CHM 311
Instrumental Analysis
Lecture Syllabus
Fall 2015

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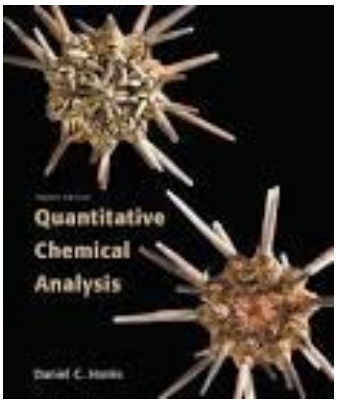
Office Hours: Mon.,Wed & Fri. 10-11 am.
Mon. 2-4 pm., and other times
by appointment.

Lecture:MWF 9:00 – 9:50



The aim of the course is to introduce you to the main methods of instrumental analysis. You will gain an understanding of the chemical principles behind the instrumental techniques, a working knowledge of instrument operation, and cognizance of the applications of instrumental analysis. Given the rapid growth in the type and complexity of chemical instrumentation, it would be difficult to cover every technique available. However, this course should provide you with the fundamental background on the workings of many important types of instruments that you will likely encounter in the future, including absorption and emission spectroscopy, electrochemical techniques, and chromatographic separation.

REQUIRED TEXT

Harris, Daniel C., *Quantitative Chemical Analysis*, 8th edition (W.H. Freeman, 2010)
ISBN 1-4292-1815-0.

This text is somewhat unconventional for an instrumental course. You will recognize it as last year's Analytical book. You might recall that during the Analytical course we actually covered less than half of the material contained in this text, the reason being that the second half of the book deals with instrumental techniques. Therefore, it seems reasonable to use what remains for an Instrumental course.

ATTENDANCE

The volume of material to be considered is large and of a cumulative nature. Therefore, it is important that you attend all scheduled class meetings. Please contact your instructor immediately if you know you will miss a lecture or especially a laboratory.

EXAMINATIONS AND COURSE GRADE

Your overall grade will be determined by computing your numerical grade according to the following:

3 Exams (12 % each)	**36%**
Final Comprehensive Exam	**15%**
Weekly Quizzes	**10%**
Talk(s)	**9%**
Laboratory	**30%**

Homework problems will be selected from the end-of-chapter problems that appear in the text. Each examination will be announced at least one week before it is given. Examination questions will be drawn from lecture material, assigned readings, homework problems, and material covered in the laboratory. The final examination will be given during Final Examination Week and will be comprehensive.

Short talks on various techniques/ instrument components will periodically be assigned.

LABORATORY

A very important aspect of this course is the laboratory work. You will use many of the instruments discussed during class. You will work in groups of 2-3 depending on the class size. The first lab covering basic electronics will be performed during the second week of class. Subsequently, each group will carry out a different experiment in a given week due to the large student-to-instrument ratio. You are expected to read the appropriate background material in preparation for the laboratory before coming to class. The laboratory grade will be 30% of your final grade.

In order to pass the course, you must receive a passing grade in both the lecture and laboratory parts of the course.

The final course grade will be based on the grading scale given below:

A 90% B 80% C 70% D 60%

For final grades, The +/- system is used (B+, A-, etc.) and breaks between half letter grades will be within the above grade ranges and made at the discretion of the instructor. The last day to withdraw with a "W" is November 6.

CHEATING WILL NOT BE TOLERATED IN ANY FORM! Please read the La Salle University Academic Integrity Policy.

TENTATIVE LECTURE SCHEDULE

Week	Chapters & Topics	
1-3	Ch 5	Calibration Methods Method Validation Standard Addition Method
	Ch. 18	Fundamentals of Spectrophotometry Properties of light and it's interactions with matter Beer's Laws What Happens When a Molecule Absorbs Light? Luminescence
4	Ch. 19	Applications of Spectrophotometry Analysis of mixtures Measuring the Equilibrium Constant
Examination I		
5-6	Ch. 20	Spectrophotometers Components Dealing with Noise FT Infrared Spectroscopy
7	Ch. 21	Atomic Spectrophotometry Atomization Flame Temperature Instrumentation Interference
Examination II		
8	Ch. 22	Mass Spectrometry Instrumentation Interpretation of results
9-10	Ch. 23	Introduction to Separation Methods Theory of chromatography processes Plate and Rate Theory
11	Ch. 24	Gas Chromatography Injection Detectors
Examination III		
12	Ch. 25	High-Performance Liquid Chromatography Introduction Elution methods Injection and Detection Reverse Phase and Gradient Elution
13	Ch 17	Magnetic Resonance Nuclear and Electron Magnetic Resonance Spectroscopy
14		Catch- Up week
15		Final Examination

STUDENTS WITH DISABILITIES: Students with disabilities should refer to the student handbook for resources that are available to them as well as compliance with the American Disabilities Act.