

CHM 321 Quantitative Analysis

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Class time: TTh 12:15-1:30 in ACAT 304

Office hours: M 1:00-3:00, TTh 9:15-10:45, and by appointment



Text: Harris, Daniel; Quantitative Chemical Analysis, 7th ed., W.H. Freeman, New York, 2007

Course Description: This course is the study of analytical chemistry and will emphasize gravimetric and volumetric techniques as well as emphasize rudimentary spectroscopy and electrochemistry. The course includes a three hour lecture per week that will capitalize on, and extend knowledge gained from, CHM 111 and 112.

A note about lab: CHM 321L is a separate course and a separate credit. You may be enrolled in the lecture and lab concomitantly, or take just the lecture, but you cannot be in the lab if you are not in, or have not taken, this lecture. If you are enrolled in the lab and drop the lecture midsemester, it is up to the discretion of the instructor as to whether you may stay enrolled in the lab.

Course Objectives: By the end of this course the successful student will be able to

- define and use terms relevant to analytical chemistry
- calculate, apply statistical methods, and integrate error analysis when appropriate
- survey and apply principles of gravimetric determinations to complex samples
- select appropriate volumetric techniques for complex samples
- identify components of a spectrophotometer
- explain basic concepts of spectroscopy and electrochemistry
- appreciate the role of quantitative analysis in the field of chemistry and the world at large

Attendance: There is no grade for attendance, however **IF** you miss a lecture (a highly discouraged act), YOU are responsible for all lecture notes, assignments, and graded work. Attendance for exams is mandatory. If you miss one exam, your final exam grade will count in place of the missed exam. If you miss additional exams, you will receive zeros for those exam grades.

Quizzes: Occasionally, during lecture, there may be short quizzes at the beginning of a lecture. Each missed quiz will be counted as a zero. There is no makeup for a missed quiz. If you are on a sports or academic team and will have to miss a class, it is your responsibility to make arrangements with me BEFORE class to take the quiz.

Grades: Points will be distributed as follows:

Major Exams (3)	50%
Cumulative Final Exam	20%
Homework, Quizzes	30%

The grading scale is as follows:

A	90-100
B+/B	87-89/80-86
C+/C	77-79/70-76
D+/D	67-69/60-66
F	≤59

Students who admit responsibility or who are found responsible through the Student Code of Conduct will receive the appropriate grade determined by the professor, which may include an X to signify academic dishonesty. Grades with an X are not subject to grade forgiveness.

Students with disabilities: In keeping with University policy, any student with a disability who requests academic accommodations should contact Disability Services at 503-5199 to arrange a confidential appointment with the Disability Services Coordinator. Students are encouraged to seek an appointment as early in the semester as possible, as accommodations are not provided retroactively. Letters of accommodation must be signed and printed on letterhead from the Disability Services office. It is the student's responsibility to provide these letters to professors in a timely manner so that accommodations may be put in place.

Students with disabilities should notify me of special needs during the first day of class.

Important University-wide Dates:

January 11 (Monday)—Classes Start
January 18 (Monday)—Martin Luther King, Jr. Day (no classes)
March 8-12 (Monday-Friday)—Spring Break (no classes)
March 29 (Monday)—Last day to withdraw from class without academic penalty
April 26 (Monday)—Last day of classes (classes ARE held)
Final Exam Schedule: April 27 (Tuesday) 11:30-2:30 **The Final Exam is cumulative.**

Homework: Just as homework was the bedrock of learning material in general and organic chemistry, you will have to do the homework in order to succeed in this class. Below are suggested homework problems from the textbook. Note that answers are given in the back of the book and the answer manual is available for sale in the bookstore.

Because answers are available, these questions will not be collected for a grade, but other questions, to be assigned as the semester progresses, **will** count for a grade.

Note that the chapters are not covered in numerical order (chapters out of order are *italicized*):

Chapter 0: 1, 3, 6

Chapter 1: Exercises A, B, C, Problems: 2-3, 5, 7-9, 11-15, 17-24, 26, 28-35

Chapter 3: Exercises A, B, C, Problems: 1-3, 5-19, 21

Chapter 4: Exercises A, B, C, F, Problems: 1-2, 3ab, 4, 8, 11-16, 18, 20-22, 29, 32, 33-35

Chapter 27: Exercises: A, B, C, Problems: 1-8, 10-22, 24-26

Chapter 6: Exercises: A, C, D, E, F, H, I, J, K, Problems: 4-8, 14-17, 19-23, 25, 27, 29-31, 33-40, 42, 44-51, 53

Chapter 7: Exercises: A, B, C, D, E, Problems: 2, 4-5, 7-16, 18

Chapter 8: Exercises: A, B, C, D, E, F, Problems: 1-4, 6a, 9-14, 17, 19, 22, 23, 25-28

Chapter 9: Exercises: A, B, C, D, F, G, H, I, J, Problems: 1-9, 11-14, 16, 18-24, 26-28

Chapter 10: Exercises: A, B, C, D, E, F, Problems: 2-7, 11-13, 15-18, 20, 22-25

Chapter 11: Exercises: A, B, C, D, E, F, G, I & Problems 1-4, 6-10, 12-15, 17-19, 23-31, 36-37, 39-46, 48-51, 53-54

Chapter 12: Exercises: A, B & Problems: 1, 13-14, 24-37

Chapter 18: Exercises: A, B, C, D, Problems: 1-12, 16-19, 21

Chapter 20: Exercises: A, B, Problems: 1-3, 6, 10, 11

Chapter 14: Exercises: A, B, C, D, E, f, G, H, I, Problems: 1-3, 5-6, 8-10, 12-16, 17abc, 19, 21-22, 24-26, 28-30, 35, 37-38, 41

Chapter 15: Problems: 1-7, 13-16, 21-24, 29

Disclaimer: This is a tentative syllabus and the instructor reserves the right to make adjustments as necessary.

Tentative Schedule

(will be modified as needed)

Tuesday	Thursday
January 12 Review	January 14 Chapter 0
January 19 Chapter 1 & 3	January 21 Chapter 3
January 26 Chapter 4	January 28 Chapter 4 & 27
February 2 Chapter 27	February 4 Chapter 27
February 9 Chapter 6	February 11 Chapter 6
February 16 Chapter 6	February 18 Exam #1 Ch 0, 1, 3, 4, 6, 27
February 23 Chapter 7	February 25 Chapter 7 & 8
March 2 Chapter 8	March 4 Chapter 9
March 9 <i>Spring Break</i>	March 11 <i>Spring Break</i>
March 16 Chapter 9	March 18 Chapter 10
March 23 Chapter 11	March 25 Exam #2 Ch 6-10
<i>Last Day to Withdraw is Monday March 29</i>	
March 30 Chapter 12	April 1 Chapter 12
April 6 Chapter 18	April 8 Chapter 18
April 13 Chapter 18 & 20	April 15 Exam #3 Ch 11, 12, 18
April 20 Chapter 14	April 22 Chapter 14 & 15
April 27 Cumulative Final Exam 11:30-2:30	April 29 Study!! Study!! Study!!

- Note that the order in which the material is covered is significantly different from the book. In general, we will cover gravimetric analysis, volumetric analysis, spectrophotometric analysis, then electrochemical analysis.
- Chapter 2 will be assigned for the lab portion of the course.