CEE / EPS C178: Introduction to Applied Geophysics
Fall 2015 Syllabus

Schedule / Instructors

Lecture: MWF 10-11am, 406 Davis Hall

Instructor: James W Rector

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Text / Handouts

Introduction to Applied Geophysics, by Burger, Sheehan and Jones

Various Handouts: Found on the web with thanks and acknowledgements to John Louie, Richard Allen, Jon Claerbout, Biondo Biondi, Terry Black, Doug Nickels, and probably a number of others. These handouts will be posted on bCourses.

Applets: http://appliedgeophysics.berkeley.edu/

- Gravity methods
  - Sphere
  - Cylinder
  - Thin Sheet
  - Polygon
- Magnetic method
  - Magnetic anomalies due to a polygon
- Seismic method
  - Raytracing
- EM methods
  - Loop response
  - Whole-space dipole
- DC Electric methods
  - Archie's Law
  - Argand Plot
  - Cole-Cole model
  - 2D resistivity

Course Objectives

1. Provide a review of the basic theory of seismic and electromagnetic waves, along with gravitational, magnetic, electric, and electromagnetic fields.

2. Develop an understanding of how measurements of these fields can be used to provide information about the physical characteristics of the subsurface.

3. Provide experience with the evaluation of these different data sets, using direct analytical and computer-assisted computation of subsurface models.

4. Develop critical thinking skills and an appreciation of the limitations or non- uniqueness of subsurface interpretations based on these types of data. Several possible solutions may exist.

5. Provide familiarity with the use of these geophysical methods in engineering, hazardous waste site, hydrological, mining and petroleum investigations.

Grading

Homework: 33%

Midterm: 33%

Final Project: 33%