

	School of Science
	GEOL 112
	Introduction to the Mineral Exploration and Mining Industries
	Term: Winter 2023 Number of Credits: 3
Course Outline	

INSTRUCTOR: Dr. Chad Morgan

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OFFICE LOCATION: T1084

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OFFICE HOURS: TBD and upon request

INSTRUCTION TIMES: Tuesdays and Thursdays, 9:00 – 10:20 am (online/video)

COURSE DESCRIPTION

This course traces the mineral resource sector from grassroots mineral exploration through to underground and open-pit extraction and the processing and marketing of mining products. The environmental impact of mining and sustainable mining techniques are introduced, as well as monitoring and remediation techniques that follow mine closure. This course also provides an introduction to First Nations in the Yukon and the history, land agreements, and regulations that influence their relationship with the mining industry.

Guest speakers supplement course curriculum with local expertise and raise awareness of active projects and industry developments in Yukon. GEOL 112 serves as a valuable foundation for students and practitioners in a wide range of science and policy fields that require a base-level of understanding concerning the mining industry.

COURSE REQUIREMENTS

There are no prerequisites for this introductory course.

EQUIVALENCY OR TRANSFERABILITY

Receiving institutions determine course transferability. Find further information at:

<https://www.yukonu.ca/admissions/transfer-credit>

LEARNING OUTCOMES

Upon successful completion of the course, students will be able to:

- Identify the various stages in the mining cycle, from exploration to mineral extraction and refinement, to mine closure and remediation. Students should be able to demonstrate an understanding of the requirements for technical and environmental studies that bridge these segments of the mine cycle.
- Compare and analyse different methods of extracting minerals in both surface and underground mining operations and describe the subsequent processing techniques that separate and refine ore.
- Describe how metals and industrial minerals are sold into the marketplace, as well as the factors involved in setting mineral prices. In addition, students should be able to demonstrate an understanding of how companies raise capital to fund mining activities.
- Describe the main issues surrounding closure and reclamation of a mine site and be able to apply that knowledge to make preliminary recommendations for currently active mining operations.
- Identify the primary characteristics of main deposit types and the ore minerals generally associated with those deposits.
- Assess the impact of mining operations on the natural and human environment and describe the main sources of environmental pollution.
- Demonstrate a fundamental awareness of the interplay between mining companies and Yukon First Nations, and the rights and responsibilities of both partners.

COURSE FORMAT

Weekly breakdown of instructional hours

This course has three hours of scheduled instruction per week. Students can expect to spend an additional 2-3 hours per week on background reading and course assignments, with additional time required for exam preparation.

Delivery format

This course will be delivered online using the Zoom videoconferencing platform. Most materials will be delivered in a synchronous format, and it is important that students prioritise attending the synchronous lectures so that they do not fall behind in the course. It is up to the discretion of the instructor whether synchronous lectures will be recorded for exam revision; it is not intended that recordings should be the

primary means of student engagement in the course. Asynchronous materials and activities may be utilised where appropriate given course material.

EVALUATION

Class Participation	15%
Theory Assignments	25% (5% each)
Midterm Exam	20%
Current Events and Technology Presentations	10% (5% each)
Final Exam	30%
Total	100%

Attendance & Participation

Fifteen percent (15%) of the course grade is attached to class attendance and/or participation. It is important that students are present and engaged to gain the knowledge necessary to successfully complete assignments and examinations.

Assignments

Students will be given five (5) lecture assignments based on assigned readings that are intended to reinforce the concepts introduced in lecture. These assignments will serve as a focal point for class discussion and peer interaction. Students will also prepare two oral presentations on mining-related current events that will be presented to the class on a date assigned by the instructor.

Lecture assignments are due at the start of lecture on the date assigned by the instructor. Late assignments will be graded based on the following scheme: a deduction of 10% per day up until a total deduction of 50% is reached, following that, assignments must be submitted prior to the date that the instructor hands back the graded assignment (set by the instructor), unless otherwise indicated by the instructor.

Students are expected to complete background textbook readings in advance of each lecture. Recommended readings are provided in the topic outline table below. Readings will require ~1-2 hours per week outside class time.

Exams

This course has two exams: a midterm exam and a final exam. Both exams will be delivered online on Moodle; specifics surrounding format and duration will be conveyed in lecture prior to the exams.

