Chemistry 3131: Analytical Chemistry II

(Instrumental Analysis)

Course Outline, Winter 2006

Contact Information

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Overview

Materials can be analysed either by their chemical reactivity or their spectroscopic behaviour. This course deals with the latter, *i.e.*, the isolation and identification of unknown substances using analytical instrumentation. Both identification of unknown and quantitation of known species are important, depending on the situation, so both aspects will be covered.

Prerequisite: Chemistry 1130 (or 1101); Recommended: Chemistry 2411
Note: **Students who have previously received credit for CHEM 2131 cannot take this course for credit**
Text: Analytical Chemistry: An Introduction, Skoog, West, Holler, and Crouch, 7th Edition
Lab Manual: Chemistry 3131 Laboratory Manual (2006 edition)

Course Material

The course can be divided into roughly 5 sections, as follows:

1. Statistical Analysis (Chapter 7 and Section 21C)
   Calibration curves, confidence intervals
2. Absorption and Fluorescence Spectroscopy (Chapters 21 - 23)
   Interaction of light with matter, comparison of visible light spectroscopy experiments, spectrometers, Beer's Law, method of standard addition, infrared spectroscopy
3. Separation Methods (Chapters 24 - 26)
   Extractions, comparison of chromatographic methods, resolution, gas-liquid chromatography (GC) instrumentation, high-performance liquid chromatography (HPLC) instrumentation, capillary electrophoresis instrumentation
4. Electrochemical Methods (Chapters 16 - 20)
   Redox equations and electrochemical cells; instrumental and practical application of potentiometry, coulometry, voltammetry, and stripping methods
5. Mass Spectroscopy (Supplemental Material)
   Isotope patterns, inductively-coupled plasma (ICP) source, molecular sources, detectors, qualitative organic analysis

The **method of evaluation** is as follows:

30% laboratory (5% for each experiment + 5% technique mark)
35% final exam (to be scheduled by registrar)
5% assignment (on section 1 of the course)
30% three section quizzes (sections 2, 3, 4) worth 10% each
these quizzes will be scheduled one week before they are written

week of	Monday class	Wednesday class	Thursday lab
January 2			check-in
January 9			
January16	Assignment 1 due		
January 23			1st lab due
January 30			
February 6			2nd lab due
February 13			3rd lab due
February 20	S T U D Y B R E A K		
February 27			
March 6			4th lab due
March 13			
March 20			5th lab due
March 27			
April 3			