

ENVT 268 Resource Exploitation - Oil, Gas, Bitumen, & Mining
3 Credits, 3 Hours Lecture, 3 Hours Lab per week

This course provides an introduction to the upstream and downstream oil, gas, oil sands and mining industries primarily in Western Canada. Topics covered include geology of the hydrocarbon reservoirs, exploration, market and economic conditions, ecological impact of linear disturbances, lease tenure systems, drilling operations, site reclamation, pipeline networks, sour gas, and history of development in Alberta. Aspects of other mineral resource activities in Alberta and the NWT are also covered.

Prerequisite: EAS100

Instructors

Instructor: Neil O'Donnell Office Location : S209G Phone Number: 780-791-4821 email: neil.o'donnell@keyano.ca	Instructor: Robert Changirwa (Labs/Tutorials) Office Location: S211B Phone Number:780-791-4940 email: robert.changirwa@keyano.ca
Office Hours (Winter 2022) Tuesday 1:00 -- 2:00 Wednesday 10:00 – noon Thursday 11:00 – noon Friday 11:00 -- noon	Office Hours (Winter 2022) Monday 11:00 - 11:50 Tuesday 12:00 - 13:50 Wednesday 13:00 - 14:50
Other times are possible, by appointment	

Hours of Instruction

Wednesday/Friday: 15:00 – 16:30, Room S214
 Tuesday: 9:00 - 11:50, Room S114 (Labs/Tutorials)

Required Resources

The Petroleum Industry: A Nontechnical Guide 0-87814-763-2
Our Petroleum Challenge, 8th Edition (or newer) 1-894348-15-X
Alberta's Oil Patch 1-894864-62-X
Canada's Oilsands available on-line
<http://www.canadasoilsands.ca/en/what-are-the-oil-sands>

Course Outcomes

Upon successful completion of this course, the student shall be able to:

- Identify the location and characteristics of the major oil and gas fields in the boreal forest region of western Canada, and summarize the operations.
- Summarize and give examples of the industries owning oil sands leases and the extent of current and planned operations; also of the various environmental contractors and industry organizations; including employment opportunities.
- Summarize and illustrate the physical and chemical characteristics of crude oil, natural gas, heavy oil, and bitumen; also the basic geology of different ore deposit types, their mineralogy, and chemistry.

- Assess and critique various environmental issues related to exploration, development, water issues (both surface and ground water), pipelines, oil spills, cleanup procedures, and the upstream oil and gas industry in western Canada.
- Summarize and give examples of the mining, extraction, upgrading, tailings, and environmental operations at the open-pit mining operations in the Athabasca area.
- Summarize and give examples of SAGD and other in-situ oil sands operations in the Athabasca and Cold Lake areas.
- Participate in field trips to an open pit operation, a SAGD operation, and the Oil Sands Discovery Centre.
- Contrast differences in open pit, underground, and solution mining.
- List and summarize special issues related to quarries, industrial minerals, and limestone excavations.

Evaluation

Assessment	Weight
5 Videos Short Reports	10%
3 2-Wk. Labs (Group, Rights, Flaring)	10%
1 Field Trip Report	5%
1 Hands-on Ore Mineral Lab	5%
3 Oil Patch Presentations	10%
Mid-Term Exam 1 (Week 7)	10%
Mid-Term Exam 2 (Week 14)	10%
Final Examination	40%
TOTAL	100%

Grading System

Alpha Grade	4.0 Scale	Percent	Rubric for Letter Grades
A+	4.0	> 92.9	Work shows in-depth and critical analysis, well developed ideas, creativity, excellent writing, clarity and proper format.
A	4.0	85 – 92.9	
A-	3.7	80 – 84.9	
B+	3.3	77 – 79.9	Work is generally of high quality, well developed, well written, has clarity, and uses proper format.
B	3.0	74 – 76.9	
B-	2.7	70 – 73.9	
C+	2.3	67 – 69.9	Work has some developed ideas but needs more attention to clarity, style and formatting.
C	2.0	64 – 66.9	
C-	1.7	60 – 63.9	
D+	1.3	55 – 59.9	Work is completed in a general way with minimal support, or is poorly written or did not use proper format.
D	1.0	50 – 54.9	
F	0.0	< 50	Responses fail to demonstrate appropriate understanding or are fundamentally incomplete.

