EPSc 454 –Exploration and Environmental Geophysics -- Fall 2016

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Fieldwork instructor: Patrick Shore (rm 396; x-7357; patrick@wustl.edu)
Class: Wednesday & Friday 1:00 – 2:00 pm, Room 102
Lab: Fridays 2:00p -- 4:00 pm, Room 102
Class Webpage: http://epsc454.wustl.edu (copies of datasets, handouts, etc)

Course Description

Study of geophysical techniques used in exploration and environmental geophysics, including potential fields, electromagnetic, and seismic methods. Basic theory, field procedures, and interpretation of data. Use of geophysical instruments on field trips, followed by reduction, analysis, and interpretation of acquired data.

Course Outline

	LECTURE	LABORATORY
Wed. Aug 31	Introduction	
Fri. Sep 2	Gravity	Use of EDM, gravimeter, magnetometer
Wed. Sep 7	Gravity	
Fri. Sep 9	none	Lab 1: Gravity & Mag – Forest Park
Wed. Sep 14	Gravity	
Fri. Sep 16	Gravity	Use of resistivity equipment
Sat. Sep 17		Lab 2: Mag and Resistivity, Cahokia?
Wed. Sep 21	Magnetics	
Fri. Sep 23	Magnetics	Gravity and Magnetics analysis
Wed. Sep 28	Magnetics	
Fri. Sep 30	Magnetics	Discuss Lab 2 dataset
Wed Oct 5	Resistivity	**Lab 1 report due**
Fri. Oct 7	Seismic intro	Use of seismic equipment
Sat, Oct 8		Lab 3: Resistivity and Seismic, Cahokia?
Wed. Oct 12	Resistivity	
Fri. Oct 14	Resistivity	Discuss Lab 3 dataset
Wed Oct 19	Resistivity	
Fri Oct 21	Electromagnetic Methods	Review Lab 2 results

Wed. Oct 26	Electromagnetic Methods	
Fri. Oct 28	**EXAM I**	No lab
Wed Nov 2	Seismic wave propagation	**Lab 2 report due**
Fri Nov 4	Seismic wave propagation	Seismic data analysis
Wed. Nov 9	seismic refraction	
Fri. Nov 11	seismic reflection	No lab
Wed Nov 16	seismic reflection	
Fri Nov 18	seismic reflection	Review Lab 3 results
Wed. Nov 23	No class –Thanksgiving break	
Fri. Nov 25	No class –Thanksgiving break	No lab
Wed. Nov 30	Ground penetrating radar	
Fri Dec 2	Ground penetrating radar	No lab
Wed Dec 7	Case studies	
Fri Dec 9	**EXAM II**	No lab
Fri Dec 16	**Lab 3 report due**	

Field Exercises: there will be two Saturday field exercises. They will run from approximately 8 am – 6 pm.

Grade: two 1.5-hour exams (open book & notes) at 20% each
Homework = 10%
Lab reports = 50%
There will be no final.

Required Textbook: *Introduction to Applied Geophysics: Exploring the Shallow Subsurface*, by Burger, Sheehan & Jones (available in the bookstore or online)

Additional Sources on Reserve:
Kearey et al: *An Introduction to Geophysical Exploration*
Parasnis: *Principles of Applied Geophysics*
Reynolds: *An introduction to applied and environmental geophysics*
Sharma: *Environmental and Engineering Geophysics*
Stein and Wysession: *An Introduction to Seismology, Earthquakes, and Earth Structure*
Sheriff: *Geophysical Methods*
Telford et al.: *Applied Geophysics*