GRANDE PRAIRIE REGIONAL COLLEGE

DEPARTMENT OF SCIENCE AND TECHNOLOGY

CHEMISTRY 2110

COURSE OUTLINE

1999-2000

Lecturer:	Dr. Barry Ramaswamy		
Room:	J218		
Tel:	Bus: 539 2072	Home:	539 6239
Prerequisite:	Chem 1010, 1020 or equivalent courses		
Transfer Credits:	University of Alberta	3 credits	
	University of calgary	3 credits	
	University of Lethbridge	3 credits	
Text Book:	Textbook of Quantitative Chemical Analysis 5th edition		
Author:	Daniel Harris W.H.Freeman and Company	New York. 1998	
Laboratory Manual:	University of Alberta Chem 211 Lab Manual		

SYLLABUS

1. Tools of Trade

   (i) Analytical Balance
   (ii) Volumetric Flask
   (iii) Pipettes and Syringes
   (iv) Burettes and other measuring flasks
   (v) Experimental Error.

2. Statistics

   (i) Standard deviation and Probability
   (ii) Gaussian error curve
   (iii) Dealing with bad data
   (iv) Practical example of a Method and the least square analysis

3. Volumetric Analysis

   (i) Principles of Volumetric analysis
   (ii) Volumetric procedures and calculations
   (iii) Principles of a titration curve
   (iv) Titration of a mixture
   (v) Calculating titration curves with a spreadsheet
   (vi) End point detection

4. Ionic equilibria

   (i) Review of chemical equilibrium
   (ii) Solubility products
   (iii) Common ion effect
   (iv) Complex formation
   (v) Activity coefficients
   (vi) Charge balance and Mass balance
   (vii) Systematic treatment of equilibrium
   (viii) Dependence of Solubility on pH

5. Acids and Bases

   (i) Introduction to acids and bases
   (ii) pH and strength of acids and bases
   (iii) Acid base equilibria
   (iv) Weak acid and weak bases
   (v) Buffers
   (vi) Diprotic and polyprotic acids and bases

6. Acid Base Titrations

(i) Titration of strong acids and strong bases
(ii) Titration of weak acid with a strong base
(iii) Titration of a weak base with a Strong acid
(iv) Titration of a weak base with a weak acid
(v) Isoelectric and isoionic pH
(vi) Finding the end point with a pH electrode
(vii) Titrations in non aqueous solvents
(viii) calculating titration curves with spreadsheets

7. EDTA Titrations
(i) Metal Chelate Complexes
(ii) EDTA titration curves
(iii) Metal ion indicators
(iv) EDTA titration techniques
(v) Doing EDTA titrations using a spreadsheet

LABORATORY EXPERIMENTS

1. Preliminary Exercises

   Use of Analytical balances, calibration of Burettes and volumetric flasks.

2. Precipitation Titrations: Argentimetric determination of chlorides

3. Complexation Titrations: Determination of calcium and magnesium with EDTA

4. Potentiometric titration of an acid mixture

5. Non Aqueous titration of Benzimidazole

6. Iodometric Determination of Copper.

7. Organic functional group analysis: Determination of ethylene glycol with periodate cleavage.

GRADING

1.	QUIZ	10 Marks
2.	MIDTERM	15 Marks
3.	FINAL EXAMINATION	35 Marks
4.	LAB WORK	40 Marks
	Total	100 Marks

Quizzes: Quizzes will be given every week for 20 minutes during the lecture session. Quizzes will cover reading assignment for the week, Lecture , assignments , and laboratory experiments. The first quiz will be on September 22, 1999.

Assignments: Assignments will be assigned during classes and are due as told. The answers will be provided in classes.

Absence: Absence from a quiz or lab needs a valid reasoning. Only a written excuse from the Doctor or a Nurse will be accepted. If you feel you really have to miss a lab or a quiz talk to your instructor in advance and make alternate arrangements.