COURSE OUTLINE

GEOL 106
Historical Geology

3 CREDITS

PREPARED BY: Mary Samolczyk, Instructor/Coordinator, Earth Sciences
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APPROVED BY: Joel Cubley, Chair, School of Science
DATE: November 6, 2020

APPROVED BY SENATE: August 21, 2019

APPLIED SCIENCE AND MANAGEMENT DIVISION
GEOL 106
Historical Geology
3 Credits
Winter, 2021

HISTORICAL GEOLOGY

INSTRUCTOR: Mary Samolczyk	**OFFICE HOURS:** By appointment
OFFICE LOCATION: T1090	**CLASSROOM:** Lecture: delivered online (synchronous and asynchronous) Lab: T1090
E-MAIL: msamolczyk@yukonu.ca	**TIME:** Lecture: Thursdays 1:00 – 2:25 PM; a second lecture will be delivered asynchronously each week Lab: W 2:30 – 5:30 PM
TELEPHONE: (867) 456 6958	**DATES:** Jan. 7 – Apr. 20, 2020

COURSE DESCRIPTION

GEOL 106 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 provide, in tandem with GEOL 105 (Physical Geology), the first-year geology courses required to enter the second year of a B.Sc. geology program at most

institutions.

PREREQUISITES

There are no prerequisites for this introductory geoscience course.

RELATED COURSE REQUIREMENTS

Students will require a computer with a stable internet connection. A headset with a microphone is recommended. Lab instruction will take place on campus using face-to-face instruction.

EQUIVALENCY OR TRANSFERABILITY

COTR GEOL 106 (3)
SFU EASC 210 (3)
TRU GEOL 2050 (3)
UBCO EESC 121 (3)
YukonU GEOL 105 (3) & YukonU GEOL 106 (3) = EESC 111 (3) & EESC 121 (3)
UVIC EOS 1XX (1.5)

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. Identify 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 and one 3-hour laboratory period 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. Students will not be able to complete lab assignments remotely and must attend each lab session. Midterms and exams will be delivered either on campus or 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 and laboratory exercises, as well as complete asynchronous course content each week. Laboratory exercises can only be completed during laboratory periods and materials may not be available outside of these hours. Accommodation for a missed lab is not always possible. It is the responsibility of the student to inform the instructor if they will be missing lecture or lab, and, in the case of a missed lab, to contact the instructor to determine if alternative scheduling is possible.

Assignments
This course includes 10 laboratory exercises that are due one week from the initial laboratory activity unless otherwise indicated by the instructor. Successful completion of these activities is critical for understanding and reinforcing lecture material. Two lecture-based assignments will be distributed at the 1/3 and 2/3 marks through the course progression.

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).

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. There is also a final laboratory exam conducted during the final week of classes in the regularly scheduled laboratory time. The midterm lecture exam is a 1.5-hour exam; the lecture and laboratory final exams are 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:

Laboratory Assignments (10)	30%
Lecture Assignments (2)	15%
Midterm Lecture Exam	15%
Final Laboratory Exam	15%
Final Lecture Exam	25%
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.
11	The Anthropocene: Impact of recent human activity on the geologic record.