

GEOS 100 PHYSICAL GEOLOGY Section 002

Course Outline Winter 2004

Prerequisite: English 12, Chem 11 or Chem 060.

1. Instructor

Dr. Tark S. Hamilton Office Fisher 344-A

Phone 370-3331

Office Hours: as posted M,T,F 10:30-5:20, T 1:30-2:20 or by appointment

hamilta@camosun.bc.ca

2. Intended Learning Outcomes

After successfully completing all components of this course students will be able to:

1. Recognize mineral names, physical properties, chemical composition, formation
2. Identify ~50 common rock-forming minerals on their physical properties
3. Infer how samples of some rocks have formed: process and conditions
4. Infer the relationship of rock-forming processes to plate tectonics
5. Describe & interpret textures of igneous, sedimentary & metamorphic rocks
6. Describe mineral & chemical variations of abundant rock types
7. Classify common rocks based on texture and composition
8. Relate a range of geological processes and identify their products
9. Understand the natural resources, their settings, limits, value and environments
10. Relate environmental conditions to geological settings and products
11. Apply techniques to determine the chronological order of events in Earth's history
12. Calculate absolute radiometric ages of Earth materials and events
13. Identify common geologic structures & their representation on maps.
14. Identify, describe and interpret geological structures in three dimensions
15. Determine the relationship of geological structures and plate tectonic boundaries
16. Determine the location of an earthquake from seismic data
17. Use seismograms to infer relative earth movements on faults
18. Relate the nature and distribution of major earth features such as mountains, volcanoes and earthquakes to plate tectonics.
19. Geological and scientific vocabulary of 2000-3000 terms and definitions

3. Required Materials

(a) Texts

Physical Geology, 9th ed.; Plummer, McGeary and Carlson

Lab. Manual in Physical Geology, AGI, 6th ed., Busch and Tasa

Recommended reading of other geology texts, a geological glossary (dictionary), a mineral identification book and web based research, readings, real and virtual field trips.

(b) Other

Hand lens, protractor, drawing compass, coloured pencils.

4. Instruction 14 weeks

Classroom 3 hours 9:30-10:20 M,T,F Mon F268, Tues F302, Fri F334

Lab 3 hours Wed – 9:30-12:20 F300 (*must pass lab to pass course*)

Local Field Trips during lab time & 2 weekend day trips on 2 weeks notice

5. Assessment

(a) **Lab exercises** (due in lab at the end of lab period) 11 X 2.5%

(b) **Lab tests (1 hour practicums: minerals, rocks, tectonics)** 5%, 5%, 10%

- (c) **Written exams** 15%, 15%, 25%
- (d) **Weekly pop quizzes on assigned lab readings and prior lecture notes at beginning of each lab period**
- (e) **Short paper on an approved geological journal article or topic due ~wk8.**

6. Grading system

Marking Scheme:

A+	100-95	A	94-90	A-	89-85		
B+	84-80	B	79-75	B-	74-70		
C+	69-65	C	64-60	D	59-50	F	<50

7. Sequence of topics (subject to modification and repetition):

Ch.1 Introduction: Geological hazards, resources, environment, processes and products
Internal processes, heat engine and plate tectonics. External (surficial processes)

Observations and Hypothesis Testing, The notion of “Deep Time” (**Lab 1**)

Ch.2& 21 Matter & minerals: Elements, atoms, ions, Mineral compositions, crystal structure & physical properties. Mineral environments, assemblages & resources (**Lab 3 - 2 parts**)

Ch.3& 21 Igneous rocks, volcanoes & plutons, and resources, magmas, properties, mineralogy, textures and environments of formation (**Lab 4**)

Ch.4 Volcanism, activity & landforms, textures, hazards, geothermal resources (**Lab 5**)

Ch.5& 9 Weathering mechanical and chemical, soil formation, erosion and mass wasting (**Midterm test 1 around week 4 and Lab Test 1 on Minerals around week 5**)

Ch.6 & 10-14 inclusive Sedimentary processes, environments, sediments, facies, rock types and resources (**Lab 6**)

Ch.7& 21 Metamorphism, metamorphic rocks settings, textures, formation and resources (**Lab 7**) and **Lab Test 2 on Rocks around week 8**

Ch.8 Geologic time: relative and absolute, geologic dating techniques (**Lab 8**)

Ch.15 Crustal deformation, tectonics and structural geology (**Lab 10**)

Ch.16 & 17 Earthquakes: types, recurrence, location, effects, tectonic settings & Earth’s interior: Core, Mantle & Crust, Planetary formation, geotherms & heat flow (**Lab 16**)

Ch.18-21 inclusive Plate tectonics, Ocean floor, basalts, active tectonics, ore formation, unique environments, plate boundaries and motions, mantle convection, Mountain building, evolution of continents, resources (**Lab 2**)

Lecture notes only: Canadian Geology and development of western Canada and local geology (**Lab Test 3 in last week: time, structure and tectonics**)

8. Course purpose: Introduction to the physical make up and natural processes on and within the earth with an emphasis to the environment and resources. Always ask what each topic has to do with resources, hazards and the environment. Learn the vocabulary as you go. Every time you read or hear a new word, learn what it means and use it in class.