School of Science

GEOL 105
Physical Geology

Term: Fall 2021
Number of Credits: 3

Course Outline

INSTRUCTOR: Dr. Chad Morgan
E-MAIL: cmorgan@yukonu.ca **PHONE:** (867) 456-8570
OFFICE LOCATION: A2303 **OFFICE HOURS:** Tues 4:00-5:00 pm in T1090 (and by appointment)

LAB INSTRUCTOR: Mary Samolczyk
E-MAIL: msamolczyk@yukonu.ca **PHONE:** (867) 456-6958
OFFICE LOCATION: T1090 **OFFICE HOURS:** Wed 11:00 – 1:00 pm (and by appointment)

CLASSROOMS: A2603 (lecture, Tues & Thurs 1:00-2:20 pm); T1090 (laboratory, Mon 1:00-3:50 pm)
DATES: September 6, 2022 to December 1, 2022

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

College of the Rockies – GEOL 105 (3)
Simon Fraser University – EASC 101 (3)
Thompson Rivers University – GEOL 1110 (3)
Trinity Western University – GEOL 109 (3)
University of British Columbia – EOSC 110 (3) and EOSC 111 (1)
University of British Columbia Okanagan – YU GEOL 105 + GEOL 106 = UBCO EESC 111 + EESC 121 (6)
University of Fraser Valley – GEOG 1XX (3)

University of Northern British Columbia – SCIE 1XX (3)
University of Victoria – EOS 120 (1.5)
Vancouver Island University – GEOL 111 (4)

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 periods for the Fall 2022 offering of this course will be delivered in-person, lectures will be delivered in room A2603 on the Ayamdigut (Whitehorse) campus and labs will be held in room AT1090 on the Ayamdigut (Whitehorse) campus. Lectures will involve instruction and interactive discussion and collaboration between the instructor and your peers.

EVALUATION

Weekly lab assignments (10)	30% (3% each)
Midterm lecture exam	20%
Final lecture exam	25%
Biweekly review quizzes (5)	10% (2% each)
Lecture assignments and learning assessments (5)	15% (3% 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 three 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.

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.

Biweekly Review Quizzes

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.

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/

COURSE WITHDRAWAL INFORMATION

Refer to the YukonU website for important dates.

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.

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 by contacting the Learning Assistance Centre (LAC): LearningAssistanceCentre@yukonu.ca.

LECTURE TOPIC OUTLINE

Week	***Date***	***Lecture***	***Lecture Topics***	***Recommended Resources***
1	Sept. 6	1	Course introduction and introduction to rocks and minerals	Chapter 1.1 – 1.4, Chapter 2
	Sept. 8	2	Minerals	
2	Sept. 13	3	Introduction to the Theory of Plate Tectonics	Chapter 1.5, Chapter 10
	Sept. 15	4	Plate Tectonics: Development of the theory	
			Open-book review quiz #1	
3	Sept. 20	5	Plate Tectonics: Driving forces for plate motion	Chapter 10
	Sept. 22	6	Igneous rocks and processes (plutonic)	Chapter 3
4	Sept. 27	7	Igneous rocks and processes (volcanic)	Chapter 4
	Sept. 29	8	Weathering, erosion, and soil formation	Chapter 5
			Open-book review quiz #2	
5	Oct. 4	9	Sedimentary rocks and processes: Rock types	Chapter 6
	Oct. 6		Learning Assessment #1: Plate Tectonics	
6	Oct. 11	10	Sedimentary rocks and processes: Depositional environments and sedimentary structures	Chapter 6
	Oct. 13	11	Metamorphic rocks and processes: Rock types and structures	Chapter 7
			Open-book review quiz #3	

7	Oct. 18	12	Metamorphic rocks and processes: Types of metamorphism	Chapter 7
	Oct. 20	Learning Assessment #2: The Rock Cycle		
8	Oct. 25	Midterm exam review		
	Oct. 27	Midterm exam (in class)		
9	Nov. 1	13	Rock deformation and geological structures: Stress and strain	Chapter 12
	Nov. 3	14	Rock deformation and geological structures: Folding and faulting	
			Open-book review quiz #4	
10	Nov. 8	15	Geologic time: Relative dating techniques and the Geologic Time Scale	Chapter 1.6, Chapter 8
	Nov. 10		Geologic Time: Absolute dating techniques	
11	Nov. 15	Learning Assessment #3: Geologic Time		
	Nov. 17	16	Earthquakes: Plate tectonic controls, classification, and measurement	Chapter 11
12	Nov. 22	17	Introduction to the Earth's interior	Chapter 9
	Nov. 24	18	Mineral and energy resources	Chapter 20
			Open-book review quiz #5	
13	Nov. 29	19	The geoscience of climate change	Chapters 16 & 19
	Dec. 1	Final exam review		

LABORATORY TOPIC OUTLINE

Week	***Topic***
1	Introduction to Whitehorse Geology
2	Geologic mapping Part I
3	Geologic mapping Part II
4	Mineral identification and classification
5	Igneous rock identification and classification
6	Sedimentary rock identification and classification
7	Metamorphic rock identification and classification
8	*TBD*
9	Structure contours and outcrop patterns
10	Virtual field trip