INTRODUCTION TO ANALYTICAL METHODS

CHEM 3025

Syllabus

Spring 2005

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I. Course Objectives

This course is designed to introduce the student to classical wet and modern instrumental analytical chemistry. The fundamentals of analytical statistics and its importance to data reliability will be discussed. The course will cover acid/base calculations, titrations, basic chemical equilibrium, atomic and molecular spectroscopic, chromatographic, and electroanalytical methods of analysis. Much of the laboratory experience will focus on modern methods of environmental analysis.

II. Course Outline

A. Introduction to Analytical

Ch 0. The Analytical Process
Ch 1. Chemical Measurements
Ch 3. Math Tools
Ch 4. Statistics
Ch 6. Intro to Titrations

B. Wet Chemistry

Ch 8. Intro Acids and Bases
Ch 9. Buffers
Ch 10. Acid-Base Titrations
Ch 12. Chemical Equilibrium
Ch 13. EDTA Titrations

C. Electrochemistry and EMR

Ch 14. Electrode Potentials
Ch 15. Electrode Measurements
Ch 16. Redox Titrations
Ch 18. Electromagnetic Radiation

D. Spectroscopic and Chromatographic Techniques

Ch 19. Spectrophotometry
Ch 20. Atomic spectroscopy
Ch 21. Intro to Chromatography and Mass Spectrometry

Ch 22. Gas and Liquid Chromatography

III. TEXT

Lecture: *Exploring Chemical Analysis*, 3rd edition, by Daniel C. Harris; W. H. Freeman and Company Publishing, New York, 2005. (ISBN: 0-7167-0571-0)

Laboratory: Laboratory assignments will be given on a weekly basis. A laboratory fee of $10 is charged to cover laboratory handout photocopying and miscellaneous charges.

Notes will be presented in PowerPoint format in most cases. These notes should be only considered as a supplement to the text and not a replacement.

IV.GRADING SYSTEM

A. Evaluation Procedures

1. *Homework assignments*
   a. Problems assigned in class will **not** be taken up for grade.
   b. Special assignments will be given randomly to be graded, i.e., library assignments.

2. *Quizzes*
   a. Quizzes are **typically given weekly** (usually Fridays) and may be unannounced.
   b. Quizzes will represent 12.5% of your total grade.

3. *Exams*
   a. The section exams will represent 37.5% of your total grade. These exams are typically a combination of matching or multiple choice, problem solving, and essay questions. Four section exams will likely be given periodically over the course of the semester. If you have conflicting commitments, arrange an alternative time **prior** to the exam. Only the three highest exam grades will be used for your grade.

TENTATIVE EXAM DATES

Exam 1	Tues., Feb. 8
Exam 2	Tues., March 8
Exam 3	Tues., April 12
Exam 4	Thurs., May 5

These section exams will be given in the evenings. Alternative arrangements can be made if you are unable to attend during the scheduled period.

   b. The final exam will be given during "finals weeks" and will represent 25% of your total grade. The final exam will be comprehensive.

4. *Laboratories*
   a. Laboratory reports are **due in one week** following experiment. All reports should be prepared using a word processor and spell-checked. Late reports are penalized 2 points for each day late. After 2 weeks, you have lost all possible points.
   b. The laboratory notebook will be used only to collect data and record experimental observations (data). Laboratory notebooks will be taken up randomly and graded for completeness, format, and neatness.

c. All laboratory experiments **must be completed** in order to receive a grade for the laboratory portion of this class.

B. Grading Standards

1. The lecture portion of this course will contribute 75% of the overall grade.
   a. The ten best quiz grades and special assignments will count as 12.5%.
   b. The section exams are worth 12.5% each (drop the lowest) for a total of 37.5%.
   c. The final exam is worth 25%.

2. The laboratory portion of the course will contribute 25% to your overall grade.
3. Letter grade assignments: A≥85.0%, B≥75.0%, C≥65.0%, D≥55.0%, and F<55.0% of the over all possible points.

V. AMERICAN WITH DISABILITIES ACT

Any student needing special accommodations due to a physical, mental or learning disability should contact Mrs. Susan Dodson, the Coordinator for Student Disability Services, Hallie McKinney, Room 111B or call (580) 745-2394 (TDD# 745-2704). It is the responsibility of each student to make an official request to the Coordinator for academic accommodations.

VI. CLASS POLICIES

(A) Attendance
1. Regular lecture attendance is expected, however you are not penalized for not attending lectures. Late assignments will not be accepted.
2. Laboratory and exam attendance is mandatory unless **prior** arrangements are made.

(B) Laboratory / Safety Rules
1. Safety glasses **must** be worn at all times by every person who steps into the laboratory. NO EXCEPTIONS. Failure to observe this precaution or other safety practices will result in reduction of grade and/or dismissal from the course.
2. A laboratory coat is recommended during the experiments.
3. **Only** closed toed shoes will be permitted in the laboratory. No flip-flops, sandals, or other open-toed shoes are allowed.
4. Smoking, eating, and drinking in the laboratory are prohibited at all times.
5. No unauthorized preparation or experiments are to be attempted at any time.