

# GEOS 100 PHYSICAL GEOLOGY Section 002

## Course Outline Fall 2004

Prerequisite: English 12., Chem 11 or Chem 060.

### 1. Instructor

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Office Hours: as posted M,T,W 12:30-13:20, Thursday 10:30-11:20

### 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
- 20.

### 3. Required Materials

#### (a) Texts

Earth, Canadian ed.; Tarbuck, Lutgens and Tsujita, Pearson publ.

Lab. Manual in Physical Geology, AGI, 6<sup>th</sup> 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

Lab 3 hours)

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) 10 X 2.5%

(b) Lab tests (1 hr tests, 3 hr final: minerals, rocks, tectonics) 5%, 5%, 10%

(c) Written exams 15%, 15%, 25%

#### 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, erosion and mass wasting

(**Midterm test 1 week 5 and Lab Test 1 on Minerals week 6**)

**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, earthquakes and plate tectonics**)