

Honors Chem II CHM 250 Spring 2009

Instructor: Prof. Christopher T. Culbertson

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Course webpage: https://online.ksu.edu/CHM_250

LECTURE: MWF 9:30-10:20 AM, King 209

OFFICE HOURS: MWF 10:30-11:30 AM, or by appointment

RECITATION SESSIONS: Thursday 9:30-10:20 AM, King 209

COURSE TEXTS:

Chemistry, Raymond Chang, 9th ed. © 2007

Quantitative Chemical Analysis, Daniel C. Harris 7th ed. © 2007

Lab Manuals are online on the lab webpage.

OTHER REQUIRED ITEMS:

Scientific Calculator

iClicker

COURSE GRADING:

ONLINE PROBLEM SETS	150 points
EXAMS (4 50 min. exams)	400 points
Final Exam	150 points
In-class participation	200 points
Laboratory	300 points
TOTAL	1200 points

FREE TUTORING:

Free tutoring is available in Leasure Hall-201, or by phone 532-5703.

CHEMISTRY HELP ROOM:

One-on-one help is available in ChemBioChem-212, during the posted hours.

EXAM SCHEDULE:

Exam 1	In-class 12 February
Exam 2	In-class 9 March
Exam 3	In-class 9 April
Exam 4	In-class 30 April
Final Exam	In-class 15 May, (Friday) 11:50-1:40 PM

EXAM POLICY:

Exams must be taken on the announced date and at the scheduled time. Exceptions will only be made for real emergencies and then only at the discretion of the instructor.

HOMEWORK POLICY:

Problem sets must be submitted on the due date. No exceptions. Start your homework as soon as it is assigned!

ATTENDANCE POLICY:

I will keep records of class attendance, and I expect you to attend each class. There is a strong correlation between good grades and class attendance. You are responsible for all material and all announcements presented in class whether you are present or not. If you miss a class it is your responsibility to get the notes from another student in the class.

If you are sick with an infectious disease and are still contagious do not come to class; this is not fair to me, my family or the other students in class. Go instead to student health for treatment. You can arrange to make the class(es) up with the instructor after you are well.

WITHDRAWAL POLICY:

February 4th is the last day to withdrawal with 100% refund. February 19th is the last day to withdrawal without obtaining a W. March 23rd is the last day to drop the course.

UNIVERSITY HONOR SYSTEM

Kansas State University has an Honor System based on personal integrity, which is presumed to be sufficient assurance in academic matters one's work is performed honestly and without unauthorized assistance. **Undergraduate and graduate students, by registration, acknowledge the jurisdiction of the Honor System.** The policies and procedures of the Honor System apply to all full and part-time students enrolled in undergraduate and graduate courses on-campus, off-campus, and via distance learning. The honor system website can be reach via the following URL: www.ksu.edu/honor.

A component vital to the Honor System is the inclusion of the Honor Pledge that applies to all assignments, examinations, or other course work undertaken by students. The Honor Pledge is implied, whether or not it is stated: "**On my honor, as a student, I have neither given nor received unauthorized aid on this academic work.**" A grade of XF can result from a breach of academic honesty. The F indicates failure in the course; the X indicates the reason is an Honor Pledge violation.

Unless explicitly stated by the instructor, all assignments given should be performed individually.

ACADEMIC ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES

Any student with a disability that needs a classroom accommodation, access to technology or other assistance in this course should contact Disability Support Services and/or their instructor.

EXPECTATIONS FOR CLASSROOM CONDUCT

All student activities in the University, including this course, are governed by the Student Judicial Conduct Code as outlined in the Student Government Association By Laws, Article VI, Section 3, number 2. Students that engage in behavior that disrupts the learning environment may be asked to leave the class.

SYLLABUS CAMPUS SAFETY STATEMENT 08-14-08

Kansas State University is committed to providing a safe teaching and learning environment for student and faculty members. In order to enhance your safety in the unlikely case of a campus emergency make sure that you know where and how to quickly exit your classroom and how to follow any emergency directives. To view additional campus emergency information go to the University's main page, www.k-state.edu, and click on the Emergency Information button.

