



**UNIVERSITY  
OF ALBERTA**

**2023-2024**

# MASTER OF ENGINEERING

## PETROLEUM 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.

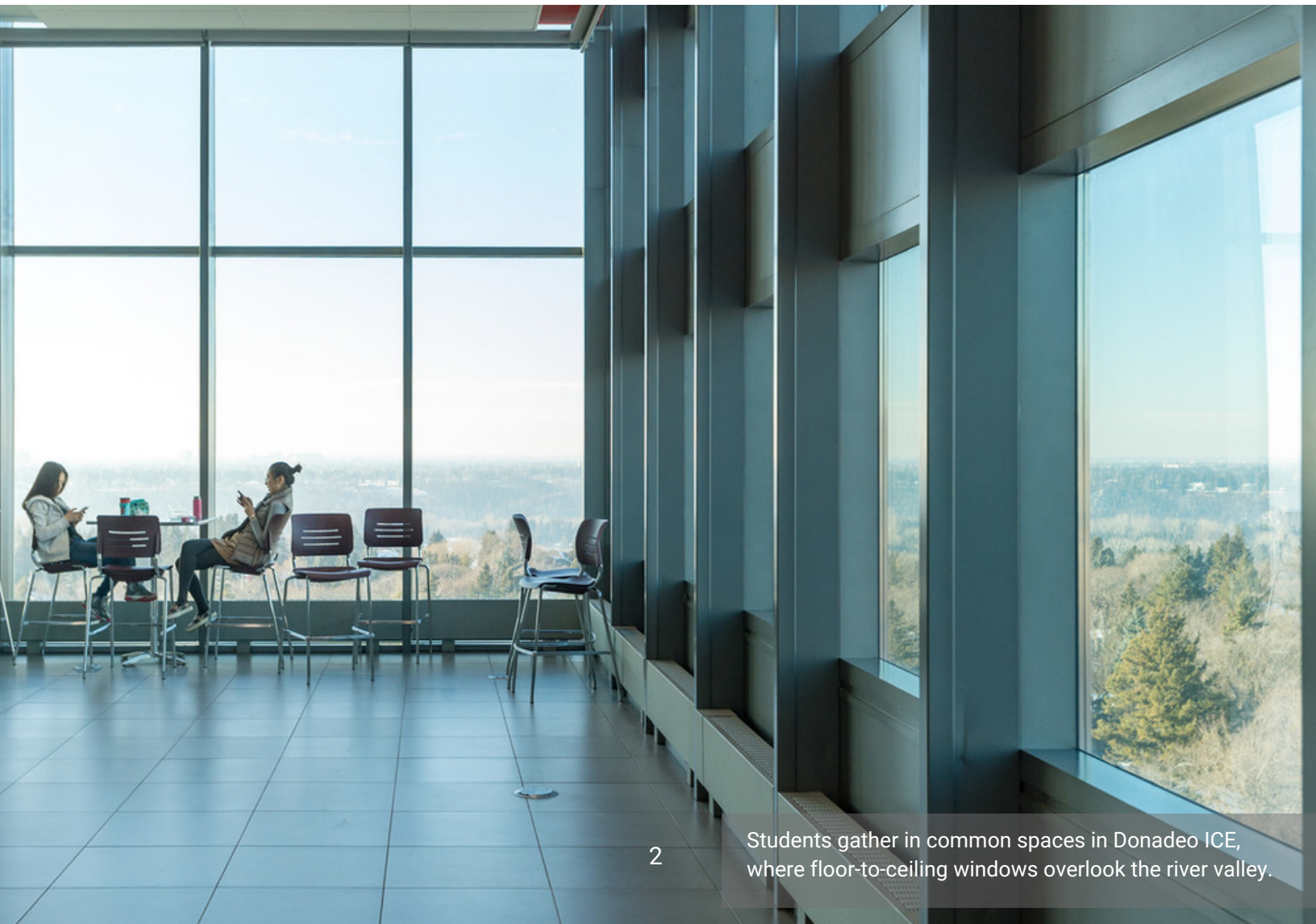
DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING

# M.ENG. PROGRAM INFO

## PROGRAM OVERVIEW

For over 50 years, the University of Alberta has offered the only accredited BSc Petroleum Engineering degree in Canada. Our program is recognized nationally and internationally for the reputation of our faculty, the quality of our research, and the capabilities of our graduates. Students benefit from the challenges of oil extraction here in Alberta and our close ties with the oil and gas industry. Our research puts M.Eng. students in a position to achieve accelerated career growth because of the richness of their education and the need for Canadian-led expertise around the globe.

Petroleum engineers are involved in the exploration and development of oil and gas fields. They apply the principles of geology, physics, and the engineering sciences to the recovery, development, and processing of petroleum. Petroleum engineers recommend the best location for drilling a well, determine if the well contains significant quantities of hydrocarbons that can be recovered economically, and make decisions regarding appropriate well completion techniques.





