Yukon University	School of Science
	GEOL 105 **Physical Geology**
	Fall 2024 **3 Credits**

Course Outline

INSTRUCTORS: Dr. Joel Cubley (lecture); Dr. Chad Morgan (laboratory)
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OFFICE: M107 (Cubley); T1084 (Morgan)
OFFICE HOURS: Drop-in and by appointment
CLASSROOMS: A2317 (Wednesday lecture); A2601 (Friday lecture); T1090 (laboratory)
DATES: September 4, 2024, to December 19, 2024

COURSE DESCRIPTION

Physical Geology (GEOL 105) is an introduction to the origin, structure, and composition of Earth. The course uses the unifying theory of plate tectonics to frame the presentation of a broad suite of geoscience processes affecting the earth. Topics covered include atomic structure and minerals; igneous, sedimentary and metamorphic rocks; weathering, erosion and depositional processes; earth composition and structure; volcanism, earthquakes, and rock deformation. Hands-on laboratory exercises focus on rock and mineral identification, basic outcrop description, and geologic map reading, construction, and analysis.

Physical Geology (GEOL 105), when paired with Historical Geology (GEOL 106), provide the standard first year of geoscience courses in most B.Sc. degree programs.

COURSE REQUIREMENTS

Prerequisite(s): 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 and classify basic rocks and minerals in hand sample.
- use basic geoscience terminology in describing lithologies, structures and geologic processes.
- connect earth processes to earth cycles, such as the rock cycle and tectonic cycle, and define the time scales at which different cycles operate.
- apply geological and geophysical principles and concepts to solving geologic problems on a number of scales.
- describe the geologic history of a region based on field exposures, maps, cross-sections, rock samples, and photographs.

COURSE FORMAT

Weekly breakdown of instructional hours

This course consists of two 90-minute lectures and one three-hour lab period per week. The lecture schedule included in this course outline details the major topics covered and when those topics will be presented throughout 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 this course will require 3-4 hours/week of homework and additional reading. It is important to note that the time required will vary by individual.

Delivery format

Lectures and lab sections for the Fall 2024 offering of this course will be delivered in-person on the Ayamdigut (Whitehorse) campus. Students are strongly encouraged to attend all lectures and laboratory exercises. Lab exercises can be completed only during lab periods and materials may not be available outside these hours. Off-campus field exercises must be completed during the allocated time with the instructor present.

EVALUATION

Weekly lab assignments (9)	36% (4% each)
Midterm lecture exam	20%
Final lecture exam	25%
Biweekly review quizzes (5)	5% (1% each)
In-class learning assessments (2)	6% (3% each)
Lecture assignments (2)	8% (4% each)
Total	100%

Assignments

Weekly lab exercises will be due at the start of the following lab section. This allows the instructor to provide ongoing feedback throughout the course and help ensure learning from one assignment to the next. In addition to laboratory exercises, students will participate in two in-class lecture "learning assessments" to help reinforce critical concepts. These are group exercises intended to inspire discussion and collaboration. Students must complete these learning assessments and submit them at the start of the following lecture.

Two take-home assignments will also be administered over the course of the semester. These assignments focus on getting students to engage with and appreciate the geologic landscape in their own area. These assignments will require the presentation of student findings and observations to peers using the course forums on Moodle.

Readings from the textbook will be assigned to support lecture instruction. Open-book review quizzes will be administered on Moodle on a biweekly basis; material in these quizzes will be drawn from both lecture and textbook material. The quizzes are short (5-7 multiple choice questions) and are intended as an incentive to stay current with textbook readings.

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).

Examinations

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 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 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 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

This course utilizes an open-source textbook offered through the BC Campus Open Ed project.

Earle, S. 2019. Physical Geology (2nd ed.). British Columbia (BC) Open Campus. The textbook may be accessed at: https://opentextbc.ca/physicalgeology2ed/

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 Topic(s)	Recommended Resources
1	Sept. 4	1	Course Introduction and Introduction to Plate Tectonics	Chapter 1, Chapter 10
	Sept. 6	2	Plate Tectonics: Theory Development	
2	Sept. 11	3	Plate Tectonics: Driving Forces for Plate Motion	
	Sept. 13	4	Introduction to Minerals (Part I)	Chapter 2
3	Sept. 18	Learning Assessment #1: Plate Tectonics		
	Sept. 20	5	Introduction to Minerals (Part II)	Chapter 2
4	Sept. 25	6	Igneous Rocks and Processes (Intrusive)	Chapter 3
	Sept. 27	7	Igneous Rocks and Processes (Extrusive)	Chapter 4
5	Oct. 2	8	Weathering, erosion, and soil formation	Chapter 5
	Oct. 4	9	Sedimentary Rocks and Processes: Rock types	Chapter 6
6	Oct. 9	10	Sedimentary Rocks and Processes: Depositional environments and sedimentary structures	
	Oct. 11	11	Metamorphic Rocks and Processes: Controls and Classification	Chapter 7
7	Oct. 16	12	Metamorphic Rocks and Processes: Types of metamorphism	
	Oct. 18	Learning Assessment #2: Rock Cycle		
8	Oct. 23	Midterm Review		
	Oct. 25	Midterm Exam (in class)		
9	Oct. 30	13	Rock Deformation and Geological Structures: Stress and Strain	Chapter 12
	Nov. 1	14	Rock Deformation and Geologic Structures: Folding and faulting	

10	Nov. 6	15	Geologic Time: Geological time scale and relative dating techniques (Part I)	Chapter 8
	Nov. 8	16	Geologic Time: Isotopic dating and other dating methods (Part II)	
11	Nov. 20	17	Geophysics and the Earth's Interior	Chapter 9
	Nov. 22	18	Earthquakes: plate tectonics controls, classification, measurement (Part I)	Chapter 11
12	Nov. 27	19	Earthquakes: plate tectonics controls, classification, measurement (Part II)	
	Nov. 29	20	The geoscience of climate change	Chapters 16, 19
13	Dec. 4	21	Introduction to mineral and energy resources (Part I)	Chapter 20
	Dec. 6	22	Introduction to mineral and energy resources (Part II)	
14	**Final Exam Period**			

LABORATORY ACTIVITIES

Week	Laboratory Activity
2	*Field Trip* – Introduction to Whitehorse Geology and Outcrop Description
3	*Field Trip* – Geologic Mapping at the Last Chance Showing, Whitehorse Copper Belt
4	*Field Trip* – Geologic Mapping at the Last Chance Showing, Whitehorse Copper Belt
6	Identification and Classification of Common Rock-forming Minerals
8	Introduction to Igneous Rocks
9	Structural Contours and Outcrop Patterns
10	Introduction to Sedimentary Rocks and Processes
12	Introduction to Metamorphic Rocks and Processes
13	Introduction to Seismology and Earthquakes
14	Introduction to Natural Hazards – Hawaii Hazard Map Case Study

The above topics are first-order themes for weekly lab exercises. Each laboratory handout will provide a detailed introduction to the theory and techniques needed to be successful in the exercise. No laboratory exercises will be conducted during the first week of classes.