

GEOGRAPHY AND PLANNING

GPHY 208 – Surface Processes and Landforms



Course Coordinator	Dr. Melissa Lafrenière	Email: Melissa.lafreniere@queensu.ca	
Office	D124 Macintosh-Corry Hall		
Contact Time	Three 1 hour lectures, 3 practical hours per week (for 9 weeks)	Phone: 613-533-6000 ext 78720	
Format	Lectures, laboratory and practical assignments based on hands on labs, maps, remote sensing and air photo analyses.		
Class Assessment	Quizzes	30%	2 Quizzes + in class review
	Practical Assignments	40%	4 assignments Weeks 3-12
	Exam	30%	Final exam period

COURSE OVERVIEW

Surface Processes and Landforms involves the study of aspects of geomorphology, weathering processes, and soil formation (pedology). Geomorphology is the study of the materials, forces and processes that shape the earth's surface, and generate landforms. Earth surface materials (minerals and rocks) are derived at depth in the earth's crust, with structures resulting from tectonic activity, volcanism or sedimentation/burial. Surface materials may then be broken down further and/or rearranged by weathering, gravity and fluid media driven by solar and gravitational energy. Pedology involves the study of the development, composition, and structure of soils, that result from the break down of rocks at the surface by weathering.

Students are introduced to the chemical and physical nature of the rocks and minerals that make up the earth's surface, and the variety of processes that govern the movement, deposition, shaping, and breakdown of these materials. The labs are designed to enhance the students' ability to characterize rocks, soils and sediment, and identify landforms using aerial photographs and topographic maps, and to interpret and analyse the processes responsible for the different landforms. These assignments provide students an opportunity to enhance their technical, numerical, and writing skills; and require the use of spreadsheets, word processing and problem solving skills.

LEARNING OUTCOMES

- Discuss the relevance of geomorphology and pedology in the environmental earth sciences, climate and planning.
- Understand and explain the processes that shape the earth's surface.
- Identify landforms, soils, and sediment structures and explain their likely genesis. Emphasis will be placed on weathering, soil forming processes, and tectonic, volcanic, mass wasting, glacial, and fluvial landforms and processes.
- Use air photos, maps and remote sensing imagery, to interpret and analyse earth surface features and their formation
- To highlight the importance of geomorphology and pedology in physical geography and environmental earth sciences.

COURSE TOPICS

- 1) Understanding geomorphic processes and systems concepts (feedback and equilibrium)
- 2) Chemical and physical weathering processes
- 3) Soil forming processes and soil orders of the Canadian Soil Classification System
- 4) Tectonic and volcanic processes and landforms
- 5) Mass wasting processes and landforms
- 6) Fluvial processes and landforms
- 7) Glacial processes and landforms.

SELECTED COURSE TEXTS & READINGS

Course text: Trenhaile (2016), 6th Edition. Geomorphology, Oxford University Press, Toronto, 575 p.
The fifth and fourth editions of this text are also acceptable.

Supplementary Readings

•**Rocks, Weathering and Soils sections**

Strahler Archibold. Physical Geography 5th ed, Can. Vers. John Wiley & Sons: Chapter 11 p 259-277, Chapter 19:Soils p.461-489
Summerfield (1991) Geomorphology, Prentice-Hall: Chapter 6

•**Volcanic and Tectonic Processes and Landforms**

Summerfield (1991) Geomorphology, Prentice-Hall: Chapters 2, 3, 4, and 5. This textbook contains excellent examples of volcanic and tectonic landforms and processes