GRANDE PRAIRIE REGIONAL COLLEGE

DEPARTMENT OF SCIENCE

CHEMISTRY 312

September 1991 **Fall Semester**

Instructor: Dr. Barry Ramaswamy.

Room: J218

Bus: Tel: 539 - 2072 **Home: 539 - 6239**

Office Hours: Available most of the time. To arrange an appointment see the lecturer after lecture.

Prerequisite: Chemistry 200 / 202 /302

Transfer Credits: University of Alberta, 6 Credits

Textbook: Quantitative Chemical Analysis, 3rd Edition
by Daniel. C. Harris
W. H. Freeman and Co., New York

COURSE OUTLINE

GRADING

ITEM	TERM	MARKS
Quiz	Fall	10
Xmas Exam	Fall	10
Quiz	Winter	10
Lab Work	Full Year	40
Final Exam	Full Year	30
Total		100

The final percentage grade will be converted to a 9 point grade on the basis of the following distribution, allowing a 2 to 3% leeway in each value.

Grade	% Range	Grade	% Range
9	90 - 100	5	57 - 64
8	80 - 89	4	50 - 56
7	72 - 79	3	45 - 49
6	65 - 71	2	26 -44

Quizzes: There will be 11 quizzes per term on Mondays during the lecture period. The first quiz will be on Monday September 23. The lowest quiz mark will be dropped. Quizzes will be about 20 to 30 minutes in length and will cover assigned readings, lectures, experiments and problems. Absence from a quiz requires **a valid excused absence.**

Excused Absence: Only a written excuse from Student Health ,the Registrar or from a Physician will be accepted for quizzes and exams.

Homework Assignment: Only Homework assignment that is not from your book will be collected and corrected. Answers to assignments will be posted in the Lab.

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Lecture Subject Outline

First Term Topics

Analytical Balance
Volumetric Equipment
Statistics of Small Numbers
Sampling and Sample Preparation
Ionic Equilibria
Volumetric Analysis
Precipitation Analysis
Acid - Base Equilibria
Titration of Strong and Weak Monoprotic Acids and Bases
Buffers and Acid - Base Indicators
Titration of Polyprotic Acids and Bases and Mixtures
Non Aqueous Titrations
Complexation in Analysis
Oxidation Reduction Analysis
Discussion of Experiments

Second Term Topics

Potentiometry and Ion Selective Electrodes
U.V. - Visible Molecular Absorption Spectroscopy
Molecular Fluorescence Spectroscopy
Flame Atomic Absorption Spectroscopy
Liquid - Liquid Extraction
Theory of Chromatography
Ion Exchange Chromatography
Gas Chromatography
Adsorption and Partition
Chromatography
Analytical Problem Solving
Discussion of Experiments

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Laboratory Experimental Work, 1991 - 92

FIRST TERM

1. Preliminary exercises - use of analytical balances, use and calibration of volumetric glassware.
2. Practical Test taking aliquots, reading burets.

3. **ANALYSES:**

(a) Chloride by Precipitation Titration
(b) Carbonate by acid - base titration
(c) Calcium by Titration with EDTA
(d) Sampling error by Titration of Potassium Hydrogen Phthalate
(e) Mixture of Acids by pH Titration with Automatic Titrator
(f) 8 - Hydroxyquinoline (oxine) by Non Aqueous Weight Titration
(g) Copper by Iodometry - Thiosulfate Titration
(h) Ethylene Glycol by Periodate Cleavage - Iodine Titration

SECOND TERM

1. Literature Search Problem
2. Analyses:

(a) Total Salt Content by Ion Exchange
(b) Iron by Spectrophotometry
(c) Glucose by Ferricyanide Oxidation in Technicon Autoanalyzer
(d) Benzene by Gas Chromatography
(e) Aniline Dyes in a Mixture by High Performance Liquid Chromatography, (HPLC)
(f) Copper by Atomic Absorption Chromatography
(g) Thorium - 234 by Carrier Precipitation and Radiochemical Counting
(h) Fluoride in Mouthwash by Ion Selective Electrode Potentiometry
(i) Nickel in Copper by Solvent Extraction and Spectrophotometry
(j) Dextromethorphan by Ion - Pair Extraction and Spectrophotometry