Analytical Chemistry
CHEM 222 - 001, Fall 2017
Syllabus

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Class time: Tuesday 8:30 – 9:55am and Thursday 8:30 – 9:55am.
Office hours: Thursday 10am – 12pm or by appointment.

Text: Fundamentals of Analytical Chemistry, ninth edition, by Douglas A. Skoog, Donald M. West, F. James Holler, and Stanley R. Crouch, Brooks/Cole 2013, ISBN-10 0495558281.

Description:
"Analytical chemistry involves separating, identifying, and determining the relative amounts of the components in a sample of matter."

Chemistry 222 is an introduction to the principles and practices of classical as well as modern analytical techniques which are commonly used in quantitation. This course will cover statistical treatment of data, advanced concepts of equilibrium (solubility, acid-base, and electrochemical), titration methods, spectrophotometric analysis, chromatographic analysis, and mass spectrometry. By the end of the semester students should have developed some expertise in the techniques covered, including being able to: perform the necessary calculations for each method; understand how and why each works; and realize the applicability, advantages, and disadvantages of each method.

Prerequisites:
CHEM 125, CHEM 126, and CHEM 124.

Homework:
Homework will be graded on effort (essentially – did you try to do it?) and returned to you. Each week's homework is due by the next Thursday, (If you know you are going to miss a Thursday, turn it in to my mailbox before Thursday. If you get sick or something comes up, email me and let me know in advance.) Since I believe that the homework will be most useful to you if you do it as you go along, there will be no points for late homework.

Special Applications Topic Report and Oral Presentation:
Each student will find one application of analytical chemistry – something that really interests you – making a brief (10 minute) explanation of the question, the analytical method used to answer it, and the results of the work to the class during the last two class sessions. A concise write-up is due with the presentation.

Grading Policy:
The class will be graded as follows:

Two in-class exams (20% each) -- 40 %
Final exam -- 30 %
Homework – 15%
Project paper -- 5 %
Oral presentation -- 5 %
Attendance -- 5%

Course Plan:
Below is a tentative weekly schedule. I will try to stick to this schedule as closely as possible. Students will be consulted with to reach an agreement on any modifications or deviations from the syllabus throughout the course of the semester.

Date	**Topic**
9/5	Welcome and Introduction Chapters 1& 4
9/7 & 9/12	Statistics Chapters 5, 6, & 7
9/14	Calibration Chapter 8
9/19 & 9/21	Chemical Equilibria Chapters 9, 10, &11
9/26	Buffer Chapter 9
9/28 & 10/3	Acid-Base Titrations Chapters 14, 15, & 16
10/5 & 10/10	Electrochemistry Chapters 18, 19, & 20
10/12	Potentiometry Chapter 21
10/17	**Exam I**
10/19	Spectrophotometry Chapters 24, 25, & 26

Date	Topic
10/24	Spectrophotometry continued Chapters 24, 25, & 26
10/26 & 10/31	Atomic Spectroscopy, Mass Spectrometry Chapter 28, 29
11/2 & 11/7	Extraction & Chromatographic Method Chapters 31
11/9 & 11/14	Gas Chromatography Chapters 32
11/16	HPLC Chapter 33
11/21	**Exam II**
11/28	Sample Preparation Chapter 36 & 37
11/30	Quality Assurance and Quality Control Chapters 8
12/5 & 12/7	Special Applications Topics Presentations
To be Scheduled	**Final Exam**

Learning Outcomes:
Understand the fundamental principles and theory of analytical chemistry.
Understand the procedures and applications of the analytical techniques.
Use statistical method to interpret the experimental data in meaningful ways.
Demonstrate the ability to use the knowledge of analytical chemistry to solve the problem.

NJIT Honor Code:
The NJIT Honor Code will be upheld, and any violations will be brought to the immediate attention of the Dean of Students. Please carefully read the honor code at http://www.njit.edu/academics/honorcode.php.