

	School of Science
	GEOL 108
	Earth Through Time
	Term: Winter 2023 Number of Credits: 3
Course Outline	

INSTRUCTOR: Dr. Chad Morgan

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OFFICE LOCATION: T1084

OFFICE HOURS: Drop-in and by appointment

CLASSROOM: Online synchronous Zoom lecture, Monday & Thursday 7:00 – 8:20 pm

DATES: January 4, 2024, to April 11, 2024

COURSE DESCRIPTION

GEOL 108 examines Earth’s history from initial formation through to the present-day using evidence found in the geologic record; as well as the corollary development of geological thought and understanding in both Western and Indigenous worldviews. The course covers three main themes in Earth history: 1) the concept of deep time; 2) the evolution of plate tectonics; and 3) the biological evolution of Earth using evidence from the fossil record. The growth of the continents, the opening and closing of ocean basins, episodes of large-scale erosion and deposition on the continents, and orogenic (mountain-building) episodes are fundamental geologic topics covered in this course. Students will develop competencies in measuring geologic time using the application of stratigraphic principles, paleontology and radioactive decay.

Life on Earth during the major geological time periods is discussed with a focus on significant evolutionary developments and mass extinctions. Plate tectonics, climate, and relative sea-level are examined as determinants of evolutionary change with particular reference to North America and Western Canada.

This course is designed to run concurrently with GEOL 106 (Historical Geology). Students in GEOL 108 will share lectures with students in GEOL 106 (Historical Geology), but will not complete a lab component. This course serves as an option for students to satisfy programs requiring a 3-credit science course without a lab. Students may not take GEOL 108 for credit towards the Earth Sciences diploma.

COURSE REQUIREMENTS

There are no prerequisites for this course.

Cross-listed or Excluded Courses: GEOL 106 Historical Geology: Students enrolled in the Earth Sciences Diploma or bridging program may not take this course for credit.

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:

1. Demonstrate knowledge and proper use of the geologic time scale, as well as understanding of the history of its development.
2. Describe Indigenous perspectives on geologic history, with a specific focus on northwestern Canada. Demonstrate how western scientific perspectives and Indigenous oral traditions have contextualized the same geologic developments through different lenses.
3. Demonstrate understanding of the suite of geologic principles used to analyze Earth history and apply those principles to evaluate and interpret the geologic history of specific localities in western Canada.
4. Summarize how Earth's continents and oceans evolve over geologic time and relate this to specific evidence preserved in the rock record.
5. Describe the relationships between plate tectonics and the evolution/extinction of life on Earth, from first life through to the present-day.
6. Research a variety of invertebrate fossils and discuss how they contribute to 1) geologists' understanding of life during specific geologic time periods and 2) interpretations of Earth history.
7. Summarize the key sedimentological, paleoclimatic, tectonic, and biological lines of evidence that have been used to interpret the history of Earth with a focus on North America and western Canada in particular.

COURSE FORMAT

Weekly breakdown of instructional hours

This course consists of two 90-minute lectures per week through Zoom in an online format. Course materials will be provided through the course Moodle page. The course will include asynchronous 'take-home' content (activities and assignments) which will require additional time outside of the scheduled lecture periods. The class will proceed following a schedule of activities with set assignments and due dates throughout the term. This is not a self-paced course. The schedule included in this course outline presents the major topics to be covered in the lectures and expected activities. Please note that the course schedule will likely be modified through the term at the instructor's discretion.

Delivery format

Lectures for the Winter 2024 offering of this course will be delivered online. Students are expected to attend the virtual lectures during scheduled class time so that they can ask questions and directly engage with the instructor and their peers. Lectures will not be recorded. Review of any missed material or completion of missed activities is the responsibility of the student. Examinations will be delivered remotely with additional details on the delivery method presented by your instructor closer to the examination date. One on one appointments with the course instructor can be facilitated online or in-person at the Ayamdigut Campus.

