

**Instrumental Analysis—Chemistry 462**  
Spring Quarter, 2012

**Instructors:**

**Lecture:** Dr. Scott Nicolaisen                      Office hours: M,W: 11:30 a.m. – 1:00 p.m.  
                  ASCB 122A    Th: 12:00 – 1:00 p.m.  
                  (323) 343-2382  
                  snickol@calstatela.edu

**Lab:** Dr. Feimeng Zhou                      Office hours: TBA  
                  ASCB 122D  
                  (323) 343-2390  
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**Textbook:** Skoog & Leary: *Principles of Instrumental Analysis, 6th Edition* (5<sup>th</sup> edition is fine, and you can find it much cheaper online—a quick search found a used copy for \$6.99)

**Lab Manual:** Feimeng Zhou: *Laboratory Manual for Instrumental Analysis*, Available at Student Bookmart.

**Lecture:** T,Th: 9:50 – 11:05 a.m., FA 347

**Laboratory:** M,W: 1:30 – 5:45 p.m., BS 331

**Course Outline**

This course is designed to provide the theoretical and practical basis for the application of modern experimental techniques in chemical instrumentation. Lectures will concentrate on the theoretical background of many instrumental techniques and their applications, while laboratories will provide the opportunity to learn the practical aspect of the instrumental techniques.

The following subjects will be discussed in the lecture portion of the course:

- Electronics, Signal and Noise, and Error Analysis                      Chaps. 2 – 5
- Optical Instrumentation and Molecular Spectroscopy                      Chaps. 6 – 7, 13 – 15
- Atomic Absorption/Flame Emission Spectroscopy                      Chaps. 9, 10
- Automated Methods of Analysis (mainly flow injection analysis)                      Chap. 33
- Chromatography                      Chaps. 26 – 28
- Mass Spectrometry                      Chaps. 11, 20
- Potentiometry & Voltametry                      Chaps. 22, 23, 25
- Surface Characterization Techniques (if time allows)                      Chapter 21

**Exams and Homework Assignments**

Two mid-term exams and a final exam, each worth 150 points, will be given on the following dates:

Exam #1      4<sup>th</sup> week of class  
Exam #2      7<sup>th</sup> week of class  
Final Exam    Thursday, June 14<sup>th</sup>, 2011: 8:00 – 10:30 a.m.

Exams will cover only material presented in class since the previous exams. The final will not be comprehensive.

### **Problem Sets**

Five problem sets will be included in your final point total. Each set will be worth 15 points. The problem numbers and due dates will be given during lectures. (Hint—the timely completion of your homework will not only keep you from being penalized for late work, but will also be extremely helpful in preparing for exams.)

Problem set #1 Appendix 1: 6, 18, 20, 22, 24  
Chapter 5: 7, 8, 10, 13  
Chapter 6: 3, 14, 15, 18, 19  
Chapter 7: 9, 12, 13, 18, 19

Problem set #2 Chapter 8: 6, 7, 9  
Chapter 9: 3, 14, 20, 22  
Chapter 10: 2, 9

Problem set #3 Chapter 20: 2, 5, 6, 7, 10

Problem set #4 Chapter 26: 9, 12-15, 16-19  
Chapter 27: 7, 13, 16, 20, 21, 22  
Chapter 28: 4, 7, 13, 14

Problem set #5 Chapter 22: 5, 7, 10  
Chapter 23: 9, 11, 14, 16, 21  
Chapter 25: 4, 6, 10, 12

### **Grading**

Laboratory reports (7 @ 40 points each)	280
Home work (5 @ 15 points each)	75
Exams (150 points each)	<u>450</u>
Total possible points	805

The approximate grading scale is (+/- grading will be used):

A : 85% - 100%  
B : 70% - 85%  
C : 60% - 70%  
D : 50% - 60%  
F : < 50%