General Geophysics

* * Geosciences 571 * *

* * Fall 2006 * *

Instructor: Laurie Brown
Office - Morrill 240; Paleomag Lab - Morrill 250
Office Hours - M, F - 9:00 - 11:00
or by appointment or chance (I am here every day, BUT gone all Wednesday afternoon with Geological Mapping)

Text: Whole Earth Geophysics by Robert Lillie, Prentice Hall, 1999
(At the Jeffery Amherst bookstore, 26 S. Prospect St, Amherst)

Meetings: Lecture: M, W, F 11:15 - 12:05, Mor 161
Lab: Friday; 1:30 - 3:30, Mor 161

Class Requirements:
Attendance at lectures and labs
Weekly problem sets
3 projects with oral presentations
Lab "reports"

Grade: Problem sets (25%), Labs (25%), Projects (first 2 – 10% each, final project – 20%), Class & Lab participation (10%)

ORAL REPORTS OF PROJECTS ARE SCHEDULED FOR:

SEPTEMBER 15 – PLATE TECTONICS
OCTOBER 23– JOURNAL REPORTS
DURING EXAM WEEK – FINAL PROJECT

NOTE: There is no final exam in this course.

GEO 571 *GENERAL GEOPHYSICS *SCHEDULE ** FALL 2006

DATE		LECTURE	TEXTBOOK	LAB
SEPT.	6	Introduction	Chp. 1	
	8	Shape of the Earth		Math Review
	11	Plate Tectonics I	Chp. 2	
	13	Plate Tectonics II		
	15	**PROJECT I**		Plate Tectonics
	18	Seismic Waves I	Chp. 3	
	20	Seismic Waves II		
	22	Seismic Refraction I	Chp. 4	Refraction Data*
	25	Seismic Refraction II		
	27	Refraction & Tectonics	Chp. 5	
	29	Seismic Reflection		(No Lab)
OCT.	2	Reflection Interpretation	Chp. 6	
	4	Reflection & Plate Tectonics		
	6	Earthquake Seismology	Chp. 7	Refraction Intrp@
	9	*HOLIDAY*		
	11	Earthquakes/Plate Tectonics	(*Monday schedule*)	
	13	Historical Earthquakes		Reflection Records
	16	Interior of the Earth I		
	18	Interior of the Earth II		
	20	Earth's Magnetic Field	Chp. 9	Equake Records
	23	**PROJECT II**		
	25	Rock Magnetism		
	27	Magnetic Anomalies		Magnetic Survey*
	30	Paleomagnetism I		
NOV.	1	Paleomagnetism II		
	3	Pmag and Plate Tectonics		Mag Anomalies@
	6	Reversals and Excursions		
	8	Gravity I	Chp. 8	
	10	Gravity II		Gravity Data*
	13	Gravity/Tectonics Settings		
	15	Isostacy I		
	17	Isostacy II		Gravity Modeling@
	20	Shallow Exploration - GPR		
	22	Shallow Exploration - EM		
	24	THANKSGIVING		(No Lab)
	27	Shallow Exploration - ER		
	29	Shallow Exploration – SP		
	Dec. 1	Heat Flow I	Chp. 10	Gravity Modeling2@
	4	Heat Flow II		
	6	Tectonics and Heat Flow		
	8	Earth Temperatures		AGU Posters
	11,13	No class – LB at AGU		

* - outdoor lab, @ computer lab

Final project reports (poster session) will be scheduled during Exams

GEO 571 PROJECT III FALL 2006

THIS FINAL PROJECT IS IN LIEU OF A FINAL EXAM IN THIS COURSE. YOU MAY CHOOSE ONE OF THE FOLLOWING TYPES OF PROJECTS USING AS SUBJECT MATERIAL ANYTHING RELATED TO GEOPHYSICS. ALL STUDENTS WILL PRESENT RESULTS OF THEIR PROJECT AS A POSTER ON A MUTUALLY CHOSEN DAY DURING EXAM WEEK (Dec 15-22). A WRITTEN REPORT ON THE PROJECT IS DUE BY DECEMBER 22.

A. FIELD PROJECT

In this project you will collect geophysical data in the field and process the data as necessary. Interpretation of the results will be required. For this project it is allowable to work in pairs if you wish - both collecting and processing the data together, making the poster and submitting one written report - two names. You may used some the equipment we use in lab - seismic refraction, gravimeter, magnetometer - or some of the other equipment we may not use - electrical resistivity, EM, GPR. These devices all come with detailed instructions booklets, as well as current (well, sort of..) software for processing and interpretation.

B. COMPUTER MODELING PROJECT

In this project you will be given an interesting aeromagnetic anomaly from the Athol quad to model using MAGCAD. A you know, magnetic modeling involves a number of variables, and in this case remanent magnetization is involved, so it will not be a simple project. Results should provide a best-fit model as well as some interpretation.

C. RESEARCH PAPER

This is the classic term paper assignment. You need to pick a topic and after library research, write a 10 - 15 page paper on it, including necessary diagrams, references, etc. Topics may come from any part of geophysics, and picking a topic that may relate to your own research interests is encouraged.

D. PALEOMAGNETISM LABORATORY PROJECT

If someone is interested,, they may do a small lab project measuring the magnetic signature of some rock samples - cores will be provided for you if you wish. It would mean learning how to run the magnetometer and demagnetizers in the lab (not very difficult) and measuring some samples. Presentation of results and interpretation required.

Consider the four options above. You will need to commit in writing to one of the options by November 1 at the latest. See me for specific ideas, suggestions and final ok.
NO CLASS DEC 8, 11 OR 13 – work on projects and posters.

- POSTER SESSION – SCHEDULED DURING EXAM WEEK – Dec 15-22
- WRITTEN REPORT DUE – DEC 22 or earlier