- A grade of C- is required for progression.
- The minimum standard for passing this course is a grade of D (50%).
- Students must achieve an average of 50% on the midterm and the final exam in order to pass the course and an overall average in the course of 50% (D).

Term Mark

- Mark will be determined from all the labs, reports, and assignments.
- Mark will be weighted average of all submissions.
- If 20% or more of submissions (labs, reports, and assignments) are missing, student will not be allowed to write the final exam. This rule applies, even if the submission has a zero grade.

Mid-Term and Final Exams

- Two mid-term exams will be given:
 - Week 7 - covers lecture materials Weeks 1-7.
 - Week 14 - covers lecture materials Weeks 8-14.
- Mid-term exams will not be deferred.
 - If missed for an “excused absence”, the percentage will be integrated into the final exam percentage.
 - If missed otherwise, the mark will be zero.
- Final exam covers lecture materials Weeks 1-15, and associated lab materials.

Lab Sessions

Instructions for lab sessions will be provided by Professor Changirwa on a separate Moodle venue.

Laboratory work will be conducted weekly starting the 2nd week of classes. Lab protocol will be explained during the first lecture in Week 1, 2022. Labs will be graded. Completion of the labs and a passing grade on that component of the course are considered mandatory to pass ENVT268.

The labs will run 3 hours per week. Attendance is mandatory. To get credit for a lab, you must attend the scheduled lab session. If you are absent, the mark recorded will be zero.

For laboratory work in this course, the observations you record must be made individually by you. All lab observations and notes must be completed in the lab. You must carry out all calculations yourself, and written answers must be in words composed uniquely by you. Refer to remarks below on Page 5.

Students present for the lab should hand in completed reports or assignments at the end of that lab session, or no later than one week following, with no penalty. After one week, a mark of zero will be assigned.

Unless specified differently by the instructors, labs, reports, and assignments will be submitted electronically via Moodle.

Any changes due to special circumstances will be communicated by instructor to students via Moodle.

Proposed Schedule of Topics

Week	Topics	T. LeRiche Alberta's Oil Patch Student Presentations 3 per student during semester	Labs
Week 1	Introduction, Review Mineral and Energy Resources Sections from EAS100 course		No Lab
Week 2	Origin and Accumulation of Petroleum and Gas	1, 2	Group Project – Oil Sands Open Pit and SAGD operations in Athabasca area. (2 week completion)
Week 3	Exploration, P&NG Rights Energy Overview	3, 4, 5	Participative Lab – Video : Exploring the Ancient Sea
Week 4	Drilling: Chemistry of Petroleum, Heavy Oil, and Bitumen: Natural Gas	6, 7, 8	Assignment - Mineral Rights, Land Sales, Continuations (2 week completion)
Week 5	Open pit and underground mining; Environmental Impact of Mining	9, 10, 11	Participative Lab – Video : The Moment of Truth
Week 6	Quarries, Industrial Minerals, Limestone, Sand & Gravel	12, 13, 14	Participative Lab – Video ; The Rotary Rig; Environmental Impact of Mining (continued)
Week 7	Mid-Term Exam No.1 (10%)		TBA
Week 8	Reading Week		
Week 9	Basic Geology Ore Deposits	15, 16, 17	Hands-on lab - ore minerals
Week 10	Oil Sands Mining & Extraction; Tailings	18, 19, 20	Field Trip to Open-Pit Oil Sands Mine: Report
Week 11	Oil Sands In-Situ, SAGD	21, 22, 23	Participative Lab - Video: Fires of Kuwait
Week 12	Oil Sands In-Situ, SAGD (continued)	24, 25, 26	Assignment on Flaring (2 week completion)
Week 13	Formation Evaluation, Flaring, Environmental Issues	27, 28	Field Trip to SAGD Operation: Report
Week 14	Refining and Petrochemicals Mid-Term Exam No.2 (10%)	29, 30	Participative Lab - Video : Product by Design;
Week 15	Transportation, Pipelines		TBA
Weeks 16 & 17	Final Exam (40%)		

Please Note:

Date and time allotted to each topic is subject to change.

Performance Requirements

Student Responsibilities

It is your responsibility as a student to contact the Office of the Registrar to complete the forms for Withdrawal or Change of Registration, and any other forms. Please refer to the list of important dates as noted in the Academic Schedule in the [Keyano College credit calendar](#). The Keyano College credit calendar also has information about Student Rights and Code of Conduct. It is the responsibility of each student to be aware of the guidelines outlined in the Student Rights and Code of Conduct Policies.

