GRANDE PRAIRIE REGIONAL COLLEGE

DEPARTMENT OF SCIENCE

Fall SEMESTER 2010 - 2011

COURSE OUTLINE - HINTON

ES 1000 – Planet Earth

	Labs	M W 8:30 - 9:50	Room F309
	Lecture	M W 10:00 - 11:20	Room F309

INSTRUCTOR: **Dr. Desh Mittra** **Office: J215;** **Office Hours**: By Appointment
Ph. 780 539 2981 E-mail: dmittra@gprc.ab.ca

TRANSFER CREDIT:			
	U. of Alberta	EAS 100	3 credits
	U. of Calgary	GLGY 201	3 credits
	U. of Lethbridge	GEOL 2060	3 credits
	Athabasca Univ.	GEOL 200	6 credits

Prerequisites: High School
Co-requisites: None

TEXTBOOKS The Blue Planet: 2nd Ed. by John Wiley & Sons.
LAB BOOK ES 1000 Laboratory Manual:
Understanding Weather and Climate, 3rd Ed., Prentice Hall (Recommended)

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

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 1000 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.

EXAMS: **Mid-Term Exam.** **October 20, 2010**
Final Exam. **TBA**

COURSE OUTLINE: Introduction to the origin and evolution of the Earth and the solar system. Plate tectonics and the rock cycle. Simple energy balances and interactions between radiation and the atmosphere, oceans, ice masses, and the global hydrological cycle. Introduction to the weather and climate processes and the reasons behind. Evolution of life, biogeography, greenhouse effect, global climate and its stability in the context of geologic time. The carbon cycle. Human interaction with the Earth. Mineral and energy resources.
This course is not available to students with credit in ES 1010 or 1020.

Approximate schedule of lecture topics is presented below:

Week One	Introduction & Course Outline. **The Earth System**: Geologic concepts, Energy cycle, Hydrologic cycle, Rock cycle and Uniformitarianism, The Human impact. (Ch. 1)
Week Two	**Earth's Nearest Neighbours**: The Solar system and Global Energy System; origin and evolution of the Planets, The terrestrial Planets. **The Sun, Giver of Life**: Structure and source of energy of Sun, Radiation and Solar spectrum, the active Sun, Other Suns. (Ch. 2, 3)
Week Three	**Plate Tectonics**: Moving continents, Earth's internal energy, Magnetic reversals, External structure of the Earth, Causes of Plate Tectonics, Rock cycle and Plate Tectonics. (Ch.4)
Week Four	**Earthquakes and Earth's Interior**: Origin of earthquakes, Locating the Epicentre, Risks involved, Prediction of earthquakes. **Minerals and Rocks**: Elements and atoms, Crystal structure, Common minerals, Features of rocks, Chemical and Physical Weathering, Soils and Soil profiles, Soil types. (Ch.5, 6)
Week Five	**Volcanoes, The Heat Within**: Properties and Composition of Magma, Viscosity, Volcanic eruptions, Types of eruptions, Types of Volcanoes, Volcanic Hazards. **The Earth's Evolving Crust:** Sedimentary Strata, Missing strata and correlation, Sedimentary Rocks, Clastic and Chemical, Metamorphism and metamorphic Rocks, Plate tectonics and mountain Building. (Ch. 7, 8)
Week Six	**Water and Ice on the Land:** Hydrologic cycle, Moisture in the atmosphere and climatic changes, Streams and different types of channels, Stream loads, Floods, Ground Water, Water Table and Groundwater movement, Porosity, Recharge and Discharge, Springs, Aquifers, Geologic work of Groundwater, Lakes. Glaciers form and distribution, Glacier budget, How glaciers move, Calving and glacier Surges. (Ch.9, 10)
Week Seven	**(Mid Terms Exams this week)** **Composition and Structure of the Atmosphere:** Temperature, Air pressure, Humidity, Condensation and Clouds, Understanding of Micro and Macro Climates. (Ch. 12)
Week Eight	**The World Ocean:** Ocean geography, Origin depth volume and Age of ocean, Salinity, Temperature and Heat Capacity of the Ocean, Ocean Circulations, Current Systems, Beaches, Reefs, Changing sea. **Winds, Weather and Deserts:** factors affecting wind speed and direction, Hadley Cell, Polar fronts, Jet streams. Dust storms, Mountain and valley winds, weather systems and Chinooks. (Ch. 11, 13)
Week Nine	**The Earth's Changing Climate**: Climate systems, Geologic records of climate change, Greenhouse effect, Reasons for climatic variations, Glacial and interglacial stages, Last Ice Age, Changes in Oceanic Circulation, Solar energy variations and volcanic activity. (Ch. 14)

