



Faculty of Earth Sciences



Department of Mineral Resources & Rocks 3rd & 4th Years Program



The Geological Society
Accredited degree courses

GEOCHEMICAL TECHNIQUES

Course Name	Course ID	Prerequisite
<i>GEOCHEMICAL TECHNIQUES</i>	<i>EMR 341</i>	<i>EMR 241</i>

Course Description

Instrumental techniques for mineral identification such as X-ray diffraction, differential thermal analysis, infrared. Staining techniques for microscopic identification. Instrumental methods for determination of the chemical composition including major and trace elements of the geological samples such as atomic absorption, X-ray fluorescence, radiometric and mass spectrometric methods. Correlation between the various analytical methods.

Course Objectives

1. Description of samples pretreatments such as crushing, grinding and sieving.
2. Description of different decomposition procedures such as acid and fusion.
3. Statistical interpretation of the results (mean, SDV, RSDV, T-test, F-test, Q-test).
4. Advantages and disadvantages of XRF technique.
5. Advantages and Disadvantages of AAS techniques (flame and carbon furnace).
6. Advantages and disadvantages of ICP technique.
7. Mineral separation techniques (manual, magnetic and heavy liquids).
8. Advantages and disadvantages of XRD technique.
9. Advantages and disadvantages of staining technique.

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

Students in this course can read from:

1. *A Handbook of Silicate Rock Analysis*, by Potts, P.J., 1987. Blackie, Glasgow ,

U.K.

2. *Analytical Methods in Geochemical Prospecting. Handbook of Exploration Geochemistry, Vol. 1.*, by Fletcher, W.K., 1981. Elsevier, Amsterdam.
3. *Laboratory Handbook of Petrographic Techniques*, by Hutchinson, C.S., 1974, John Wiley & Sons, Inc., New York.
4. *Physical Methods in Determinative Mineralogy*, by Zussman, J., 1977. Academic Press, London.

List of URLs for this Course

- <http://elchem.kaist.ac.kr/vt/chem-ed/analytic/ac-meths.htm>

Course Outcome

By the end of this course, the students should:

1. Student can be familiar with sample pretreatments such as crushing, grinding and sieving.
2. Student can be able to describe the different decomposition procedures such as acid attack and fusion.
3. Student can be able to do statistical treatment for the results (mean, SDV, RSDV, T-test, F-test, Q-test).
4. Student can be aware of advantages and disadvantages of XRF technique.
5. Student can be aware of advantages and disadvantages of AAS technique (flame and carbon furnace).
6. Student can be aware of advantages and disadvantages of ICP technique.
7. Student can be acquainted with mineral separation techniques (manual, magnetic and heavy liquids).
8. Student can be aware of advantages and disadvantages of XRD technique.
9. Student can be aware of advantages and disadvantages of staining technique.