Laboratory Safety

In the science laboratories, safety is important.

Students must complete the *WHMIS for Students* online training course on Moodle before entering the science laboratories.

Students must comply with the mandatory laboratory safety rules for this course as provided in the laboratory manual. Failure to do so will result in progressive discipline such as a verbal warning, refused entry into the laboratory, or suspension from the College.

Before entering the lab, students are responsible reviewing the lab manual and relevant Safety Data Sheets for the purpose of evaluating risks associated to health. Some hazards used in the laboratory may have additional risks to those with pre-existing medical conditions.

Student Attendance

Class attendance is useful for two reasons. First, class attendance maximizes a student's learning experience. Second, attending class is a good way to keep informed of matters relating to the administration of the course (e.g., the timing of assignments and exams). Ultimately, you are responsible for your own learning and performance in this course.

It is the responsibility of each student to be prepared for all classes. Students who miss classes are responsible for the material covered in those classes and for ensuring that they are prepared for the next class, including the completion of any assignments and notes that may be due.

Academic Misconduct

Students are considered to be responsible adults and should adhere to principles of intellectual integrity. Intellectual dishonesty may take many forms, such as:

- Plagiarism or the submission of another person's work as one's own;
- The use of unauthorized aids in assignments or examinations (cheating);
- Collusion or the unauthorized collaboration with others in preparing work;
- The deliberate misrepresentation of qualifications;
- The willful distortion of results or data;
- Substitution in an examination by another person;
- Handing in the same unchanged work as submitted for another assignment; and
- Breach of confidentiality.

The consequences for academic misconduct range from a verbal reprimand to expulsion from the College. More specific descriptions and details are found in the Student Rights and Code of Conduct section of the Keyano College credit calendar. It is the responsibility of each student to be aware of the guidelines outlined in the Student Rights and Code of Conduct Policies.

In order to ensure your understanding of the concept of plagiarism, you must successfully complete the online tutorial found on ilearn.keyano.ca. Then print the certificate, sign it, and show it to each of your instructors. Your course work may not be graded until you show this signed certificate.

Specialized Supports

The Student Services department is committed to Keyano students and their academic success. There are a variety of student supports available at Keyano College. Due to the continuing situation with the Covid-19 pandemic, the offered support services will be implemented differently this semester by being provided mostly virtually. In-person service can be requested as needed. All Alberta Health Services guidelines will be followed for in-person appointments—wear a mask, maintain two meters of physical distance, use hand sanitizer, and stay home if you are unwell.

All student services are available during Keyano business hours: Monday to Friday, 8h30-16h30. The Library has evening and weekend hours. Please check [keyano.ca/library](https://www.keyano.ca/library) for current hours.

Accessibility Services: provides accommodations for students with disabilities. Students with documented disabilities, or who suspect a disability, can meet with a Learning Strategist to discuss their current learning barriers and possible accommodations. Students who have accessed accommodations in the past are encouraged to contact us to request them for the semester. Please note that requesting accommodations is a process and requires time to arrange. Contact us as soon as you know you may require accommodations. For accessibility services supports and to book a virtual appointment, please contact accessibility.services@keyano.ca.

Accessibility Services also provides individual and group learning strategy instruction for all students, as well as technology training and supports to enhance learning. Meet with a Learning Strategist to learn studying and test-taking strategies for online classes. Schedule an appointment with the Assistive Technology Specialist to explore technology tools for learning. Book an appointment today by emailing accessibility.services@keyano.ca

Academic Success Coaching: offers you support and access to resources for your academic success to help you to find the Keys to your Success. The Academic Success Coach will work with you to develop an academic success plan, develop your study and time management skills, and connect you with the right resources here at Keyano. Academic.success@keyano.ca is the best way to access resources during virtual service delivery.

Wellness Services: offers a caring, inclusive, and respectful environment where students can access free group and individual support to meet academic and life challenges. Mental Health Coordinators offer a safe and confidential environment to seek help with personal concerns. All individual appointments will continue virtually.

Wellness Services welcomes students to participate in any of the virtual group sessions offered throughout the academic year addressing topics including mindfulness and test anxiety.

