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SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY  
SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

Course Title: GEOPHYSICS I

Code No.: GEO 111-4

Program: GEOLOGICAL ENGINEERING TECHNICIAN

Semester: 1

Date: SEPTEMBER, 1988

Author: MANFRED ENGEL

New: \_\_\_\_\_ Revision: X

APPROVED:  Sept 29/88

Chairperson Date

CALENDAR DESCRIPTION

**GEOPHYSICS I**

**GEO 111-4**

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**COURSE NAME**

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**PHILOSOPHY/GOALS:**

This course provides the student with an introduction to the basic physical properties of the earth. Emphasis will be on exploration geophysics and the student will be familiar with the application and operation of magnetometers, hammer seismographs and gamma ray spectrometers. The plotting and elementary interpretation of data will be taught in the course.

**METHOD OF ASSESSMENT:**

Three written tests of equal value (25% each) -  $3 \times 25 = 75\%$

Three geophysical reports using data obtained from field exercises:

2 Magnetometers surveys (10% each) -  $2 \times 10 = 20\%$   
1 Seismic survey (5%) -  $1 \times 5 = 5\%$

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100%

The student has to participate in all field exercises.

A+ = 90% or better  
A = 80% - 89%  
B = 70% - 79%  
C = 60% - 69%

Students with a final average between 45% and 59% can write a supplemental exam on the total material covered.

**TEXTBOOK(S):**

Practical Geophysics for the Exploration Geologist, Northwest Mining Association, ISBN 0-931986-01-X

Applied Geophysics, Telford  
Principles of Applied Geophysics, Parasnis  
Geophysical Prospecting, Dobrin  
Interpretation Theory in Applied Geophysics, Grant & West  
Introduction to Geophysics, Garland  
Geophysical Case Histories, CIM Congress Volume  
Bulletins by manufacturers and consulting firms.

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<u>TOPIC</u>	<u>PERIODS</u>	<u>DESCRIPTION</u>
1	2	<u>Introduction</u> <ul style="list-style-type: none"><li>- Historical outline and relation to other earth sciences</li><li>- Properties used</li><li>- Application of Geophysics today; mining, petroleum, engineering, and military uses</li><li>- References and sources of information</li><li>- Overview of Geophysical Methods</li></ul>
2	24	<u>Magnetic Methods</u> <ul style="list-style-type: none"><li>- The earth's magnetic field and the magnetic properties of rocks and ores, poles, permanent field, secular variation, magnetic storms, susceptibility, permeability</li><li>- Instruments used for magnetic measurements - compass, Fluxgate magnetometer, proton precession magnetometer, Gradiometer</li><li>- Magnetic fields of idealized ore bodies sphere, horizontal cylinder, vertical slabs, generalized forms</li><li>- Ground magnetic surveys base stations, field stations</li><li>- Field practice using Fluxgate Magnetometers</li><li>- Interpretation of field data and estimation of shape, size, orientation and grade of anomalous bodies.</li></ul>

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<u>TOPIC</u>	<u>PERIODS</u>	<u>DESCRIPTION</u>
3	14	<u>Seismic Methods</u> - Types of elastic waves, body and surface waves - Detection of earthquake waves - Reflection seismic method - Refraction seismic method. Field practice using seismic hammer method. - Interpretation of seismic waves. Multiple and dipping layer methods.
4	6	<u>Radioactivity</u> - Radioactive decay and radiation, geiger counters and scintillometers - Prospecting for radioactive minerals - Radiometric surveying - Core logging
5	4	<u>Fluorescence</u> - Use of the ultra violet mineral light in prospecting for fluorescent minerals
6	4	<u>E-M Methods; An Introduction</u> - Instruments - Survey procedures
7	4	<u>Tests</u>
	<u>58</u>	