

# **CHEM 345: Introduction to Analytical Chemistry**

Fall 2013

## **Course Instructor:**

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**Course Prerequisites:** CHM 212 and 218

**Lectures:** S-473, Tuesday & Thursday 12:30-1:20 pm

**Textbook:** Quantitative Chemical Analysis, 8<sup>th</sup> edition, by Daniel C. Harris

**ACS Academic Lab Safety Guide:**

[http://portal.acs.org/portal/PublicWebSite/about/governance/committees/chemicalsafety/publications/WPCP\\_012294](http://portal.acs.org/portal/PublicWebSite/about/governance/committees/chemicalsafety/publications/WPCP_012294)

**Labs:** S-492, Tuesday & Thursday 1:30-3:15 pm

**Lab Requirements:** Lab goggles and a bound laboratory notebook

## **Course Description:**

Introduction to the basic principles of Analytical Chemistry including traditional wet methods and contemporary instrumental methods of chemical analysis.

## **Course Objectives:**

1. To learn how to analyze results through statistical methods.
2. To learn chemical equilibrium, titrations, and basic knowledge of electrochemistry.
3. To develop wet laboratory techniques essential for high precision experimentation.
4. To acquire the ability to operate advanced instrumentation and to interpret results through modern theory.

**Grading:** Homework 20%, Quizzes 15%, Labs 40%, and Final Exam 25%

Grading Scale: A 90-100 B 80-89 C 70-79 D 60-69 F < 60

## **Attendance:**

Attendance for this class is not mandatory. Absences from quizzes and laboratories can only be made-up if the absence falls within one of the categories outlined in the undergraduate catalog. To make-up a quiz or lab, you will need to follow the process for securing an excused absence. All excused absences must be obtained as soon as possible.

## **Course Policies:**

1. Homework and lab reports will not be accepted after their due dates.
2. Graphing calculators, calculators with alphanumeric programming, and calculators on cell phones, PDAs, etc. cannot be used during quizzes/exams. Likewise, sharing of calculators during quizzes/exams is prohibited.
3. During quizzes/exams, all materials necessary will be provided to you except a pencil and calculator. You may NOT use your own paper, etc.
4. Please turn off cell phones during class, failure to do so may result in dismissal from lecture.

- Students with disabilities who require special accommodations will be made.  
[www.marshall.edu/disabled](http://www.marshall.edu/disabled).
- Academic dishonesty will be dealt with as outlined in the undergraduate catalog.

### **Tentative Schedule:**

	Tuesday	Thursday
Week 1 8-27, 8-29	Chapter 0,1,2 HW Lab: Balance (check in)	Chapter 3,4 HW Lab: Volumetric Tech
Week 2 9-3, 9-5	Chapter 4 HW Lab: Grav. Cl	Chapter 26 HW Lab: Grav. Cl
Week 3 9-10, 9-12	Chapter 26 Quiz Lab: Grav. Cl	Chapter 5,6 HW Lab: Stand. NaOH
Week 4 9-17, 9-19	Chapter 6,7 HW Lab: % KHP	Chapter 7 Quiz Lab: Stand. HCl, Soda Ash
Week 5 9-24, 9-26	Chapter 8 HW Lab: Soda Ash Unknown	Chapter 9 HW Lab: pH Meter
Week 6 10-1, 10-3	Chapter 10 HW Lab: Titration Curve	Chapter 11 Quiz Lab: Unknown Acid
Week 7 10-8, 10-10	Chapter 13,15 HW Lab: Redox %Fe Known	Chapter 13,14 HW Lab: Redox %Fe Unknown
Week 8 10-15, 10-17	Chapter 14 Quiz Lab: [Cl <sup>-</sup> ] and the Nernst Equ.	Chapter 17,18 Intro. Spectroscopy HW <i>No Lab</i>
Week 9 10-22, 10-24	Chapter 17,18,19 Beer's Law HW Lab: UV/Vis	Chapter 17,19 Vibrational Spec. HW Lab: UV/Vis
Week 10 10-29, 10-31	Chapter 17 Luminescence Quiz Lab: IR	Chapter 20 HW Lab: IR
Week 11 11-5, 11-7	NMR Spectroscopy HW Lab: Fluorescence	Chapter 21 Quiz Lab: Fluorescence
Week 12 11-12, 11-14	Chapter 22 HW Lab: Paper Chromatography (check out)	Chapter 23 HW Lab: GC
Week 13 11-19, 11-21	Chapter 24 Quiz Lab: GC	Chapter 24 HW Lab: HPLC
Week 14 11-26, 11-28	<i>Thanksgiving/Fall Break</i>	<i>Thanksgiving/Fall Break</i>
Week 15 12-3, 12-5	Chapter 25 HW Lab: HPLC	Review Quiz
Week 16 12-10	Final Exam, 12:45 - 2:45	

### **Suggested Activities for Success:**

- Read the suggested material from the textbook before and after each lecture.
- Try to work through every homework problem no matter how difficult.
- Always attend class and take good notes.
- Seek help from others, some possibilities:
  - Take advantage of office hours.
  - Work in small groups on studying for quizzes and the final.
- Exercise regularly and maintain a healthy diet.