

Quantitative Analysis Labs (1 semester hour credit)

Section 01 Wednesday 1:00 – 4:50 36-308

Section 02 Monday 1:00 – 4:50 36-308

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Office Hours: 10:00 am to 12:00 pm MWF and by appointment

Class Hours: Students must attend all scheduled four-hour laboratory periods. They are responsible for any material covered or announcements made in their absence. Students will not be allowed to work at any time other than their own scheduled lab period.

Course Description: Theory and techniques of chemical analysis including evaluation of data, titrimetric, potentiometric, and spectrophotometric methods will be explored. Corequisite: CHEM 3210. Prerequisites: CHEM 1010/1011L and 1020/1021L.

Course Objectives: 1) to develop proficiency in the techniques by which various chemical substances are analyzed quantitatively, such that the analyses will be both accurate and precise; 2) to know and understand the chemical reactions and the physical principles underlying the analyses; 3) to become familiar with and proficient in the use of the instruments and apparatus employed in such analyses; 4) to become organized and efficient in carrying out the analyses, and 5) to learn to work safely in the laboratory.

Reference Texts:

*Analytical Chemistry*, Gary Christian, 6<sup>th</sup> ed., John Wiley & Sons, Inc., Hoboken, NJ, 2003.  
*Quantitative Chemical Analysis*, Dan Harris, 7<sup>th</sup> ed., Freeman and Company, Inc., New York, NY, 2007.

Lab Manual: *Quantitative Analysis Laboratory Manual*, Cheryl L. Klein Stevens, Sr. Joanne Bauer, and Linda R. Allen, Spring 2009 edition.

Materials Required: safety goggles, lab coat, towel, and laboratory notebook

Course Requirements: **All scheduled lab Experiments are to be completed. Any student who fails to complete the Experiments and submit the required reports will receive an automatic grade of F for the course. There will be no exceptions to this requirement.**

Course Evaluation:

1. *Lab Reports* consist of the completed report form and a typed discussion. The report form will be given to you to fill in when you complete the Experiment. The discussion should discuss in concise, well-developed paragraphs the results of the Experiment, the accuracy and precision of the Experimental results, the possible errors and/or limitations of the procedure, and how these may have affected the results. The discussion must be typed. Guidelines are found in the lab manual.

2. Reports are due at the beginning of the next lab period following the completion of the Experiment. **Reports submitted late will receive penalties of 5 points per day. Reports will not be accepted more than one week late.** There will be no exceptions.
3. *Quizzes* will be given at the beginning of the lab period. These quizzes will generally be based on: 1) the lab Experiment just completed; 2) the lab Experiment just begun; and 3) any other relevant or assigned material. Study questions for the Experiments and the quizzes are found in the lab manual. A student who comes late on days when a quiz is scheduled will forfeit the time missed due to his/her tardiness.
4. *Lab Notebook* consists of a permanently bound book with title, date, and objective. The notebook must be brought to the lab each period.
5. All data *must* be recorded directly in the lab notebook in ink. Calculations are to be done on the left side of the page, opposite the data. The results of the calculations should be *summarized* neatly for future reference. All information and calculations are kept in the notebook and not scattered on notebook paper. At the end of each lab period, the data page *must* be initialed by your instructor and the tear-out carbon copy submitted.
6. The notebook will be turned in at the Final Exam and graded.
7. *Lab Technique and Deportment* includes cooperation in clean-up duties, observation of safety rules, overall lab techniques and behavior in the lab. Violations may result in 5 or 10 point penalties, and repeated violations may result in ejection from the lab or F in the course.
8. The *Final Exam* is a comprehensive, written exam.
9. *Cheating* is copying data and/or calculations, copying on quizzes, sharing solutions or lab duties. All parties involved will receive a zero for the Experiment. Multiple violations will result in an F and possible disciplinary action by the University.

11. <i>Grade:</i>	8 Lab Reports (75 points each)	675	A	90-100%
	7 quizzes (25 points each)	175	B	75-89%
	lab notebook	50	C	60-74%
	technique & deportment	50	D	50-59%
	<u>final exam</u>	<u>100</u>	F	0-49%
	<b>TOTAL POSSIBLE POINTS</b>	<b>975 points</b>		

## Spring 2010 Lab Schedule

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<b>Date</b>	<b>Experiment</b>	<b>Quiz</b>	<b>Work Due</b>
Jan M11-W13	Introduction and Lab Check In Exp 1: Candy Statistics		
Jan M25-W27	Excel Statistical Analysis		
Feb M1-W3	Exp 2: Calibration of a 25 mL Buret and 10 mL Pipet Solution Preparation for Exp 3	Quiz 1	Report 1
Feb M8-W10	Exp 3: Standardization of NaOH		
Feb 15-17	No class - Mardi Gras		
Feb M22-W24	Exp 3: Determination of %KHP in an Unknown Sample	Quiz 2	Report 2
Mar M1-W3	Exp 4: Potentiometric Titration of a Weak Acid		
Mar M8-W10	Prep of Solutions for Exp 5 & 6	Quiz 3	Report 3 Notebook
Mar M15-W17	Exp 5: Iodometric Titration of Vitamin C	Quiz 4	Report 4
Mar W24	Exp 6: EDTA Titration for Water Hardness	Quiz 5	Report 5
Mar 29-31	No class - Spring Break		
Apr M5	Exp 6: EDTA Titration for Water Hardness	Quiz 5	Report 5
Apr W7-M12	Exp 7: Spectrophotometric Determination of Fe	Quiz 6	Report 6
Apr W14-M19	Exp 8: Gas Chromatography	Quiz 7	Report 7
Apr W21-M26	Lab Check Out & Final Exam		Report 8 Notebook