

SAULT COLLEGE
of Applied Arts and Technology
Sault Ste. Marie

COURSE OUTLINE

INSTRUMENTAL ANALYSIS - LAB
CHM 202-6

revised June 1981 by J. Korrey

A handwritten signature in black ink, appearing to be 'J. Korrey', is written over the end of the 'revised' line.

INSTRUMENTAL ANALYSIS LAB

CHM 202-6

The laboratory program is designed to reinforce the theory portion of the program. In order to do this the student will study the various parameters associated with each instrument and to see the effect produced by changes in each. In addition, he/she will perform a sample experiment making use of the optimum instrumental conditions determined beforehand.

A brief outline of the laboratory work is listed below. For further information consult the objectives of the lab program.

INSTRUMENTAL ANALYSIS BOOKS

Robinson, James W., - Undergraduate Instrumental Analysis - Dekker

Willard, Merritt & Dean - Instrumental Methods of Analysis

Ewing - Instrumental Methods of Analysis

Reilley & Sawyer - Experiments for Instrumental Methods

Strobel - Chemical Instrumentation

A brief outline of the laboratory work is listed below. For further information consult the objectives of the lab program.

INSTRUMENTAL ANALYSIS

CHEM 202-6

TOPIC	PERIODS	TOPIC DESCRIPTION	REFERENCE
1		<u>Specific Ion Electrodes</u> Determination of Chloride in tomato juice by sample addition. Investigation of the behaviour of a sodium-ion sensitive glass electrode. Determination of calcium in milk.	
	9	<u>Potentiometric Titrations</u> Determination of the dissociation constants, K_1 and K_2 of a polyprotic acid.	
2	9	<u>Electrolytic Methods</u> Electrodeposition of lead, copper, and zinc in brass.	
3	9	<u>Voltammetric Methods</u> <u>Polarography</u> a) To prepare and run a polarogram of known samples of metal ions in solution. b) To identify and determine the concentration of metals in an unknown sample. c) To study polarography of organic compounds - Nitrobenzene. (optional)	Reilley-Sawyer pg. 56 Reilley-Sawyer pg. 68
4	9	<u>Optical Methods</u> <u>Spectronic 20</u> a) To determine the optimum wavelength to use in an analysis. b) To study the technique of handling cuvettes. c) To study the Beer-Lambert law. d) To study the effects of interferences by analysis of a two components mixture.	
5		<u>Ultra-Violet & Visible Spectrophotometry</u> Wavelength calibration check with Holmium Oxide filter. Determine the absorption spectra of Benzene Vapour. Determine the effect of variables on recorded spectra, gain, split width, scan and chart speed. Determination of aspirin by UV absorption.	

TOPIC	PERIODS	TOPIC DESCRIPTION	REFERENCE
6	9	<p><u>Infra-Red Spectrophotometry</u></p> <p>Pathlength Calibration</p> <p>Polystyrene Film - used to study qualitative identification techniques</p> <p>Sample handling techniques for liquids</p> <p>Mull techniques for solids</p> <p>Window Polishing & Care</p> <p>Qualitative Identification of organic compounds from their IR Spectra</p>	
7	9	<p><u>Atomic Absorption Spectrometry</u></p> <p>To determine the percentage of two of the following, by absorption:</p> <ol style="list-style-type: none"> Copper in Copper Oxide Nickel in Nickel Oxide Zinc in an Ore Calcium and Magnesium in cement T.E.L. in Gasoline Ni and Mo in steel Mn and Pb in steel <p><u>Atomic Emmission</u></p> <ol style="list-style-type: none"> Sodium in Serum Potassium in Serum Sodium and Potassium in Cement 	
8		<p><u>Gas Chromatography</u></p> <ol style="list-style-type: none"> Determination of the retention times for Qualitative Analysis of Hydrocarbons Quantitative Analysis using weight factors 	