Grande Prairie Regional College
Department of Science and Technology

Course Outline - Winter 2005
Earth Science 1010 – Introduction to Physical Earth Science

Lecture: Tuesday and Thursday an 8:30 – 9:50 in room J229
Laboratory: Monday, Thursday, Friday at 2:30 to 5:20 in room J107 or J103 (check your schedule)

Instructor: Jason Tuchelt **Telephone**: 539-2048 **E-Mail**: tucheltj@gprc.ab.ca **Office**: J210
Office Hours: no set hours, please make an appointment or just come on by my office

Course Summary and Objective
Our planet Earth, minerals, different types of rocks, plate tectonics, volcanoes, weathering and erosion, geologic time scale, folds, faults, mass wasting, hydrologic cycle, rivers, wind and deserts, glaciers, oceans, earthquakes and the Earth's interior. The course has been designed to generate competence in the fundamental concepts of the earth and atmospheric 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 Geography and as a course for non-specialists who desire to obtain knowledge of the Earth and Atmosphere.

Laboratory Objective
Identification of: minerals, sedimentary rocks, igneous rocks and metamorphic rocks. Use of topographic maps, creating cross-sections, reading geologic maps and structures and landform identification.

Textbook and Lab Book
Earth's Dynamic Systems: 10th Ed. by W.K. Hamblin and E.H. Christiansen
EAS 101 Laboratory Manual a U of A publication

Other Items (not required but may prove useful)
Simon and Schuster's Guide to Rock's and Minerals or any equivalent book.
Dictionary of Geological Terms

All books and materials are available at the College Bookstore

Mark Distribution

Lecture Mid Term Exam	15%
Lecture Final Exam	30%
Lecture Assignments	20% (Four assignment worth 5% each)
Laboratory Final Exams	15% (Two finals worth 7.5% each)
Weekly Lab Assignments	10%
Lab Quizzes	10%

Laboratory and Lecture Term Exams
The lecture and laboratory will each have 2 tests throughout the semester. Labs can be used for studying rocks, minerals or maps other than scheduled lab hours by pre-arranging with Medha Karnik the lab technologist (Telephone 539-2952)

Lecture Assignments
You will be given four separate assignments over the semester that will seek for you to use your knowledge from the lecture and apply them into practical and real world problems in geology. You will be given one week to complete each assignment

Laboratory Assignments and Quizzes
You will be responsible to complete a lab assignment during the laboratory period. The topics covered in the lab will closely follow those taught in the lecture section for that week. You will have a short 15-30 minute quiz on the material that was presented in the week's previous laboratory.

Late Assignments
For all lecture and lab assignments that are not handed in at the beginning of a lab or lecture on the assigned due date, a 20% per day penalty will be applied. No assignments will be accepted if they are over 3 days late.

Sickness / Family Emergencies
If you are sick or have a family emergency occurring on an exam or quiz date you must contact the instructor as soon as possible and provide a doctors or family members letter (whichever is applicable) to the instructor as soon as possible for you to get a rewrite of the exam. Missing exams due to outside work obligations is not a suitable excuse.

Missing Labs
If for some reason you cannot make your assigned lab session please make sure to make it up that week! You may come to another one of the session for that week but make sure to OK it with the assigned lab instructor (myself or Desh Mittra, Room J215, Telephone 539-2981) first!

Lecture Schedule

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

Week	Topic	Chapter
January 3	Introduction & Course Outline. Planet Earth: Geologic concepts, our solar system, Earth's outer layer, Earth's interior, Features of the ocean basin. Origins and Structure of the Earth, The Geologic Time Scale	1

January 10	Geologic Systems: Hydrologic system, Oceans, Rivers, Glaciers; Tectonic system: Divergent, Convergent and Transform plate boundaries. Gravity and Isostasy. Minerals: Atomic structure and physical properties of minerals. Rock- forming minerals.	2, 3
January 17	Classification of rocks and rock cycles. Igneous rocks, origin and classification of rocks. Intrusive rock bodies, Origin and type of magmas. Sedimentary rocks and their classification, Sedimentary structures, Clastic versus chemical, Stratigraphic sequences.	4, 5
January 24	Metamorphic rocks, classification, metamorphic facies, relation to plate tectonics, mineral and energy resources. Structure of rock bodies: Dip, Strike, Joints, Faults.	6, 7
January 31	Geologic Time: Relative age, Absolute age, Unconformities. Radioactivity and radiometric dating. Other methods to measure time. Our atmosphere; composition and energy, air circulation. Oceans and water circulation.	8, 9
February 7	Climate zones and climate changes. Weathering; physical and chemical. Products of weathering; soil, land forms.	10
February 14	**Mid Term Exam** Slope systems; mass movement and its types. Slope processes and landforms. River Systems; collecting, transporting and dispersing. Dynamics of stream flow. Development of channels, bars, flood plains, landform and sediments. Deltas.	11, 12
February 21	Reading Week – No Classes	
February 28	Groundwater Systems. Water tables and aquifers. Natural and artificial discharge. Erosion and deposition by groundwater. Groundwater resources. Subsidence. Glacier Systems. Continental ice sheets and alpine glaciers; Pleistocene glaciation, Other glaciations. Landforms and sediments.	13, 14
March 7	Shoreline Systems. Waves, longshore drift,. Wave erosion and deposition. Evolution of shoreline. Reefs. Tides and tsunamis.	15
March 14	Eolian Systems. Wind erosion , transportation and deposition. Dunes and their types. Loess.	16
March 21	Plate Tectonics; Continental drift, plate boundaries, plate motion and	17, 18

	driving force. Seismicity and Earth's Interior, Earthquakes and plate tectonics, hazards and preventions, convection inside earth.	
March 28	Divergent Plate Boundaries, Origin and evolution of oceanic crust. Transform plate boundaries	19, 20
April 4	Convergent plate boundaries, hot spots and mantle plumes	21, 22
April 11	Tectonics and landscape. Review	23
April 16	**Last Day of Classes**	

Lab Schedule

Week	**Topic**
January 10	Mineral Identification
January 17	Igneous Rocks
January 24	Sedimentary Rocks
January 31	Metamorphic Rocks
February 7	Review Lab - Minerals and rocks
February 14	**FINAL LAB EXAM** (PART 1) - open book
February 28	Topographic Maps
March 7	Cross Sections and Rivers
March 14	Geologic Maps and Structure Sections
March 21	Glaciation
March 28	Review Lab - Maps and Landscapes
April 4	**FINAL LAB EXAM** (PART 2) - closed book