GRANDE PRAIRIE REGIONAL COLLEGE
DEPARTMENT OF SCIENCE

WINTER SEMESTER 2004 - 2005

COURSE OUTLINE

EARTH SCIENCE 1010
An Introduction to Earth & Atmosphere

Lecture	Section B3	M W	10:00 - 11:20	Room E306A
Labs	L1, L2	MF	14:30 - 17:20	Room J107

INSTRUCTOR: **Dr. Desh Mittra** **Office: J215** **Ph. 539 2981**

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

OBJECTVE The course has been designed to generate competence in the fundamental Concepts of 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 desirous of obtaining knowledge of the Earth and Atmosphere.

COURSE OUTLINE 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 Earth's interior.

Identification of: - minerals, sedimentary rocks, igneous rocks and metamorphic rocks. Topographic maps, cross-sections, geologic maps and structures, rivers and glaciers.

TEXTBOOKS Earth's Dynamic Systems: 10th Ed. by W.K. Hamblin and E.H. Christiansen
LAB BOOK EAS 101 Laboratory Manual: U of A publication

OTHER ITEMS 1. Simon and Schuster's Guide to Rock's and Minerals or any equivalent book.
2. Dictionary of Geological Terms

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

Week of Jan. 3	Introduction & Course Outline. Planet Earth: Geologic concepts, our solar system, Earth's outer layer, Earth's interior, Features of the ocean basin. (Ch. 1)
Week of Jan. 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. (Ch. 2, 3)
Week of Jan. 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. (Ch.4 & 5)
Week of Jan. 24	Metamorphic rocks; classification, metamorphic facies, relation to plate tectonics, mineral and energy resources. Structure of rock bodies: Dip, Strike, Joints, Faults. (Ch. 6 & 7)
Week of Jan. 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. (Ch. 8 & 9)
Week of Feb. 7	Climate zones and climate changes. Weathering; physical and chemical. Products of weathering; soil, land forms. (Ch.10)
Week of Feb. 14	**(Mid Terms Exams this week)** 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. . (Ch. 11 & 12)
Week of Feb. 21	**NO CLASSES. READING WEEK**
Week of Feb. 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. (Ch. 13 & 14)

Week of Mar. 7	Shoreline Systems. Waves, longshore drift,. Wave erosion and deposition. Evolution of shoreline. Reefs. Tides and tsunamis.(Ch. 15)
Week of Mar. 14	Eolian Systems. Wind erosion , transportation and deposition. Dunes and their types. Loess. (Ch. 16)
Week of Mar. 21	Plate Tectonics; Continental drift, plate boundaries, plate motion and driving force. Seismicity and Earth's Interior, Earthquakes and plate tectonics, hazards and preventions, convection inside earth.(Ch. 17 & 18)
Week of Mar. 28	Divergent Plate Boundaries, Origin and evolution of oceanic crust. Transform plate boundaries, (Ch. 19 & 20)
Week of Apr. 4	Convergent plate boundaries, hot spots and mantle plumes(Ch. 21 & 22)
Week of Apr. 11	Tectonics and landscape. Review (Ch. 23)

Last day of classes – April 14, 2005

ASSIGNMENTS	You will be given weekly assignments consisting of multiple choice, true/false or fill in the blanks type questions. These assignments are open book and are available on Black Board. You will be given two choices and marks will be recorded out of the best. The test will be available for two weeks before the due date. If you do not complete your test within given time, a **20%** deduction per day will be applied to your score.
Minitest	Every second week, you may be given a mini-test at the start of class which will be approximately 15 minutes long. Labs will also have quizzes.

MARKS DISTRIBUTION

Mini tests	5%
Assignments	15%
Lab quiz	10%
Weekly labs	10%
Midterm exam	15%
Lab final	15% (Two finals 7.5% each)
Final exam	30%
	100%

Assignment Due Dates

Ass#	Chapters	Due date	Special Info
1.	1, 2, 3	Jan. 19	
2.	4, 5	Jan. 26	mini-test Jan. 31
3.	6, 7	Feb. 2	
4.	8, 9	Feb. 9	mini-test Feb. 14
5.	10	Feb. 16	
Mid-Term Exam		**Mar. 2 – Wednesday**	
6.	11, 12	Mar. 9	
7.	13, 14	Mar. 16	mini-test Mar. 21
8.	15, 16	Mar. 23	
9.	17, 18, 19	Mar. 30	
10.	20, 21, 22	Apr. 6	mini-test Apr. 11
11.	**Fill in the blanks**	Apr. 13	

LAB SCHEDULE

Week of:

January 10	Lab 1.	Mineral identification
January 17	Lab 2.	Igneous rocks
January 24	Lab 3.	Sedimentary rocks
January 31	Lab 4.	Metamorphic rocks
February 7	**Review Lab -**	**Minerals and rocks**
February 14	FINAL LAB EXAM (PART 1) - open book	
February 28	Lab 5.	Topographic Maps
March 7	Lab 6.	Cross Sections and Rivers
March 14	Lab 7.	Geologic Maps and Structure Sections
March 21	Lab 8.	Glaciation
March 28		**Review Lab**
April 4	FINAL LAB EXAM (PART 2) - closed book	

<u>Note</u> - All books and materials are available at the College Bookstore
- labs could be used for studying rocks, minerals or maps other than scheduled lab hours by pre-arranging with Medha Karnik, our lab technologist.