# 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).

Please refer to the Graduate Handbook for full program policies.

FALL  
2023

PET E 631 (Advanced Production Engineering)  
CIV E 789 (Writing/Comm for Engineers)  
**Plus one** 500/600/700 level General Engineering Elective, **as approved by the M.Eng. Academic Advisor**

WINTER  
2024

PET E 630 (Advanced Reservoir Engineering)  
PET E 636 (Computational Methods for Transport Phenomena in Porous Media )  
PET E 664 (Advanced Drilling Engineering)

FALL  
2024

**Three** 500/600/700 level General Engineering Electives, **as approved by the M.Eng. Academic Advisor**

WINTER  
2025

PET E 900 Capstone project (Directed Research – Petroleum section)

# STUDENT SUPPORT

## GRADUATE PROGRAM ADVISORS

Trina Catral – 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](mailto:cgradvis@ualberta.ca)

## ASSOCIATE DEAN GRADUATE STUDENTS CEE/MP

Dr. Zaher Hashisho – 7-241 Donadeo ICE  
Email: [ad.ceegrad@ualberta.ca](mailto:ad.ceegrad@ualberta.ca)

## PETROLEUM GRADUATE COORDINATOR

Dr. Hassan Dehghanpour – 6-279 Donadeo ICE  
Email: [dehghanpour@ualberta.ca](mailto:dehghanpour@ualberta.ca)

## M.ENG. ACADEMIC ADVISOR

Dr. Yuntong (Amy) She – 7-259 Donadeo ICE  
Email: [civmeng@ualberta.ca](mailto: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](mailto: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](http://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	<b>91</b>	<b>4</b>
QUACQUARELLI SYMONDS	<b>111</b>	<b>4</b>
TIMES HIGHER EDUCATION	<b>118</b>	<b>6</b>



# 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](http://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*

## 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.

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](mailto:robyn4@ualberta.ca)

### WORKSPARK CONSULTING

Professional development workshops in resume writing and networking  
Web: [workspark.ca](http://workspark.ca)



# COURSE INFO

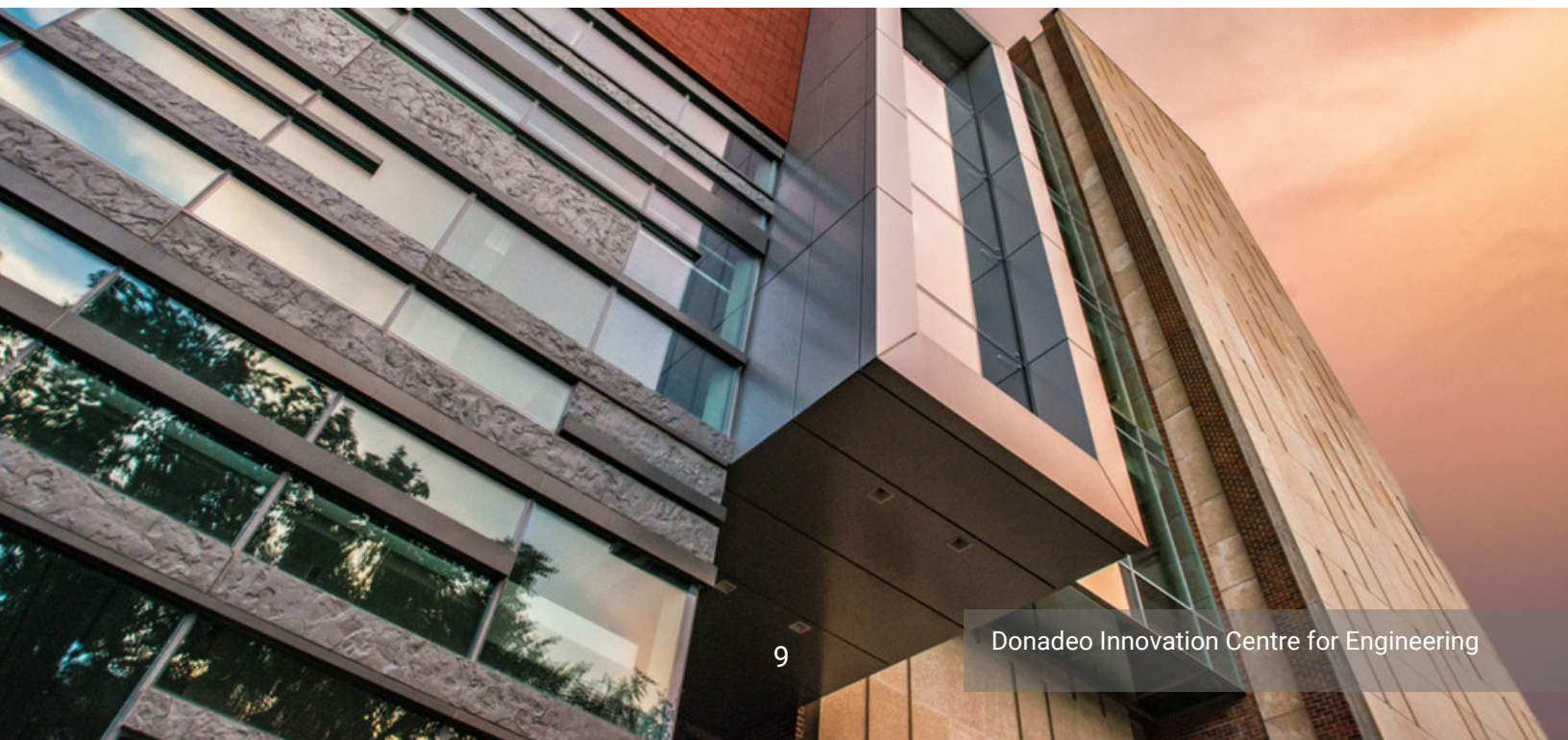
## PET E 630 ADVANCED RESERVOIR ENGINEERING

