

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

COURSE OUTLINE

Course Title: ANALYTICAL CHEMISTRY - INSTRUMENTATION I
Code No.: CHM 221-4
Program: Water Resources Engineering Technology
Semester: Four
Date: June, 1983
Author: Doug Heggart

New: x Revision: _____

APPROVED: _____
Chairperson Date

CALENDAR DESCRIPTION

ANALYTICAL CHEMISTRY - INSTRUMENTATION I

CHM 221

Course Name

Course Number

PHILOSOPHY/GOALS:

The course is designed to give the student an understanding of the role Instrumentation has in Analytical Chemistry. The course involves theory and laboratory which will serve as a basis for Analytical Chemistry - Instrumentation II taught in semester five.

METHOD OF ASSESSMENT (GRADING METHOD):

Final Grade - Theory	50%
Lab	50%
Theory - Assignments and Quizzes	20%
- Mid-term test	30%
- Final test	50%

Late labs will be marked but will be downgraded 10% per week while late assignments will not be accepted.

TEXTBOOK(S):

Introduction of Chemical Analysis - Braun, McGraw-Hill, 1982

Undergraduate Instrumental Analysis, 3rd Edition, Robinson, Dekker, 1982

TOPIC NO.	TOPIC DESCRIPTION
1	<p>Working Curves and Standards</p> <ul style="list-style-type: none">- non-linear- linear- method of standard additions- curve fitting - least squares fit- Assignment #1- Quiz #1
2	<p>Molecular Spectroscopy</p> <ul style="list-style-type: none">- review of atomic physics as it relates to EMR- development of Beer-Lambert Law- criteria for selection of λ for an Absorption measurement- analysis based on light scattering - turbidimetry - nephelometry- end point detection using Absorption measurement- determination of K_a using Absorption measurement- Assignments #2 and #3- Quiz #2- Mid-Term
3	<p>Atomic Absorption</p> <ul style="list-style-type: none">- comparison of AAS, AFS, FES, AES- double beam vs. single beam- application- advantages and limitations- interferences- monochromators, detectors- Assignment #4
4	<p>Chromatography</p> <ul style="list-style-type: none">- types of chromatography- HPLC, GC<ul style="list-style-type: none">- Column, Paper- TLC, Ion-exchange- electrophoresis- stationary Phase, Mobile Phase, Carrier Gas- Detectors- Qualitative and Quantitative aspects of G.C.- retention time and retention volume- efficiency, HETP, n- resolution, symmetry- Column Types- Assignment #5

- LABS:
1. Spectrophotometric -
 - a) determination of Fe in H_2O
 - b) determination of phenol in H_2O
 - c) determination of pH in H_2O
 2. Potentiometric I -
 - a) determination of [HOAC] in H_2O
 - b) determination of [H_3PO_4]
 3. Atomic Absorption -
 - a) determination of [Ca]
 - b) determination of [Mg]
 - c) determination of water hardness
 4. Potentiometric II - using Specific Ion Electrodes:
 - a) determination of Cl^- in H_2O
 - b) plotting first and second derivative curves
 5. Optical - determination of activity
 6. Chromatography -
 - a) hydrocarbons in H_2O
 - b) Qualitative and Quantitative determination
 - c) parameter adjustments