EVALUATION

Lecture Participation	10 %
Lecture Assignments	20 %
Fossil and Earth Materials Field book	15 %
Midterm Examination	25 %
Final Examination	30%
Total	100%

Attendance and Participation

Students are expected to attend lectures, as well as complete asynchronous course content each week. It is the responsibility of the student to inform the instructor if they will be missing a lecture and to make-up for missed content on their own time. Attendance and participation will be noted by the instructor and will be valued at 10% of the final grade.

Assignments

Two lecture-based assignments will be distributed at scheduled intervals during the course. These assignments will focus on topics in historical geology. In addition, students in GEOL 108 will maintain a Fossil and Earth Materials Field book throughout the term, which will largely involve an examination of key fossils through Earth's history. Submission of field book entries will be due at throughout the course, as well as at course end. Further details will be provided at the start of the term by your 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). All assignments must be submitted prior to the end of the last lecture.

Examinations

This course has two lecture examinations: a midterm and a final. The midterm exam (1.5 hrs) is conducted during scheduled lecture time; the final exam (3 hrs) is conducted during the final exam period scheduled by the Office of the Registrar.

Missed exams will be assigned a grade of 0% unless re-scheduling for a valid reason is approved and determined in advance of scheduled exam date. If there are known conflicts with exam scheduling, please see the instructor as soon as possible to discuss an alternative examination date.

COURSE WITHDRAWAL INFORMATION

Refer to the YukonU website for important dates.

TEXTBOOKS & LEARNING MATERIALS

Recommended Textbook:

Fensome, R., Williams, G., Achab, A., Clague, J., Corrigan, D., Monger, J., & Nowlan, G. (eds.) 2014. *Four Billion Years and Counting: Canada's geological heritage* (1st edn.). Nimbus Publishing and the Canadian Federation of Earth Sciences, 402 pp. ISBN: 978-1-55109-996-5.

The textbook is available at the Ayamdigt Campus bookstore and can also be purchased online at retail sellers including Amazon.ca and Chapters-Indigo.

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.

TOPIC OUTLINE

Week	Date	Lecture	Lecture Topics	Recommended Readings
1	Jan. 4	1	Introduction to the course and geology overview	Ch. 1 – 2
2	Jan. 8	2	Geologic Principles and the Sedimentary Rock Record	Ch. 3
	Jan. 11	3	Deep Time and development of the Geologic Time Scale	
3	Jan. 15	4	Fundamentals of Palaeontology	Ch. 4
	Jan. 18	5	Fundamentals of Palaeontology II	
4	Jan. 22	6	Hadean Eon and Cosmology: Origin of the Universe, Solar System, and Earth	Ch. 5
	Jan. 25			
5	Jan. 29	7	Archean Eon I	Ch. 6 – 7
	Feb. 1	8	Archean Eon II	
6	Feb. 5	9	Proterozoic Eon I	Ch. 6 – 7
	Feb. 8	10	Proterozoic Eon II	
7	Feb. 12	11	Early Paleozoic Era I	Ch. 6 – 7
	Feb. 15	Midterm Exam Review		
8	Feb. 20	Reading Break (no classes)		Ch. 6 – 7
	Feb. 22	Reading Break (no classes)		
9	Feb. 26	Midterm Exam		Ch. 8
	Feb. 29	12	Early Paleozoic Era II	
10	Mar. 4	13	Late Paleozoic Era III	Ch. 8
	Mar. 7	14	Late Paleozoic Era IV	
11	Mar. 11	15	Mesozoic Era I	Ch. 9
	Mar. 14	16	Mesozoic Era II	
12	Mar. 18	17	Mesozoic Era III	Ch. 10 – 11
	Mar. 21	18	Cenozoic Era I	
13	Mar. 25	19	Cenozoic Era II	Ch. 10 – 11
	Mar. 28	20	Yukon through time	
14	Apr. 1	Easter Monday (no class)		Ch. 18, 20
	Apr. 4	21	The Anthropocene debate, a new epoch?	
15	Apr. 8	Final Exam Review		