computerized techniques and GIS software
- Expand functional knowledge and operations of Esri's ArcGIS for solving real-world engineering problems



COURSE INFO

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 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

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 TRANSPORTATION SECTION

The Department of Civil and Environmental Engineering offers the Capstone project course to M.Eng. students in the Transportation Engineering stream.

Students will complete directed research projects as part of this course, using the knowledge they have gained throughout their undergraduate and graduate program.

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

NOTES