### COURSE OBJECTIVES

Single and multiphase flow in porous media: concepts of relative permeability, capillary pressure, and wettability. Immiscible and miscible displacement processes in porous media. Overall reservoir performance (tank model): Mechanics of primary production and material balance equation of gas, gas condensate, volatile and black oil reservoirs. Graphical and analytical decline curve analysis. Diffusivity equation and pressure transient in oil and gas reservoirs.

### LEARNING OUTCOMES

- Learning fundamental concepts including interfacial phenomena, wettability, capillary pressure, and relative permeability, and their applications in analyzing reservoir rock-fluid interactions.
- Modelling fluid flow in porous media under steady state, pseudo-steady state, and unsteady state conditions
- Streamline modelling for applications such as tracer test, waterflooding, and well-pattern design.
- Analyzing well-testing data to estimate reservoir parameters such as permeability, reservoir drainage area and shape, and initial reservoir pressure.
- Modelling miscible and immiscible displacement in porous media for different applications such as enhanced oil recovery.
- Modeling fluid-flow in fractured reservoirs for application such as production data analysis and forecasting, and reservoir characterization.



# COURSE INFO

## PET E 631 ADVANCED PRODUCTION ENGINEERING

### COURSE OBJECTIVES

Inflow performance relationships. Analysis of multiphase flow through pipes and restrictions using flow correlations and mechanistic methods. Flow pattern prediction for vertical, horizontal and inclined pipes. Total system analysis, production optimization. Design of artificial lift systems.

### LEARNING OUTCOMES

- Build inflow performance relationships for vertical wells based on field data or correlations.
- Build inflow performance relationships for a well producing multiple layers based on field data or correlations.
- Carry out pressure traverse calculations along a tubing (vertical or slanted) using empirical or semi-empirical multiphase flow models.
- Perform nodal analysis based on vertical lifting performance and inflow performance analysis.
- Analyze the effect of operation parameters on the productivity of a given oil well using nodal analysis.
- Optimize a well's productivity using nodal analysis.

## PET E 636 COMPUTATIONAL METHODS FOR TRANSPORT PHENOMENA IN POROUS MEDIA

### COURSE OBJECTIVES

Single and multi-phase flow problems in porous media for compressible and incompressible flow. Multi-dimensional flow will be considered. Analytical, numerical and stochastic flow models will be developed for heterogeneous porous media.

### LEARNING OUTCOMES

- Derive basic flow equations and analytical solutions for various scenarios.
- Develop and implement finite-difference and finite-volume based solutions to describe single- and two-phase flow problems in 1-D and 2-D with the appropriate boundary and initial conditions.
- Develop an understanding of selected special topics in simulation (error propagation, reservoir heterogeneities, streamline simulation, and history matching).

# COURSE INFO

## PET E 664 ADVANCED DRILLING ENGINEERING

### COURSE OBJECTIVES

Recent advances in drilling techniques. Optimization of drilling operational parameters, directional drilling and deviation control, design aspects of horizontal and multilateral well drilling, measurement while drilling, drill string mechanics, bottom-hole assembly design, tubular stability, drag and torque problems.

### LEARNING OUTCOMES

- Learn design concepts behind specific drilling engineering problems and apply knowledge to solve advanced drilling engineering problems
- Learn factors controlling drilling cost and methods for drilling performance evaluation and optimization of drilling operational parameters.
- Learn drill string design, BHA design, factors controlling hole deviation and drill string buckling.
- Learn design concepts of drilling directional, horizontal, and multilateral wells, including 2D-3D well trajectory planning, selecting the Kick-Off point and making the trajectory change.
- Learn the design concepts of modern drilling technologies such as underbalanced drilling (UBD) and managed pressure drilling (MPD) including; candidate selection and hydraulics design of UBD and MPD.



# 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.

## PET E 900 CAPSTONE DIRECTED RESEARCH PROJECT PETROLEUM SECTION

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