COURSE OUTLINE

GEOL 108
Earth Through Time

3 CREDITS

PREPARED BY: Mary Samolczyk, Instructor/Coordinator, Earth Sciences
DATE: November 5, 2020

APPROVED BY: Joel Cubley, Chair, School of Science
DATE: November 6, 2020

APPROVED BY SENATE: August 19, 2020

APPLIED SCIENCE AND MANAGEMENT DIVISION
GEOL 108
Earth Through Time
3 Credits
Winter, 2021

EARTH THROUGH TIME

INSTRUCTOR: Mary Samolczyk	**OFFICE HOURS:** T 2:30 – 4:00 PM
OFFICE LOCATION: T1090	**CLASSROOM:** Lecture: delivered online (synchronous and asynchronous)
E-MAIL: msamolczyk@yukonu.ca	**TIME: Lecture:** Thursdays 1:00 – 2:25 PM; a second lecture will be delivered asynchronously each week
TELEPHONE: (867) 456 6958	**DATES:** Jan. 7 – Apr. 20, 2020

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.

PREREQUISITES

There are no prerequisites for this introductory geoscience course.

RELATED COURSE REQUIREMENTS

In Winter 2021, GEOL 108 will be delivered remotely using the Zoom platform. Students are required to have access to a computer with a reliable internet connection. A headset with a microphone is recommended.

EQUIVALENCY OR TRANSFERABILITY

This course is new and its transferability is still being evaluated. Receiving institutions always determine course transferability. Further information and assistance with transfers may be available from the School of Science.

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

This course consists of two 90-minute lectures per week. The schedule included in this course outline details the major topics covered in the lecture section; laboratory activities are complimentary to lecture material. Please note that this schedule will likely be modified during the term to accommodate lecture topics that may not be finished within the predicted lecture time.

Lectures for the Winter 2021 offering of this course will be delivered remotely using the online Zoom platform and Moodle. The scheduled lecture period in this course will be delivered synchronously. Students are expected to join the synchronous lecture session so that they can ask questions in real-time and directly engage with the instructor and their peers. The synchronous lecture will not be recorded. A second lecture/activity will be delivered asynchronously each week and will be made available to students on the Moodle course page. Midterms and exams will be delivered remotely. Your instructor will notify you of the delivery method prior to each test.

ASSESSMENTS:

Attendance & Participation

Students are expected to attend all synchronous 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.

Assignments

Two lecture-based assignments will be distributed at scheduled intervals through the course. These assignments will be focussed on special topics in Yukon historical geology. In addition, students in GEOL 108 will maintain a Fossil and Earth Materials Journal

throughout the term, which will largely involve an examination of key fossils through Earth's history. Submission of journal entries will be due at 1/3 and 2/3 through the course, as well as at course end. It is expected that journals will be up to date at these due dates and feedback will be given at this time.

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.

Tests
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 lecture exam is designed to take 3 hours.

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.

EVALUATION

Lecture Assignments (2)	20%
Fossil and Earth Materials Journal	20%
Midterm Lecture Exam	25%
Final Lecture Exam	35%
Total	100%

REQUIRED TEXTBOOKS AND MATERIAL

There is no required textbook in this course. Textbooks that are highly recommended include:

- Levin, H.L. and King, D.T. 2017. The Earth Through Time (11th ed.). New York, NY: Wiley. 600 p.
- Wicander, R. and Munroe, J.S. 2016. Historical Geology (8th ed.). Cengage Learning. 448 p.

Additional required and supplementary reading will be provided by the instructor throughout the course.

ACADEMIC AND STUDENT CONDUCT

Information on academic standing and student rights and responsibilities can be found in the current Academic Regulations that are posted on the Student Services/ Admissions & Registration web page.

PLAGIARISM

Plagiarism is a serious academic offence. Plagiarism occurs when a student submits work for credit that includes the words, ideas, or data of others, without citing the source from which the material is taken. Plagiarism can be the deliberate use of a whole piece of work, but more frequently it occurs when students fail to acknowledge and document sources from which they have taken material according to an accepted manuscript style (e.g., APA, CSE, MLA, etc.). Students may use sources which are public domain or licensed under Creative Commons; however, academic documentation standards must still be followed. Except with explicit permission of the instructor, resubmitting work which has previously received credit is also considered plagiarism. Students who plagiarize material for assignments will receive a mark of zero (F) on the assignment and may fail the course. Plagiarism may also result in dismissal from a program of study or the University.

YUKON FIRST NATIONS CORE COMPETENCY

Yukon University recognizes that a greater understanding and awareness of Yukon First Nations history, culture and journey towards self-determination will help to build positive relationships among all Yukon citizens. As a result, to graduate from ANY Yukon University program, you will be required to achieve core competency in knowledge of Yukon First Nations. For details, please see www.yukonu.ca/yfnccr.

ACADEMIC ACCOMMODATION

Reasonable accommodations are available for students requiring an academic accommodation to fully participate in this class. These accommodations are available for students with a documented disability, chronic condition or any other grounds specified in section 8.0 of the Yukon University Academic Regulations (available on the Yukon University website). It is the student's responsibility to seek these accommodations. If a student requires an academic accommodation, they should contact the Learning Assistance Centre (LAC): lac@yukonu.ca.

TOPIC OUTLINE

Module	Course topic(s)
1	Introduction to historical geology: fundamental geologic principles; introduction to the three major themes in Earth history; Indigenous perspectives on early Earth history and how First Nations oral histories parallel western scientific thought in upcoming course topics.
2	Sedimentary rocks and historical geology: relationship between tectonic settings and sedimentary rock types; information provided by colour, texture, and structures in rocks; sea level change in the sedimentary record; stratigraphy and correlation; unconformities.
3	Evolution of life through time: relationships between fossils, past climates and paleogeography; the fossil succession; evolution and the organization of life.
4	Geological concepts of time: relative vs. absolute dating; the geologic time scale; radioactive dating methods; geological hierarchy of chronological periodization.
5	Planetary beginnings and the origin of Earth: the Big Bang, the formation of the solar system and initial accretion of Earth.
6	Evolution and structure of Earth (Archean Eon): differentiation post-accretion; characteristics of the primitive atmosphere; the primitive ocean and early hydrologic cycles; the origin of life.
7	The Proterozoic Eon: geologic and evolutionary highlights of the Paleoproterozoic, Mesoproterozoic, and Neoproterozoic eras—Snowball Earth, transition to an oxygenated atmosphere, evolution of soft-bodied multicellular organisms.
8	The Paleozoic Era: major tectonic events; supercontinent assembly and breakup, Cambrian explosion of life and the proliferation of shelled animals; advent of vertebrates; mass extinctions.
9	The Mesozoic Era: breakup of Pangaea and its implications for Cordilleran geology; formation of epicontinental seas; climate factors; dinosaurs and the rise of mammals, mass extinction at the K-T boundary.
10	The Cenozoic Era: ice ages and paleoclimate; western North American tectonic activity and volcanism; eastern passive margin sedimentation and marine transgressions and regressions; evolutionary advances. Human origins.

12	The Anthropocene: impact of recent human activity on the geologic record.