Syllabus

Course Title: Intro to Geophysics (Fall 2008) *v2*
Catalog / Ref. No.: GEOS 0447 / 3795
Class Times / Rm: R 5:30 PM / Rossey Hall, R-617
Prerequisites: Math & Physics preferred
Instructor / Office: Dr. William W. Montgomery / Rossey Hall, R-503
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Office Hours: TR 1-3 PM; W 1-2 PM

Course Description: The discipline of geophysics concerns itself with the physics of the Earth. Earth conducts seismic waves, emanates gravitational and magnetic fields, and acts to both conduct and retard electrical currents. We can determine or infer certain properties of the subsurface of the Earth through measurement of both naturally occurring and induced signals. This course is designed to give the student an introduction to general physics of the Earth, with emphasis placed upon the shallow subsurface. Shallow, applied geophysics is fast becoming a mainstay exploration tool in environmental geology and hydrogeology, and a variety of field equipment and techniques will introduce students to potential applications. The introduction to geophysics the student receives in this course will serve as an excellent basis from which to explore various branches of geophysics in more detail in advanced courses.

Course Objectives / Expected Learning Outcomes: The student will develop a fundamental understanding of geophysical theory and a familiarity with tools and interpretational techniques in order to determine properties of the Earth and/or to solve specific problems. The student will develop a knowledge base, both theoretical and practical, in seismic wave reflection and refraction interpretation, electrical resistivity methods, gravity field interpretation, and magnetic field interpretation. If time permits, the student will also be introduced to induced polarization (IP) interpretation, electro-magnetic (EM) surveying, and ground-penetrating radar (GPR). Adequate time will be spent on quantitative analysis to reinforce student understanding of theory and to promote independent problem-solving, and development of critical thinking skills and application of common sense will be reinforced throughout the course.

Text: Burger, H.R., Sheehan, A.F., Jones, C.H., 2006, ***Intro to Applied Geophysics***, W.W. Norton
ISBN: 978-0-393-92637-8

Course Calendar:

Week	Dates	Subject(s)	Reading	Assts / Exercises / Field Days
1	09-04	Approach Subsurface	Ch 1	**Asst01**: Travel times in air & water
2	09-11	Seis Fundamentals	Ch 2	**Asst02:** Travel time of diff ray paths
3	09-18	"	"	9-20: Find buried pool **(Exr GPR02)**
4	09-25	Seismic Refraction	Ch 3	**Asst03:** Interpret refraction data
5	10-02	"	"	**Exr GPR01:** Find Buried UST
6	10-09	Seismic Reflection	Ch 4 cont	10-11,12: Poss Fld Days 2,3 (S. Hook)
7	10-16	"	**Exam 1**	10-17,18, 19:GANJ **(Ppr/Pst)**
8	10-23	Electrical Resistivity	Ch 5	**Exr Resis01:** Urban Resis Profile
9	10-30	"	"	11-01:Turtle Back Park I – Seis, Resis
10	11-06	Exploring with Gravity	Ch 6	Prepare, interpret field data
11	11-13	"	"	Poss cmps exr: Gravity in Rossey Hall
12	11-20	Magnetics	Ch 7	11-22:Turtle Back II: **Exr Refrac01**
13	11-27	***Thanksgiving***	"	
14	12-04	Ground Penetrating Radar	Reserve	**Exr Resis02**
15	12-11	Group Presentations		
Thurs, 12-18		**Exam Period 6:00 PM**		

Notes at http://faculty.njcu.edu/wmontgomery

Syllabus (cont) - Intro to Geophysics (Fall 2008) *v2*

Evaluation & Assessment Measures

• 1 exam	= 100 pts
• Assignments (3)	= 100 pts
• Exercises (3)	= 150 pts
• Paper and Presentation	= 100 pts
• Attendance & participation	= 100 pts
Total	= 550 pts

Grading System

Traditional point system modified by bell curve analysis and test score clusters

- +/- 90-100% = A-, A
- +/- 80-89% = B-, B, B+
- +/- 70-79% = C-, C, C+
- +/- 60-69% = D
- < 60% = F

Assignments

3 assignments (100 points) are currently required. Assignments require problem-solving, quantitative reasoning, and critical thinking, but they are not based upon NJCU field data.

Exercises (Field and Written)

Field exercises enable students to gain hands-on experience with equipment and field techniques. Therefore, I trade off class time for field time. There should be 5 weekend days where we get into the field each semester. New field exercise development enables you to be involved in field data collection and exercise creation while we increase the size and breadth of our Geophysical exercise "bank". For Fall, 2008, you will be expected to participate in all field exercises and complete 3 written exercises (@ 50 points each) that have been (or will be) created.

Individual Paper and Oral Presentation

Select a topic of interest relating to the environment, especially one that includes the use of geophysics to solve a problem or answer a question. Obtain instructor approval for the topic. Writing required: 500-1000 words. Bibliography required: use at least 3 good references (no text, dictionaries, Encarta, Wikipedia, etc.), one of which must be non-Web-based. Project will be graded for written content and oral presentation quality. Oral presentation grade will be 50% peer average, 50% instructor, based upon NJCU's evaluation rubric criteria (see instructor website).

Expectations of Behavior

- Treat yourself and others with respect – the only dumb question is the one you don't ask.
- Attend class – you'll enjoy yourself and earn attendance points too.
- In unavoidable cases of schedule conflicts, you may take an exam **early**.
- If you are going to miss an exam due to illness, you must :
  1. Contact me **prior** to the exam in order to reschedule it ASAP
  2. Document the nature and severity of your illness

  NOTE: Failure to follow this procedure will result in NO CREDIT for the exam.
- Integrity is critical in business and in life – cheating on exams will not be tolerated. If you are a party (willing or unwilling) to cheating, your exam score will be zero. Remember, the person next to you may be clueless.
- Plagiarism is a form of cheating; it is theft. When you take text verbatim from a source such as a book, the Internet, or the New York Times without quotation marks, you are stealing that quote or idea from someone else and taking credit for it as your own. There is nothing wrong with using someone else's work…but **don't be a thief**.