Any student who is absent from a test or exam for legitimate reasons will be eligible to write a deferred exam. Please note that excuses such as car trouble, vacation travel, oversleeping, and misreading the test schedule are not considered legitimate reasons and do not qualify the student for a deferred exam. For

missed exams, the student must contact the instructor within 48 hours of the missed exam by email. For missed final exams, students must contact the instructor to discuss an appropriate course of action. Any deferred exams will be scheduled by the Chair of the School of Science.

COURSE WITHDRAWAL INFORMATION

Refer to the YukonU website for important dates.

TEXTBOOKS & LEARNING MATERIALS

Stevens, Robert. 2019. *Mineral Exploration and Mining Essentials* (2nd edition). Pakawau GeoManagement Inc. (www.miningessentials.com)

The textbook is available for purchase online from both the website above and from online booksellers such as Amazon. Students will also require a computer with a stable internet connection. A headset with a microphone is recommended.

ACADEMIC INTEGRITY

Students are expected to contribute toward a positive and supportive environment and are required to conduct themselves in a responsible manner. Academic misconduct includes all forms of academic dishonesty such as cheating, plagiarism, fabrication, fraud, deceit, using the work of others without their permission, aiding other students in committing academic offences, misrepresenting academic assignments prepared by others as one's own, or any other forms of academic dishonesty including falsification of any information on any Yukon University document.

Please refer to Academic Regulations & Procedures for further details about academic standing and student rights and responsibilities.

ACCESSIBILITY AND ACADEMIC ACCOMMODATION

Yukon University is committed to providing a positive, supportive, and barrier-free academic environment for all its students. Students experiencing barriers to full participation due to a visible or hidden disability (including hearing, vision, mobility, learning disability, mental health, chronic or temporary medical condition), should contact [Accessibility Services](mailto:access@yukonu.ca) for resources or to arrange academic accommodations: access@yukonu.ca.

THEORY ASSIGNMENT DUE DATES

Number	Theory Assignment	Due Date
1	Chapters 2 & 3: Geology and Mineral Deposits	Jan. 17
2	Chapter 4: Mineral Exploration	Jan. 31
3	Chapters 5 & 6: Mineral resources, reserves and mining technical studies	Mar. 2
4	Chapters 7 & 8: Mineral processing and environmental considerations	Mar. 23
5	Assigned Reading	Apr. 6

TOPIC OUTLINE

Week	Date	Lecture	Lecture Topics	Required Readings
1	Jan. 5	1	Introduction to the course and Industry Overview	Ch. 1 (pp. 1-13)
2	Jan. 10	2	Industry Overview and Intro to Geology	
	Jan. 12	3	Intro to Geology	Ch. 2 (pp. 15-37)
3	Jan. 17	4	Mineral Deposits I	Ch. 3 (pp. 47-108)
	Jan. 19	5	Mineral Deposits II	
4	Jan. 24	6	Mineral Deposits III	
	Jan. 26	7	Yukon Geology and Mineral Deposits	
5	Jan. 31	8	Mineral Exploration I	Ch. 4 (pp. 113-167)
	Feb. 2	9	Mineral Exploration II	
6	Feb. 7	10	Mineral Exploration III	
	Feb. 9	11	Guest Lecture (TBA)	
7	Feb. 14	12	Guest Lecture (TBA)	
	Feb. 16	Midterm Exam Review		
8	Feb. 21	Reading Break (no classes)		
	Feb. 23			
9	Feb. 28	Midterm Exam		Ch. 5 (pp. 170-197)
	Mar. 2	13	Mineral Resources and Reserves, and Mining Technical Studies	
10	Mar. 7	14	Mineral Resources and Reserves, and Mining Technical Studies	
	Mar. 9	15	Yukon technical reporting and governing bodies	
11	Mar. 14	16	Mining I	Ch. 6 (pp. 199-229)
	Mar. 16	17	Mining II	
12	Mar. 21	18	Mining III	Ch. 7 (pp. 230-251)
	Mar. 23	19	Mineral Processing I	
13	Mar. 28	20	Mineral Processing II	Ch. 8 (pp. 253-274)
	Mar. 30	21	Environmental Considerations I	

14	Apr. 4	22	Environmental Considerations II	
	Apr. 6	23	Guest Lecture (TBA)	
15	Apr. 12	Final Exam Review		