SAULT COLLEGE
OF APPLIED ARTS AND TECHNOLOGY
SAULT STE. MARIE

COURSE OUTLINE

ANALYTICAL CHEMISTRY I
CHM 207-4 Theory

REVISED: June, 1980 by J. Korrey

QUANTITATIVE ANALYSIS

REFERENCE TEXTS

Pierce, Haenisch & Sawyer	Quantitative Analysis - Wiley
Brown & Sallee	Quantitative Chemistry - Prentice Hall
Fischer & Peters	Quantitative Chemical Analysis - Saunders
Flaschka, Barnard & Sturrock	Quantitative Analytical Chemistry - Barnes & Noble
Hamilton, Simpson & Ellis	Calculations of Analytical Chemistry - McGraw-Hill
Kolthoff & Sandell	Textbook of Quantitative Inorganic Analysis - MacMillan
Skoog & West	Fundamentals of Analytical Chemistry - Holt, Rineha & Winston
Vogel, A. I.	A Textbook of Quantitative Inorganic Analysis - Wil

COURSE OUTLINE

ANALYTICAL CHEMISTRY I

CHM 207-4

TOPIC DESCRIPTION

Scope of Analytical Chemistry

Classification of Methods
Sampling
Dissolving of Samples

- Acids
- Fluxes

Chemical Stoichiometry

- Significant Figures, Common Statistical Measures
- Methods of Expressing Concentration
  - In Physical Units - weight percent
    percent vol. to vol.
    percent weight by vol.
  - In Chemical Units -
    moles
    mole fraction
    Formality and Molarity
    Normality and Equivalents
    Titer
    Gravimetric Factor

COURSE OUTLINE CON'T

ANALYTICAL CHEMISTRY I

CHM 207-4

TOPIC DESCRIPTION

Quantitative Analysis Review

Chemical Equilibrium - review of first year theory

Solubility of Precipitates

a) Common ion effect
b) Inert electrolyte effect
c) pH effect
d) Formation of Complex ions
e) Selective Precipitation

Precipitate Formation

Rate of Nucleation
Particle Growth

Digestion of Precipitates

Peptization

Contamination of Precipitates

a) Coprecipitation
b) Homogeneous Precipitation

Related Gravimetric Problems

COUR OUTLINE
VOLUMETRIC ANALYSIS

TOPIC DESCRIPTION

Acid - Base Titrations
- a) Bronsted - Lowry Theory
- b) Strength of Acids
- c) Buffers
- d) Hydrolysis
  - i) Salt of a Strong Acid & Strong Base
  - ii) Salt of a Strong Acid & Weak Base
  - iii) Salt of a Weak Acid & Strong Base
  - iv) Salt of a Weak Acid & Weak Base

Study of Indicators

Theory of Complex Ions

Oxidation - Reduction Methods - Principles & Theory

Introduction
- a) Requirements of a Good Analysis
- b) Types of Volumetric Analysis
- c) Primary and Secondary Standards

Review of PH and p- functions

Titration Curves
- a) Acid - Base Titrations
- b) Precipitation Titrations

Factors Affecting Titration Curves

Reagent Concentration

Completeness of the Reaction

COURSE OUTLINE CON'T

VOLUMETRIC ANALYSIS

TOPIC DESCRIPTION

Type of Precipitate

End Point Determination in Precipitation Reactions

a) Formation of a Soluble Complex Ion
b) Cessation of Precipitation
c) Formation of a Coloured Precipitate
d) Use of an Adsorption Indicator
e) Use of an External Indicator

Number	Periods	Topic Description	Reference
		Special Topics	
19	2	Types of Electrodes - reference - indicating	
20	2	Measurement of pH - Basic Principles - How a glass electrode works - applications of glass electrodes - errors in pH measurements with a glass electrode	
21	3	Colorimetry - Spectronic 20 - definition of terms - Beer - Lambert Laws - Failure of Beer's Law - Choice of wavelength - Simultaneous det'n of two or more components - relative concentration error	