Faculty of Earth Sciences

Geophysics Department

The Geological Society
Accredited degree courses

GEOPHYSICAL DATA PROCESSING

Course Name	Course ID	Prerequisites
GEOPHYSICAL DATA PROCESSING	***EGP 491***	***EGP341, EGP331, EGP321, MATH204***

Course Description

Discrete Fourier transform, fast Fourier transform, convolution, auto-correlation and cross-correlation, sampling theorem (aliasing, truncation of analytic signal, Nyquist frequency), Z-transforms, digital filters, 2-D Fourier transform, emphasis on computer applications.

Course Objectives

1. To help students to be actively involved in any process of geophysical data.
2. Increase student skills for logic thinking.
3. Ability to program different geophysical problems using numerical approaches.
4. To learn principles of optimization and minimization.

General References for the Course: (Books/Journals…*etc*.)

Students in this course can read from:

1. *Applied Geophysics*, by Telford, W.M., Geldart, L.P., Sheriff, R.E., 1990. Cambridge University Press, 2, 770pp. This is an encyclopedia for various techniques. A bit difficult to read.
2. *Interpretation Theory in Applied Geophysics*, by Grant F.S., and West, G.F., 1965. McGraw-Hill Book Co.,
3. *Introduction to Geophysical Prospecting, 4th Edition*, by Dobrin, M.B. and C.H. Savit, 1988. McGraw-Hill. This is the textbook for this course for several years. Nice text and very exploration oriented.
4. *Shaum's Outline Series (Fortran programming)*

5. *Seismic Data Processing (A review), SEG series*
6. *Notes (Scintric 856 manual) magnetometers and data reduction: A general geophysical theory book that can be used to shore up your background if need be.*

List of URLs for this Course

- http://bass.gmu.edu/~gbeale/ece_360/exmpl360.html
- http://www.ees.nmt.edu/Geop/Classes/GEOP529.html
- http://www.kurnikov.org/links/math_links.htm

Course Outcome

The student will be able to know the wave properties, signal characters, signal analysis, and interpretive methodologies in g & m. He is supposed to learn the following:

1. Student can apply some concept of signal/anomaly separation.
2. Student can apply some polynomical fitting, second derivatives.
3. Student knows the magnetic signal processing, Evler deconvolution.
4. Student knows theFourin transform.