

GEOGRAPHY 101

PHYSICAL ENVIRONMENTAL GEOGRAPHY

Dr. D. Scott Mackay, Instructor

Course Objectives

This course provides an introduction to the geographical aspects of the physical environment. The major physical systems of the atmosphere, hydrosphere, biosphere, and lithosphere, as well as their interactions at the earth's surface, are discussed. Particular attention is given to the role of these systems on human activities, and the role of human modification of these systems.

Required Text and Study Guide

McKnight, T.L. and D. Hess. 2005. *Physical Geography: A Landscape Perspective*, 8th Ed., Prentice Hall, Upper Saddle River, NJ.

Grading

Your final grade will be based exclusively on three tests worth 30, 35, and 35% of your final mark, respectively. The tests will be multiple-choice, and each test will consist of approximately 50-60 questions. The instructor reserves the right to alter the format and length of the exam as is deemed necessary. These tests will be non-cumulative and will be based on the lectures and assigned readings. On each test some of the questions will be similar to those provided by the instructor as practice questions. No paper will be assigned in this course, and there will be no final examination.

Make-up tests will only be given where a student contacts me either before or on the day of the scheduled test and offers an acceptable excuse. Makeup exams must to be taken no more than seven (7) days after the scheduled exam date, excepting where prolonged illness prevents this. In the case of an illness or accident a medical certificate from either a doctor or Health Services will be required. If proper documentation is not presented, then, at the discretion of the instructor, the makeup exam may differ in content and form from the regular exam. Under no circumstances will a student be permitted to take more than one makeup test.

The following table describes how numerical grades will be translated into letter grades:

A	(88% or higher)
A-	(84% to 87.99%)
B+	(80% to 83.99%)
B	(76% to 79.99%)
B-	(72% to 75.99%)
C+	(68% to 71.99%)
C	(64% to 67.99%)
C-	(60% to 63.99%)
D+	(56% to 59.99%)
D	(52% to 55.99%)
F	

Office Hours

Should you have any problem or question regarding the course, I will always be available in my office (113 Wilkeson Quad, Ellicott Complex) from 10 a.m. to 12 p.m. on Wednesdays. If you wish to make an appointment for some other time, my office number is 645-2722 ext. 64 and my email address is dsmackay@buffalo.edu.

Course Outline and Readings

Earth's Atmosphere (Required reading: Chapter 3)

Composition of the atmosphere, vertical structure of the atmosphere, ozone and human impacts

Earth's Radiation balance (Required reading: Chapter 1 and Pages 70-93)

Solar radiation, earth-sun relations, insolation losses in the atmosphere; ground radiation; energy balance

Temperature (Required reading: Pages 93-99)

Temperature inversions; land and water temperature differences; cycles of radiation and temperature; global warming; urban heat islands

Pressure Systems (Required reading: Pages 100-111)

Pressure gradients; the effect of the Coriolis force and surface friction on upper-atmosphere and surface winds

Global Circulation (Required reading: Pages 111-129)

Lower troposphere circulation patterns and Asiatic monsoon; Upper troposphere: tropical easterlies; Hadley cell; jet streams and Rossby waves. Local wind patterns

FIRST TEST: 30% (September 28)

Hydrologic Cycle (Required reading: Chapter 9)

Components of the hydrologic cycle; surface and underground water; global water resources

Evapotranspiration (Required reading: Pages 130-134)

Evaporation; transpiration; atmospheric humidity; effects of land use on evapotranspiration

Precipitation (Required reading: Pages 134-161)

Water states and heat; dew and frost; adiabatic processes; clouds and cloud physics; human-induced precipitation; convective uplift and thunderstorms; orographic uplift and Chinook winds

Weather systems (Required reading: Chapter 7)

Air masses and fronts; extratropical cyclones; characteristics and distribution of tropical cyclones; tropical cyclones as natural hazards; characteristics and distribution of tornadoes; tornadoes as a natural hazard

Climatic zones (Required reading: Chapter 8)

Classifying climates; distribution of climatic types; climatic variability and its effects on humans

The Biosphere (Required reading: Chapters 10 and 11)

Biogeochemical cycles; characteristics and distribution of the major biomes

SECOND TEST 35% (November 2)

Earth materials and landforms (Required reading: Chapter 13)

Igneous, sedimentary, and metamorphic rocks

Internal processes (Required reading: Chapter 14)

Plate tectonics; volcanism; volcanic hazards; volcanism and climate; crust deformation; earthquakes

Weathering and erosion processes (Required reading: Chapters 15 and 17)

Weathering and mass wasting; overland flow and accelerated erosion; land use impacts on erosion; chemical weathering and the formation of karst landscapes

Fluvial processes (Required reading: Chapter 16)

Watersheds; stream channels and drainage patterns; floodplains and flooding; effects of urbanization on runoff and stream flow; cycles of landscape development

Arid Lands (Required reading: Chapter 18)

Surface water; Aeolian processes; Characteristic landforms

Glaciers and glacial landforms (Required reading: Chapter 19)

Alpine glaciers and landforms produced by such glaciers; continental ice sheets and the landforms they produce

Soils (Required reading: Chapter 12)

Soil-forming factors; physical and chemical properties of soils; major soil types

THIRD TEST 35% (December 9)