UNIVERSITY OF ALBERTA

2023-2024

MASTER OF **ENGINEERING**

CONSTRUCTION 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

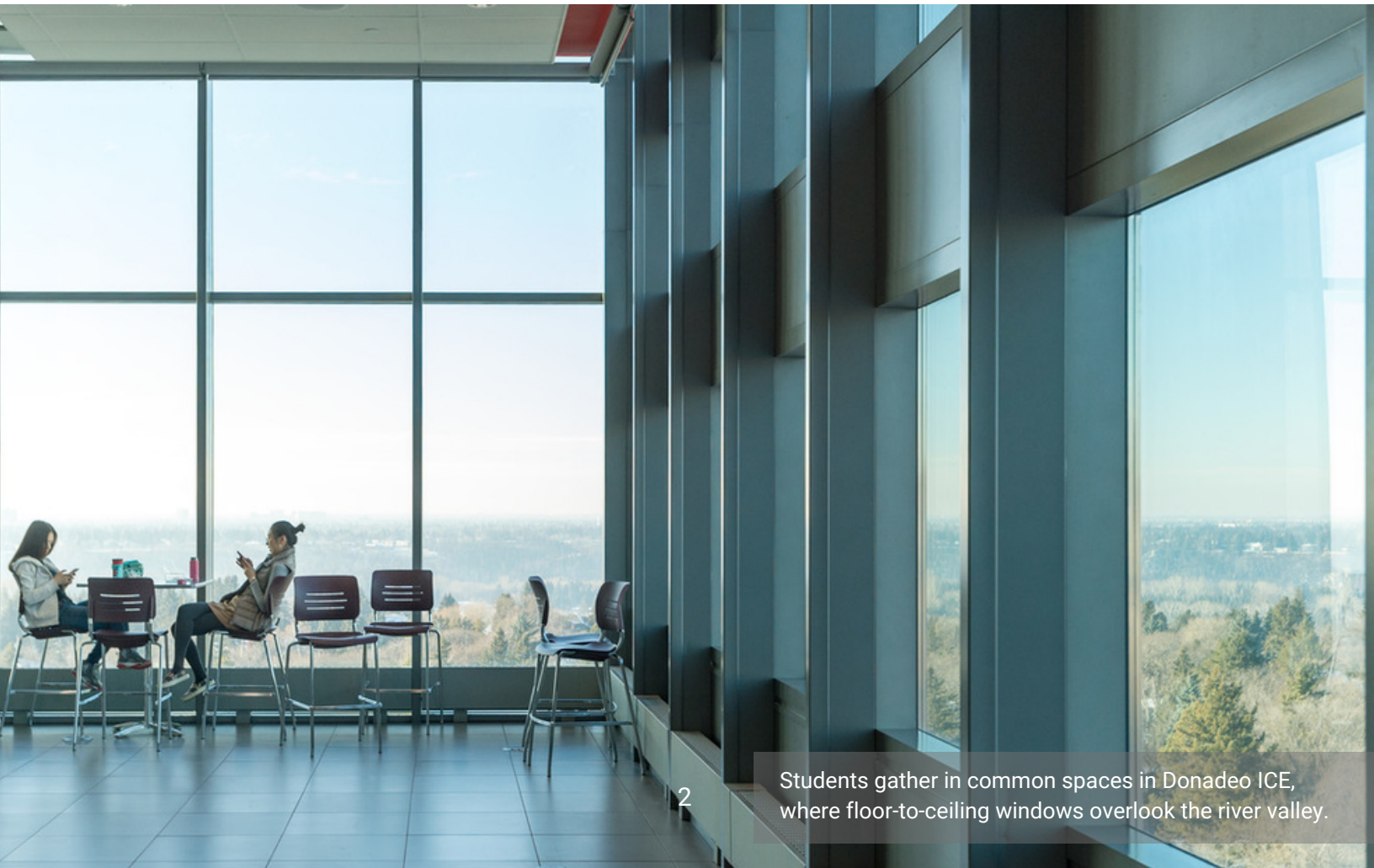
PROGRAM
OBJECTIVES

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

LEARNING
OUTCOMES

- Estimate the cost and duration for construction activities as well as apply the critical path method and production planning methodologies to a construction project.
- Evaluate project performance, analyze project cash flow, and identify sources of uncertainty in construction projects.



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 MEng Academic Advisor. Please refer to the Graduate Handbook for full program policies.