Individual virtual appointments can be made by emailing wellness.services@keyano.ca.

Library Services: provides students with research and information supports as they engage in their studies. Library staff are available to support you both virtually and in person during the fall semester. For library service supports and inquiries, please email askthelibrary@keyano.ca.

Individual support with the Information Librarian will be provided virtually. Appointments can be requested by email or by placing a [Book a Librarian](#) request using the online form found [here](#).

Research and Subject Guides are helpful resources when conducting research or addressing your information needs. To view a subject or course specific guide, use the following [Subject Guides link](#)

To access additional research resources, including Citation Guides (APA, MLA, Chicago, or IEEE), go to the [Research Help Library page](#).

Skill Centre: provides academic support services to students registered in credit programs at Keyano College in the form of tutoring, writing support groups, facilitated study groups, workshops and study

space. Tutoring services are **free** to Keyano students. Tutoring is available for Math, Writing, English, and Science subject areas.

While most courses are being offered online, the Skill Center will be offering mostly virtual tutoring services and in-person sessions as requested. Please email Skill.centre@keyano.ca to get in contact with our tutoring staff.

For the most up to date information on how to book a tutoring session, please view the [Keyano Skill Centre homepage](#).

E-Learning

Technology and internet will impact your online learning experience. It's important that you are able to watch an online video and other course materials, take online quizzes, and participant in a live class with your instructor and other students.

Keyano College operates in a Windows based environment and having the correct tools for online learning is important. Here's a list of recommended system requirements for Fall 2020.

Internet Speed

Minimum Internet speeds of 5 Mbps.

Recommended Internet speeds of 25 Mbps (especially if you are sharing your internet at home).

Check your internet speed with Fast.com.

System requirements:

Microsoft Windows	Apple
<p>Minimum Requirements:</p> <ul style="list-style-type: none"> · A Windows 10 computer/laptop · Minimum 4GB of RAM. · 10GB+ available hard drive storage. · Enough available hard drive space to install the Microsoft Office suite (approximately 3GB). Microsoft Office software is free to all Keyano students and employees. · Microphone, webcam and speakers. A headset with a microphone is recommended. · System updates must be regularly installed. · Anti-Virus / Anti-Malware software 	<p>Minimum Requirements:</p> <ul style="list-style-type: none"> · A Macintosh (V10.14 and above) computer/laptop · Minimum 4GB of RAM. · 10GB+ available hard drive storage. · Enough available hard drive space to install the Microsoft Office suite (approximately 3GB). Microsoft Office software is free to all Keyano students and employees. · Microphone, webcam and speakers. A headset with a microphone is recommended. · System updates must be regularly installed. · Anti-Virus / Anti-Malware software.
<p>Recommended Requirements</p> <ul style="list-style-type: none"> · 8GB of RAM · A method of backing up/synchronizing to local or cloud-based storage such as OneDrive is highly recommended. This is included if you complete the setup of KeyanoMail and download MS Office using your Keyano email for free. 	<p>Recommended Requirements</p> <ul style="list-style-type: none"> · 8GB of RAM · A method of backing up/synchronizing to local or cloud-based storage such as OneDrive is highly recommended. This is included if you complete the setup of KeyanoMail and download MS Office using your Keyano email for free.

Chromebooks are **not** recommended as they are not compatible with testing lockdown browsers.
A Microsoft Surface or iPad or iPad Pro may be possible alternatives in some program areas.

Specific department requirements:

Business and OA programs require Windows 10.

Other programs may utilize Windows based tools as well.

Computer Software

Students will be able to get access to Microsoft Office 365 for Free using Keyano Credentials by [clicking here](#).

Recording of lectures and Intellectual Property

Students may only record a lecture if explicit permission is provided by the instructor or by Accessibility Services. Even if students have permission to record a lecture or lecture materials, students may not publish any of the lectures or lecture materials, this includes any recordings, slides, instructor notes, etc. on any platform. Thus no student is allowed to publish or sell instructor notes without formal written permission. It is important to recognize that the Canadian Copyright Act contains provisions for intellectual property.

ITS Helpdesk

If you are having issues with your student account, you can contact the ITS Helpdesk by emailing its.helpdesk@keyano.ca or calling 780-791-4965.

Please watch your Keyano email for workshop announcements from our Student Academic Support Services team.