

	<b>School of Science</b>
	<b>GEOL 112</b>
	<b>Introduction to the Mineral Exploration and Mining Industries</b>
	<b>Term: Winter 2024</b> <b>Number of Credits: 3</b>
<b>Course Outline</b>	

**INSTRUCTOR:** Dr. Chad Morgan

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**OFFICE LOCATION:** T1084

**PHONE:** (867) 456-8570

**OFFICE HOURS:** drop-in and by appointment

**INSTRUCTION TIMES:** Lectures on Monday and Wednesday 9:00 – 10:20 am (Room A2601)

### **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 consists of two 80-minute lectures per week. The lecture schedule included in this course outline provides the major topics covered and roughly when those topics will be presented during the course. Please note that this schedule will likely be modified throughout the term, as some topics may not be finished within the predicted lecture time. It is expected that the course will require 2-3 hours per week of background reading and homework on course assignments. Additional time may be required for exam preparation. It is important to note that the time required will vary by individual.

### **Delivery format**

Lectures for the Winter 2024 offering of this course will be delivered in-person. Lectures will be delivered in room A2601 on the Ayamdigut (Whitehorse) campus. Lecture slides, course resources, and assignments will be provided digitally on the Moodle course page. Lectures will not be recorded.

## EVALUATION

Theory Assignments	30% (6% each)
Midterm Examination	25%
Current Events and Technology Presentations	15% (7.5% each)
Final Examination	30%
Total	100%

## Assignments

Students will be given five (5) lecture assignments based on assigned readings that are intended to reinforce the concepts introduced in lecture. Readings will require ~1-2 hours per week outside class time. Lecture assignments are due at the start of lecture on the date assigned by the instructor. 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.

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.

## Exams

This course has two lecture examinations, a midterm and a final. The midterm exam is conducted during scheduled lecture time; the final exam is conducted during the final exam period scheduled by the Office of the Registrar. The midterm lecture exam is a 1.5-hour exam; the final exam will be conducted within a 3-hour time slot.

Missed exams will be assigned a grade of 0% unless re-scheduling for a valid reason is approved and determined in advance of the scheduled exam date. 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 phone or email. For missed final exams, students must contact the Chair of the School of Science. Any deferred exams will be scheduled by the Chair.

## COURSE WITHDRAWAL INFORMATION

Refer to the YukonU website for important dates.

## TEXTBOOKS & LEARNING MATERIALS

### Required Textbook:

Stevens, Robert. 2019. *Mineral Exploration and Mining Essentials* (2<sup>nd</sup> edition). Pakawau GeoManagement Inc. ([www.miningessentials.com](http://www.miningessentials.com))

The textbook is available for purchase online from both the website above and from online booksellers such as Amazon.

## 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](#) for resources or to arrange academic accommodations: [access@yukonu.ca](mailto:access@yukonu.ca).

### Theory Assignment Due Dates

Number	Theory Assignment	Due Date
1	Chapters 2 & 3: Geology and Mineral Deposits	Jan. 30
2	Chapter 4: Mineral Exploration	Feb. 13
3	Chapters 5 & 6: Mineral resources, reserves and mining technical studies	Mar. 21
4	Chapters 7: Mineral processing	Apr. 2
5	Chapter 8: Environmental considerations	Apr. 9

## TOPIC OUTLINE

<b>Week</b>	<b>Date</b>	<b>Lecture</b>	<b>Lecture Topics</b>	<b>Required Readings</b>
1	Jan. 4	1	Introduction to the course and Industry Overview	Ch. 1 (pp. 1-13)
2	Jan. 9	2	Industry Overview and Intro to Geology	
	Jan. 11	3	Intro to Geology	Ch. 2 (pp. 15-37)
3	Jan. 16	4	Mineral Deposits I	Ch. 3 (pp. 47-108)
	Jan. 18	5	Mineral Deposits II	
4	Jan. 23	6	Mineral Deposits III	
	Jan. 25	7	Yukon Geology and Mineral Deposits	
5	Jan. 30	8	Mineral Exploration I	Ch. 4 (pp. 113-167)
	Feb. 1	9	Mineral Exploration II	
6	Feb. 6	10	Mineral Exploration III	
	Feb. 8	11	TBD	
7	Feb. 13	12	TBD	
	Feb. 15	Midterm Exam Review		
8	Feb. 20	Reading Break (no classes)		
	Feb. 22			
9	Feb. 27	Midterm Exam		
	Feb. 29	13	Mineral Resources and Reserves, and Mining Technical Studies	Ch. 5 (pp. 170-197)
10	Mar. 5	14	Mineral Resources and Reserves, and Mining Technical Studies	
	Mar. 7	15	Yukon technical reporting and governing bodies	
11	Mar. 12	16	Mining I	Ch. 6 (pp. 199-229)
	Mar. 14	17	Mining II	
12	Mar. 19	18	Mining III	Ch. 7 (pp. 230-251)
	Mar. 21	19	Mineral Processing I	
13	Mar. 26	20	Mineral Processing II	Ch. 8 (pp. 253-274)
	Mar. 28	21	Environmental Considerations I	
14	Apr. 2	22	Environmental Considerations II	
	Apr. 4	23	TBD	
15	Apr. 9	Final Exam Review		