COURSE OBJECTIVES

At the end of this course the student will have learned and/or be able to understand the following:

1. Be able to use and manipulate SI units and prefixes
2. Prepare solutions of a given molarity, molality, ppm, or %
3. Understand the concept of significant figures and error propagation
4. Know what a Gaussian distribution is and how it arises
5. Understand and be able to calculate averages, standard deviations, relative standard deviations and confidence intervals
6. Be able to correctly use F, t, and Q tests
7. Be able to generate calibration curves
8. Understand how methods are validated
9. Understand how to perform standard additions and use internal standards
10. Understand chemical equilibria and its relationship to thermodynamics
11. Understand solubility products and complex formation
12. Understand protic acids, pH, and acid and base strength
13. Be able to perform a titration and use the titration to calculate the concentration of an unknown
14. Be able to effectively choose an appropriate end point detector
15. Understand the effect of ionic strength on solubility
16. Understand the difference between concentration and activity
17. Understand acid-base equilibria
18. Understand how buffers work and what buffering is
19. Understand polyprotic acids and bases

20. Be able to use the Henderson-Hasselbalch equation correctly and understand how it is derived
21. Be able to perform an acid base titration
22. Understand both Galvanic and Electrolytic cells, standard potentials, the Nernst equation, and the relationship between standard potentials and the equilibrium constant
23. Understand the parts of an electrochemical analyzer – reference electrode, working electrode and counter electrode
24. Understand what a junction potential is and how a pH electrode works
25. Understand ion-selective electrodes
26. Understand how coulometry, amperometry and voltammetry work
27. Understand how acid rain is generated and the ozone hole is formed
28. Know Beer's Law and how to use it
29. Know the basic components of a spectrometer
30. Understand the basics of atomic spectroscopy
31. Understand what chromatography is and how bands are separated and how and why they broaden as they move through a column
32. Understand what mobile and stationary phases are and how analytes partition between them
33. Understand the basic components of a gas chromatograph and a liquid chromatograph
34. Understand the basic forms of liquid chromatography – partition, adsorption, size exclusion, ion-exchange, and affinity
35. Understand how to prepare a sample correctly for analysis

CHM 250 – Spring 2009 Tentative Lecture Outline

Week	Date	Lecture Topic	Chap. (QCA)	Chap.(Chang)
1	16-Jan	Introduction/SI Units and algebra	0	
2	19-Jan	MLK Holiday		
	21-Jan	SI Units	1	1, 4.5, 12.3
	22-Jan	Experimental error	3	
	23-Jan	Experimental error	3	
3	26-Jan	Statistical Methods	4	
	28-Jan	Calibration	5	
	29-Jan	Calibration	5	
	30-Jan	Intro. To Chem. Equil.	6	
4	2-Feb	Intro. To Chem. Equil.	7	
	4-Feb	Intro to Titrations	7	
	5-Feb			
	6-Feb	Chemical Equil.	8	
5	9-Feb	Chemical Equil.	8	
	11-Feb	Catch-up/review		
	12-Feb	Exam I		
	13-Feb	Monoprotic Acid/base equilibria	9	
6	16-Feb	Monoprotic Acid/base equilibria	9	
	18-Feb	Monoprotic Acid/base equilibria	9	
	19-Feb			

	20-Feb	Polyprotic acid base equilibria	10	
7	23-Feb	Polyprotic acid base equilibria	10	
	25-Feb	Acid/base titrations	11	
	26-Feb	Acid/base titrations	11	
	27-Feb	Acid Rain		17.1; 17.6
8	2-Mar	Transition Metals		22
	4-Mar	Transition Metals		22
	5-Mar	Nuclear Chemistry		23
	6-Mar	Catch-up/review		
9	9-Mar	Exam II		
	11-Mar	NO CLASS		
	12-Mar			
	13-Mar	Nuclear Chemistry		23
	16-20 Mar	Spring Break		
10	23-Mar	Intro. To Electrochemistry	14	
	25-Mar	Intro. To Electrochemistry	14	
	26-Mar			
	27-Mar	Electrodes and Potentiometry	15	
11	30-Mar	Electrodes and Potentiometry	15	
	1-Apr	Electroanalytical Techniques	17	
	2-Apr			
	3-Apr	Fundamentals of Spectroscopy	18	
12	6-Apr	Applications of Spectroscopy	19	
	8-Apr	Catch-up/review		
	9-Apr	Exam III		
	10-Apr	Appl. Of Spectrophotometry/The Ozone Hole	19	Ch. 17.1-17.3
13	13-Apr	Spectrophotometers	20	
	15-Apr	Atomic Spectroscopy	21	
	16-Apr			
	17-Apr	Atomic Spectroscopy	21/22	
14	20-Apr	Mass Spectroscopy	22	
	22-Apr	Introduction to Analytical Separations	23	
	23-Apr			
	24-Apr	Gas Chromatography	23/24	
15	27-Apr	Gas Chromatography	24	
	29-Apr	Catch-up/review		
	30-Apr	Exam IV		
	1-May	HPLC	25	
16	4-May	HPLC	25/26	
	6-May	Chromatographic Methods	26	
	7-May	Final Review		
	8-May	Sample Preparation	28	
Final	15-May	Final Examination (11:50 - 1:40 PM) Comprehensive		