FALL **2023**	CIV E 601 (Project Management) CIV E 602 (Contract Admin) CIV E 789 (Writing/Comm for Engineers)
WINTER **2024**	CIV E 607 (Productivity Modelling) CIV E 709 (Lean Construction) CIV E 709 (Sustainable Construction)
FALL **2024**	CIV E 608 (Construction Engineering) **Plus two** 500-, 600- or 700-level Engineering or Science courses, ***as approved by the M.Eng. Academic Advisor***
WINTER **2025**	CIV E 900 Capstone project (Directed Research - Construction section)

STUDENT **SUPPORT**

GRADUATE **PROGRAM ADVISORS**

Trina Cattral – 7-387 Donadeo ICE
Christina Ezekowitz – 7-381 Donadeo ICE
Arlene Figley – 7-389 Donadeo ICE
Ellie Kim – 7-385 Donadeo ICE

Email: cgradvis@ualberta.ca

ASSOCIATE DEAN **GRADUATE STUDENTS CEE/MP**

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

CONSTRUCTION **GRADUATE COORDINATOR**

Dr. Vicente Gonzalez – 6-289 Donadeo ICE
Email: vagonzal@ualberta.ca

M.ENG. **ACADEMIC ADVISOR**

Dr. Yuntong (Amy) She – 7-259 Donadeo ICE
Email: civmeng@ualberta.ca

STUDENT COACHING **SERVICES**

The Department of Civil and Environmental Engineering is committed to supporting its M.Eng. students as they move through the program.

Students will be provided career and professional development supports throughout their program to aid them in developing their academic and career goals, recognizing and addressing challenges, and building upon their personal strengths to move past their limitations.

Dr. Robyn Braun will support students with their various writing projects and serve as instructor for the communications course. Dr. Braun will also serve as an additional resource and support for students as they navigate the program, the University, and the city of Edmonton.

Contact Dr. Braun at: robyn4@ualberta.ca

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 to Friday (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**

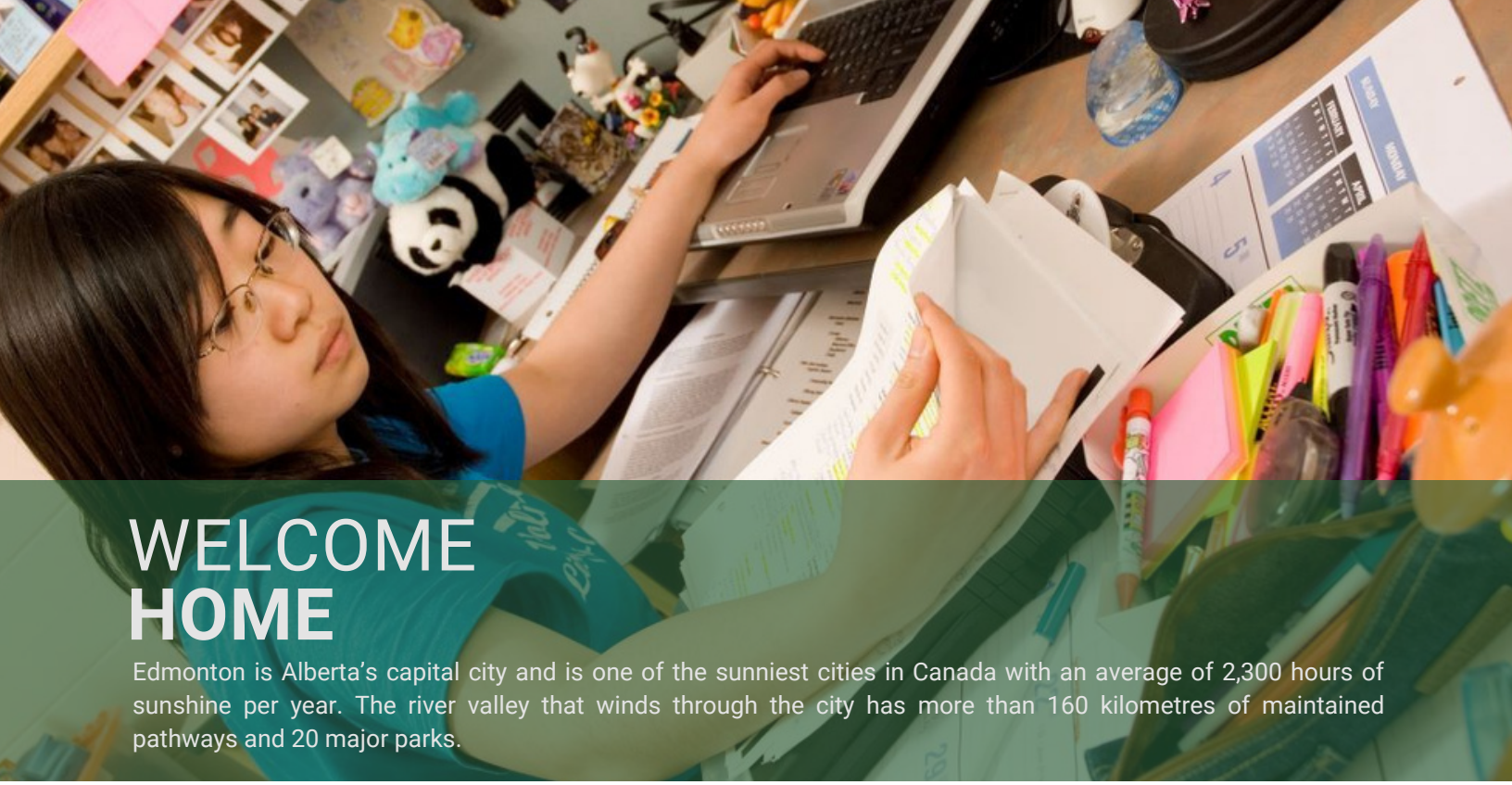
The Post-Graduation Work Permit Program (PGWPP) allows students who have graduated from eligible Canadian designated learning institutions (DLIs) to obtain an open work permit to gain valuable Canadian work experience. Our program also provides academic credentials that are recognized by Alberta licensing 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 inline with Engineers Canada competencies and professional development hours count towards yearly professional requirements.

