ENVS 541: Analytical Geochemistry

SYLLABUS

Instructor: Dr. Bassam S. Al-Tawabini
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Textbook: **Analytical Chemistry for Technicians By John Kenkel**
+ Power Point Presentations + Handouts

Description

Introduces principles and applications of chemical analysis of geological materials, including spectroscopy, mass spectrometry and atomic spectroscopy. Lectures will cover theory of analysis while practical laboratory-based exercises focus on how instruments work and instrument operation. Laboratory sessions will provide hands-on experience in relating lecture material to practical analysis.

Prerequisite: Consent of instructor.

Reference Books:

1. Csuros, M. Environmental Sampling and Analysis for Technicians, Lewis Publisher, 1994.
2. Settle, Frank. Handbook of Instrumental Techniques for Analytical Chemistry, 1997.
3. Christian G. and O'Reilly J. Instrumental Analysis, 2nd Ed. 1986.
4. Chemical Analysis, Modern Instrumentation Methods & Techniques, By Francis R and Annick R., John Wiley & Sons Press, 2000.
5. Wolfgang, K. "Environmental Analysis" Elsevier Publisher, 2001.
6. Harvey, D. "Modern Analytical Chemistry". McGraw Hill. 2000.

Course Outline

Week No.	Subject	Textbook Chapter	Lecture No.1	Lecture No. 2
1.	Introduction to the course materials		Outlines of the Course	Introduction to Geochemistry
2.	Sampling & Sample preparations methods	1 & 2	Introduction to Analytical Sciences (Ch. 1)	Sampling and Sample preparation (Ch. 2)
3.	Introduction to Instrumental Analysis	3,4 & 6	Introduction to Gravimetric & Titrimetric Analysis	Introduction to Instrumental Analysis

4.	Analytical Separation Methods	11	Separation Methods	Chromatography Separation Methods
5.	Chromatography (GC, HPLC) Instruments	12,13	GC (Ch. 12)	HPLC (Ch. 13)
6.	Laboratory Session , Chromatography Lab.	-	First Exam	RI Lab
7.	Spectrochemical Methods + FTIR Instrument	7, 8	UV Instruments (Ch. 7)	FTIR (Ch. 8)
8.	Mass Spectrometry / GC / MS Instrument	handouts	Theory of MS	Applications
9.	Laboratory Session, FTIR an GC/MS	RI Labs	GC/MS Lab	UV + FTIR Lab
10.	Filed Trip	-	TBA	TBA
11.	Atomic Emission Spectroscop / AA & ICP Instrument	9	Theory	Applications
12.	Laboratory Session, AA & IC Lab	RI Labs	RI Lab	RI Lab
13.	Principles of X-Ray technique	10	Second Exam	Ch. 10
14.	Laboratory Session, XRD / XRF Lab.	RI Labs	XRD	XRF
15.	Presentation of Research Project	-		
16.	Final Exam			

Grading:

Activities	Points
Attendance + H.W.	10
Participation in Class Discussions + Presentations	15
First Major	20
Second Major	20
Final	35

Total **100**

GOOD LUCK

Dr. B. Tawabini