



The University of Sydney

GEOS3104

Geophysical Methods

GEOS3904

Geophysical Methods (Advanced)

Lecturers: Prof Peter Hatherly
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Classes: Lectures: 2 lectures per week
Practical: 1 practical class per week

Course Synopsis & Aims

The aim of this course is to introduce the geophysical methods used to investigate the Earth. The course is mainly based on the techniques used for minerals and hydrocarbon exploration and production, covering marine and terrestrial applications. Where appropriate, applications in global geophysics will also be described. The course is relevant for students with interests in land-based and marine resource exploration, as well as environmental applications. Students wishing to become professional geophysicists are strongly encouraged to expand their geophysics background through completion of an Honours degree.

Objectives

The objectives of this course are to provide students with an adequate understanding of geophysical methods to enable them to critically assess most forms of geophysical data and to participate in geophysical investigations.

Assessment

50% practical work
50% examination

Fieldwork

No formal field work is scheduled but there may be measurements undertaken at a nearby site.

Lecture Outline

Week 1	Introduction to geophysics, data attributes and signal processing
Week 2	Petrophysics, seismic waves, elastic parameters and instrumentation
Week 3	Seismic refraction surveying and global geophysics
Week 4	Global geophysics
Week 5	Seismic reflection surveying
Week 6	Seismic interpretation
Week 7	Gravity surveying
Week 8	Magnetics surveying
Week 9	Radiometrics and resistivity surveying
Week 10	Electromagnetics
Week 11	Borehole logging
Week 12	Radar & case history - coal geophysics
Week 13	Case history - microseismic monitoring & student presentations

Practical Outline

Week 1	Data attributes and signal processing basics
Week 2	Signal processing
Week 3	Seismic refraction interpretation
Week 4	Global geophysics
Week 5	Seismic reflection interpretation
Week 6	Seismic reflection interpretation
Week 7	Gravity
Week 8	Magnetics
Week 9	Interpretation of magnetic and gravity data
Week 10	Borehole log interpretation
Week 11	Minerals exploration case history
Week 12	Design of an exploration program
Week 13	Revision

Required Texts/Reading List

Classnotes will be supplied through the University Copy Centre. Geophysical text books held in the library provide adequate additional information.