UNIVERSITY OF ALBERTA **RANKINGS**

	WORLD	CANADA
ACADEMIC RANKING OF WORLD UNIVERSITIES	**91**	**4**
QUACQUARELLI SYMONDS	**111**	**4**
TIMES HIGHER EDUCATION	**118**	**6**



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

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.

In February 2023, the Department of Civil and Environmental Engineering and the School of Mining and Petroleum hosted a networking mixer for our Master of Engineering students. The mixer was part of an ongoing program to support grad students by providing communications training and professional development opportunities.

The mixer, held at the prestigious Royal Glenora Club in Edmonton's River Valley, brought together about 100 grad students and more than a dozen industry representatives for three hours of speakers, professional networking, and delicious food.

Structural engineer at DIALOG and UofA graduate Cam Franchuk gave an inspirational talk reflecting on what he's learned over his 21 years as an engineer. He gave practical advice about lifelong learning and getting your boots muddy, but a recurrent and appropriate overarching theme was the importance of communication. After his presentation, each industry representative came to the podium to introduce themselves, their company, and their work. The last part of the evening was dedicated to mingling and conversation between industry professionals and students.

Our students prepared for the event with a mock mixer training workshop earlier in the week. Dr. Robyn Braun, the Department's Instructor of Communications, and consultants from WorkSpark covered professional dress, conversation starters, handshakes, introducing yourself, and following up after the event.

The mixer and preparation workshop are just part of the support we provide graduate students to help them develop as professional engineers in Canada.

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

Our department supports students with opportunities to develop professional communication skills and access to career resources.

We support our students in developing effective communication, teamwork, and adaptability through industry networking events, experiential learning opportunities, and professional development.

Through our professional development and communications support team, we help students develop their resumes, practice interviewing skills, and connect with potential employers. 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.

INSTRUCTOR OF **COMMUNICATIONS**

Dr. Robyn Braun – 7-240 Donadeo ICE
Email: robyn4@ualberta.ca

WORKSPARK **CONSULTING**

Professional development workshops in resume writing and networking
Web: workspark.ca

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.

COURSE INFO

CIV E 601
ANALYTICAL METHODS FOR PROJECT MANAGEMENT

COURSE OBJECTIVES

This course provides updated knowledge and analytical methods to extend basic concepts and techniques in project management while keeping the analytical flavor typical of an engineering course.

