Introduction to Analytical Chemistry

Chemistry 215

Section: D100

Term: 2000 Spring

Instructor: Dr.Paul Li

Office: SSB-7104

Discussion Topics: The underlying principles of analytical measurement science are introduced in this course. The concepts of sampling, experimental error, precision, accuracy, statistical analysis and calibration will be covered in the lecture and put into practice in laboratory sessions.

The principles of solution equilibria are fully developed throughout the course. Complexometric reaction equilibria involving metal ions and multidentate ligands and stepwise formation reactions in solutions are treated from the perspective of individual species measurement. Titrimetric and electrochemical methods (potentiometry, coulometry, voltammetry) of solution species measurement are introduced.

Two powerful analytical instrumentation methods: atomic spectroscopy and gas chromatography-mass spectrometry (GC-MS) will be briefly covered in two laboratory experiments.

2 lecture hours/week; 0 tutorial hour/week; 4 lab hours/week.

Lecture Topics:

Introduction; Principles of chemical analysis; Gravimetric analysis; Solution equilibria (multiprotic acids and bases, complexes), Titrimetric methods; Electrochemical methods (potentiometry, coulometry, voltammetry).

Laboratory Experiments:

Calibration, Gravimetry, Titrimetry, Potentiometry, Voltammetry, Atomic spectroscopy, GC-MS.

Grading: Midterm Exam 15%, Laboratory 40%; Final Exam (lecture 35%, lab 10%)

Required Texts: Daniel C. Harris, "Quantitative Chemistry Analysis", 5th Edition, 1999.

Introduction to Analytical Chemistry

Publishers: W. H. Freeman & Company.

A Lab Manual will be distributed at the first laboratory lecture.

Recommended Texts: Gary D. Christian "Analytical Chemistry" 5th Ed. 1994, John Wiley & Sons.

Materials/Supplies: Black, hardcover notebook for the laboratory.

Prerequisite/Corequisite: Prerequisite: CHEM 122 (or 103) and CHEM 126 (or 118).

Notes: None