GRANDE PRAIRIE REGIONAL COLLEGE
DEPARTMENT OF SCIENCE AND TECHNOLOGY

WINTER SEMESTER 2002-2003

COURSE OUTLINE

EARTH SCIENCE 1010

INTRODUCTION TO PHYSICAL EARTH SCIENCE

LECTURE Section A3 T,R 8:30-10:00 Room J228

INSTRUCTOR: **Dr. Rob Young** - Office #J215, Phone 539-2048, email RYoung@gprc.ab.ca

TRANSFER CREDIT:

U. of Alberta	EAS 101	3 Credits
U. of Calgary	GLGY 201	3 Credits
U. of Lethbridge	GEOL 2060	3 Credits
Athabasca Univ.	GEOL 200	6 Credits

OBJECTIVE: The course has been designed to generate competence in the fundamental concepts of Earth Sciences through the media of lecture, visual aids, and integrated laboratory exercises. ES 1010 serves both as the introductory course for specialists in Geology or Physical Geography, and as a course for non-specialists desiring knowledge of the Physical Earth.

COURSE OUTLINE: **Lecture**: Planet Earth, minerals, rocks and rock types, plate tectonics, volcanoes, earthquakes and Earth's interior, weathering and erosion, geologic time scale, folds, faults, mass wasting, hydrologic cycle, rivers, glaciers, wind and deserts.

Lab: Identification of minerals, rocks (igneous, sedimentary and metamorphic). Use of topographic maps, cross-sections, geologic maps and structures, glaciers, and rivers.

TEXTBOOKS: **Understanding Earth** by Press and Siever (3rd ed.) The second edition may be used, however, students using it are responsible for identifying and compensating for content differences.

LAB BOOK: Lab exercises for Earth Science from the Bookstore

OTHER ITEMS: Simon and Schuster's Guide to Rocks and Minerals or equivalent
Dictionary of Geological Terms

The following approximate schedule of lecture topics is presented as an aid to your study.

Week of: (Monday)	Topics
January 6	The Scientific Method. Origin of the Earth. Introduction to plate tectonics, and Earth structure and composition. (Ch. 1) Atomic structure and physical properties of minerals. (Ch. 2).
January 13	Origin and classification of rocks, rock cycles, igneous rocks, , relation to plate tectonics. (Ch. 4)
January 20	Vulcanology, volcanic processes and landforms, Sedimentary rocks and classification (clastic and chemical), lithification processes. (Ch. 5 and 7)
January 27	Metamorphic rocks (classification, metamorphic facies, relation to plate tectonics). (Ch. 8)
February 3	Structural geology and rock deformation (folds, faults, plate tectonic setting). Geologic time (absolute vs. relative), principles of stratigraphy. (Ch. 9 and 10)
February 10	Earthquakes (elastic rebound theory, Richter scale, causes of earthquakes, epicenter). Earth's interior, Earth's magnetism and paleomagnetism. Plate tectonism (Ch. 18, 19 and 20)
February 17	**Midterm on Thursday, Feb. 20**
February 24	Reading week (no classes)
March 3	The hydrologic cycle. Weathering, limestone karst systems, processes, and caves. (Ch. 6, 12)
March 10	Mass movement and landforms. (Ch. 11)
March 17	River processes in drainage basins. Four basic river types. River landforms and sediments. (Ch. 13) Landscape evolution and geomorphic processes and sediments (Ch. 16)
March 24	Glacial processes. Glaciers in mountains and continental glaciers. Glacial landforms, sediments. (Ch. 15 plus additional reading)
March 31	Glacial studies continued.
April 7	Periglacial environments (permafrost, active layer). Landforms and sediments. (Ch. 15)
April 14	Wind processes and landforms. Desert processes and landforms. (Ch. 14)

Last day of classes – April 16, 2003. Final exam date TBA.

ASSIGNMENTS: You will be given a series of assignments that may consist of multiple choice, true/false, fill in the blank type questions, or short answer. These assignments are open book, and some midterm and final exam questions will be based on these assignments. They are due one week from the day they are handed out. Late = 0.

Laboratory exercises: Labs will be handed in at the end of the lab period. There will be two lab exams during the term and will be, as much as possible, non-cumulative exams (see dates below in the lab schedule). Weekly quizzes that test content from the previous week will be given. Note that the lab will be open during periods when labs are not scheduled. See Medha Karnik if you would like to use the lab, but find the door locked.

Week of: (Monday)	**Lab Topics**
January 6	Introduction and Mineral Identification
January 13	Lab 1: Mineral identification
January 20	Lab 2: Igneous rocks
January 27	Lab 3: Sedimentary rocks
February 3	Lab 4: Metamorphic rocks
February 10	Review for labs 1-4
February 17	**Midterm Lab Exam (Open book)**
February 24	No Lab (Reading week)
March 3	Lab 5: Topographic maps
March 10	Lab 6: Topographic maps and cross sections
March 17	Lab 7: Geological maps and structure sections
March 24	Lab 8: Glaciation
March 31	Review labs 5-8
April 7	**Lab Final Exam (Closed book)**

MARKS DISTRIBUTION:

Assignments	10%
Lab quiz	10%
Weekly labs	10%
Midterm exam	20%
Lab exams (2x10%)	20%
Final exam	30%
Total	100%