Week Ten	**Evolution of Life:** Life and its characters, Prokaryotes and Eukaryotes, The Ecosystem and Food Chains, Life Energy, production and growth, Population Dynamics, Life and Global Environment. (Ch. 15,)
Week Eleven	**Geochemistry and Life:** Biogeochemical cycle and evolution, Biological conservation of elements, Carbon cycle, Nitrogen cycle and Phosphorous cycle, Atmosphere, Hydrosphere and Geosphere, Types of erosions. (Ch. 16)
Week Twelve	**Evolution and History of Biosphere:** Competitions, Exclusions and Ecological Niche, New species from Old, Mutation, Migration, Life's evolution on Earth, Life on Land, Extinctions and links with human activity. (Ch. 17)
Week Thirteen	**Resources from the Earth:** Mineral resources, Hydrothermal-magmatic-sedimentary and residual mineral deposits, Energy Resources, Fossil fuel, coal, Other sources of Earth. (Ch. 18)
Week Fourteen	Review and exam preparation.

Last day of classes – December 10, 2010

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	10%
Assignments	15%
Weekly labs	10%
Midterm exam	20%
Lab final	15% (Two finals 7.5% each)
Final exam	30%
	100%

Assignment Due Dates

Ass#	Chapters	Due date	Special Info
1.	1, 2	Sep. 22	
2.	3, 4	Sep. 29	mini-test Oct.6
3.	5, 6	Oct. 6	
4.	7, 8	Oct. 13	mini-test Oct.20
Mid-Term Exam		**Oct. 20 – Wednesday**	
5.	9, 10	Oct. 27	
6.	12	Nov. 3	mini-test Nov.8
7.	11, 13	Nov. 10	
8.	14	Nov. 17	mini-test Nov.22
9.	15, 16	Nov. 24	
10.	17, 18	Dec. 8	mini-test Dec.1
11.	**Fill in the blanks**	Dec. 10	

LAB SCHEDULE

Week of:

September 1	**NO LABS**	
September 6	Lab 1.	Maps and topographic profiles
September 13	Lab 2	Mapping Geological History
September 20	Lab 3.	The Tectonic System
September 27	Lab 4	Identification and properties of Minerals and Rocks
October 4	Lab 5	Water at and Beneath the Earth's Surface
October 11	**FINAL LAB EXAM (PART 1)**	
October 18	Lab 6.	Glaciers and Glaciation

October 25	Lab 7.	Solar Radiations, Climate and Weather
November 1	Lab 8.	The Life and Times of Planet Earth
November 8	Lab 9.	Mineral Resources and the Human Footprints
November 15	Lab 10.	Environmental Studies
November 22	**Labs Review**	
November 29	**FINAL LAB EXAM (PART 2)**	

Note **- All books and materials are available at the 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.

STATEMENT ON PLAGIARISM AND CHEATING:

Please refer to pages 49-50 of the College calendar regarding plagiarism, cheating and the resultant penalties. These are serious issues and will be dealt with severely.

GRANDE PRAIRIE REGIONAL COLLEGE			
GRADING CONVERSION CHART			
Alpha Grade	**4-point Equivalent**	**Percentage Guidelines**	**Designation**
A^+	**4.0**	**90 – 100**	**EXCELLENT**
A	**4.0**	**85 – 89**	
A^-	**3.7**	**80 – 84**	**FIRST CLASS STANDING**
B^+	**3.3**	**77 – 79**	
B	**3.0**	**73 – 76**	**GOOD**
B^-	**2.7**	**70 – 72**	
C^+	**2.3**	**67 – 69**	**SATISFACTORY**
C	**2.0**	**63 – 66**	
C^-	**1.7**	**60 – 62**	
D^+	**1.3**	**55 – 59**	**MINIMAL PASS**
D	**1.0**	**50 – 54**	
F	**0.0**	**0 – 49**	**FAIL**
WF	**0.0**	**0**	**FAIL, withdrawal after the deadline**