

Grande Prairie Regional College

Department of Science

ES 1020

Introduction to Environmental Earth Science

Fall Semester 2006

Lecture Section A2 WF 13:00 - 14:20 Room J204

Labs L1 M 14:30 - 17:20 Room J107

INSTRUCTOR: **Dr. Desh Mittra** **Office: J-215** **Ph. 539 2981**

TRANSFER CREDIT: U. of Alberta EAS 102 3 credits
 U. of Lethbridge GEOG 1XXX 3 credits
 Athabasca Univ. GEOL 2265 3 credits

Course Objectives

This introductory course in physical geography is designed to guide the student toward a clearer understanding of planet Earth through lectures, personal study and laboratory exercises. The focus is on atmospheric processes, ecological processes and on the resulting global patterns of energy flow, weather, climate, vegetation, soils and ecosystems. It is hoped that the student will gain a deeper understanding and appreciation of the relationships between the processes and patterns in the environment. Laboratory exercises and exams will be designed to see if the student can select and apply the relevant knowledge given in the lectures and during the laboratory sessions.

Textbook:

Strahler and Strahler; *Physical Geography*. 3rd Canadian edition, John Wiley Publication.

Lab Manual

ES 1020; Introduction to Environmental Earth Science,

Course Requirements

1. Development and study of lecture notes complemented with the study of the text book
2. Students must read relevant sections in the text and lab manual prior to each lecture and lab session. These are given in the course outline and serve to be the minimum requirement for each section.
3. **Attendance of all laboratory exercises** in the lab that you have signed up for during registration. Labs are meant to complement and enhance material presented in lectures and should not be taken lightly. Materials learned on the labs will be tested in two lab exams. To be prepared you should bring the following materials to each lab session: (a) the text book and lab manual; (b) a drawing pencil and eraser; (c) a ruler calibrated in centimeters, millimeters and inches; (d) protractor and right triangle; (e) at least 4 coloured pencils; (f) a calculator would be useful for most labs
4. Completion of the mid-term, final and 2 lab exams

Mark Distribution

Assignments:	15%
Labs:	20%
Lab Exams:	15% (7.5% each)
Mid-term Exam:	20%
Final Exam:	30%

Lecture Outline

Week of Sept 4	Introduction and discussion of course outline objectives and student responsibilities. Introduction to Physical Geography , Systems in Physical Geography, Environment and Global changes. Spheres, Scales, Systems and Cycles <i>Readings: Chapter 1 and 2</i>
Week of Sept 11	The Earth: its shape, rotation and the environmental effects. Geographic grid, Map projections, Global time and the Earth's revolution around the Sun. <i>Readings: Chapter 3</i>
Week of Sept 18	The Global Energy System: Electromagnetic Radiation, Insolation over the globe, Composition of the Atmosphere, Net radiation latitude and energy balance. Air temperature and Air temperature Cycles: Surface and air temperature, Daily cycles and annual cycles of air temperature, World patterns and global warming <i>Readings: Chapter 4 and 5</i>
Week of Sept 25	Atmospheric Moisture and Precipitation: Hydrologic cycle, Humidity, Adiabatic process, Clouds, Precipitation and air quality. Winds and Global Circulation System: Atmospheric pressure, Wind, Global wind and Pressure patterns, Ocean currents. <i>Readings: Chapters 6 and 7</i>
Week of Oct. 2	Weather Systems: Air masses, Cyclones and Anticyclones, Tropical and equatorial weather systems, Pole-ward transport of heat and moisture. The Global Scope of Climate: Keys to climate and its classification. <i>Readings: Chapters 8 and 9</i>
Week of Oct 9	Low-Latitude Climates: Monsoon and trade wind, Wet-Dry tropical climate, Dry tropical climates. <i>Readings: Chapter 10</i>
October 15 Week of Oct 16	Mid-latitude and High-latitude Climates: Dry and moist subtropical

climate, Mediterranean climate, Marine west-coast climate, Dry mid-latitude climate, Boreal forest climate, Tundra climate, Ice sheet climate and our changing climate.

Earth Material and Cycle of Rock Change: The crust, Igneous, Sedimentary and Metamorphic rocks, Rock cycle.

Readings: Chapters 11 and 12

Week of Oct 23	Lithosphere and the Tectonic System: Earth's structure, Geologic Time scale, Plate Tectonics, Continents of the past. Volcanic and Tectonic Landforms: Volcanic activity and its landforms, Tectonic activities and its landforms, Earthquakes <i>Readings: Chapter 13 and 14</i>
October 27	Midterm exam
Week of Oct 30	Weathering and Mass Wasting: Mass wasting, Physical and chemical, Associated landforms, Processes and landforms of Arctic and Alpine Tundra Hydrologic Cycle: Ground water its effects and management, Surface water-Rives and lakes Fluvial Processes and Landforms: Stream erosion and transportation, Stream gradation <i>Readings: Chapter 16 and 17</i>
Week of Nov 6	Landforms and Rock Structure: Strike and Dip, Horizontal strata and coastal plains, Warped rock layers, Other land masses types The Work of Waves and Wind: Tidal currents, Types of coastlines, Wind action, Sand dunes, Loess <i>Readings: Chapter 18 and 19</i>
Week of Nov 13	Glacier System and Ice Age: Glaciers- Alpine and Continental, Sea ice and icebergs, Ice Age, Landforms shaped by ice, Investigating Ice age Soil System: Nature of the soil, Soil water balance, Soil development, Global scope of soil, Global climate change and agriculture <i>Readings: Chapter 20 and 21</i>
Week of Nov 20	Systems and Cycles of Biosphere: Energy flow in ecosystems, Biomass as energy source, Biochemical cycles in biosphere. Biogeographic Processes: Ecological biogeography, Ecological succession, Historical biogeography, Biodiversity. <i>Readings: Chapter 22 and 23</i>
Week of Nov.27	Global Ecosystem: Natural vegetation, Structure and life-form of plants, Terrestrial ecosystems <i>Readings: Chapter 24</i>
Week of Dec. 4	Review
December 7	Last Day of Classes