LEARNING OUTCOMES

- To distinguish balanced vs. unbalanced pricing in project tendering through bid factor analysis
- To follow industry best practices in performing project breakdown and preparing project network models
- To apply path-float based critical path method to simplify project scheduling and time cost trade-off analysis
- To critically apply Earned Value management in project cost control
- To apply a non-computer approach to resource scheduling by updating project network models
- To interpret complex precedence relationships on project network models by applying formalized transform schemes
- To perform risk analysis and simulation analysis for contingency estimating in bidding and path float based project scheduling
- To critically apply linear scheduling and repetitive scheduling methods
- To gain teambuilding and project management experiences through conducting a group-based Term Project

COURSE INFO

CIV E 602
CONTRACT ADMINISTRATION

COURSE OBJECTIVES

This course provides the students with a comprehensive knowledge and interactive discussion regarding the major practices of construction project procurement. This objective is achieved by covering the following 3 topics:

- Project delivery methods (PDMs), procurement methods and construction contracts
- Contract formation and administration
- Construction claims and alternative dispute resolution (ADR)

LEARNING OUTCOMES

- Select the optimum: project delivery method, procurement method and contracting strategy
- Perform efficient contract formation and administration tasks and responsibilities during both the planning and execution stages of any project
- Minimize and manage conflicts, disputes and construction claims in projects
- Utilization of alternative dispute resolution techniques in construction projects to avoid litigation
- Achieve timely and effective construction project closeout

CIV E 607
PRODUCTIVITY MODELING AND ANALYSIS

COURSE OBJECTIVES

This course sets particular focus on how to define, model, and analyze productivity in construction and how to tackle challenges in workface planning aimed at productivity improvement.

LEARNING OUTCOMES

- To identify human and environmental factors relevant to labor productivity in construction
- To apply time-based and motion-based productivity assessment techniques commonly acceptable and practically feasible in construction
- To apply multiple linear regressions in productivity modeling and analysis in construction.
- To apply advanced network diagramming technique for resource use planning and workflow simulation at the workface level
- To gain knowledge and insight in codes on occupational health and safety in construction
- To place lean concept into productivity perspective in construction
- To identify opportunities and limitations of automation in productivity improvement

CIV E 608

CONSTRUCTION ENGINEERING

COURSE OBJECTIVES

This course introduces the student to the methods and tools needed for estimating, planning and directing operations in building construction and heavy civil projects. The course focuses on equipment and methods, productivity, and safety management.

LEARNING OUTCOMES

- Model operations and methods involved in building construction and heavy civil construction.
- Apply construction methods to various project settings to assess the factors affecting the selection of equipment, determine ownership and operating costs, estimate earthwork quantities, calculate equipment and fleet production, apply equipment and quality control in construction operations, and employ information resources pertinent to equipment management.
- Formulate a deeper understanding of the underlying problems in construction and compare between different underlying theories in construction management.
- Understand and apply the basics of safety management in various project settings

COURSE INFO

CIV E 709
LEAN CONSTRUCTION

COURSE OBJECTIVES

In this course, Students will learn about the Toyota production system, the last planner system, value stream mapping, integrated project delivery, location-based management, target value design, process improvement, and many other lean concepts. Students will also learn fundamental project management concepts and techniques to define, plan, and execute construction projects. The focus will be on actions that can be taken to meet and sometimes exceed expectations for project time, cost, and quality. The importance of communication and risk management throughout all project stages will be emphasized. Students will be trained on academic paper writing and communication. Students will also be exposed to software applications that aid project management. Students will be challenged as individuals and as members of a team to deliver a paper-based project.

LEARNING OUTCOMES

- Define and explain the management principles of Lean Construction
- Map construction processes and identify wasteful activities
- Measure value in construction process flows
- Propose improvement measures for construction processes
- Explain the basics of Integrated Project Delivery
- Perform advanced location-based management planning assessments
- Demonstrate the understanding of the Last Planner's System for production planning and control

CIV E 709
SUSTAINABLE CONSTRUCTION

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.

COURSE INFO

CIV E 789
WRITING/COMMUNICATION SKILLS FOR ENGINEERS

COURSE OBJECTIVES

This course introduces M.Eng. students to the development of standard documents used in an engineering career, as well as the fundamentals of technical writing and communication, and of effective professional communication.

LEARNING OUTCOMES

- Communicate effectively and respectfully in diverse settings, in person and via standard business documents, such as email.
- Identify and abide by the rules of plagiarism and academic and professional standards of communication.
- Evaluate their own writing process and institute changes when necessary.
- Solicit and provide actionable feedback on writing and other forms of communication.
- Recognize and produce standards for specific technical documents.
- Research and consider the context, audience, and purpose of their writing projects.
- Write a thesis statement and organize their writing at various levels, from document-level through to sentence structure.
- Identify active and passive voice, and use each appropriately.
- Recognize and evaluate rhetorical devices, strategies, and techniques.

CIV E 900
CAPSTONE DIRECTED RESEARCH PROJECT
CONSTRUCTION SECTION

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

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

Please see the M.Eng. Academic Advisor for information about the Construction section.

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