

Chem 112 Lab, General Chemistry 2
Course Syllabus, Spring 2012

Instructor: Mr. Bob Bundy (sec 104 lab)

Office: Bradley 201A (Inside the lab on the north hall.)

Office hours: M-2:30-5:00, W-8:00-9:30, Th-9:30-10:30, F-8:00-9:30

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Lab: Th 11:00 – 2:00 pm (sec 104)

I. Course Description

General Chemistry II Lab is designed to supplement the curriculum covered in Chem 112 Lecture. Experiments will deal with the major principles discussed in class and will also include inorganic qualitative analysis. This course is primarily intended for students majoring in chemistry, biology, engineering, and pre-professional fields.

II. Goals and Learning Outcomes

The overall goal of Chem 112 Lab is to provide students with the knowledge and skills necessary to understand and solve chemistry related problems. Upon completion of this course, the student should specifically be able to:

1. Apply the theoretical ideas covered in lecture to practical situations in the laboratory.
2. Perform data collection and analysis in the laboratory and document experimental findings in a laboratory report.
3. Apply a logical process of problem solving based on existing knowledge of chemical reactions.
4. Express solution concentration in molarity, molality, and normality.
5. Relate colligative properties of solution to concentration.
6. Determine the rate law for a reaction using the method of initial rates.
7. Use an integrated rate law to determine concentration as a function of time.
8. Identify an appropriate reaction mechanism based on kinetic data.
9. Use equilibrium constant expressions to determine equilibrium solution concentration.

III. Textbooks, Readings, and Other Materials

1. Freeman, D. D. and Reger, D. L. *General Chemistry Laboratory Experience, Chemistry 111 & 112*, University of South Carolina, ISBN 0-7380-0823-0
2. Basic Scientific calculator, available at the USCL bookstore
3. Safety Goggles, available at the USCL bookstore

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IV. Overall Structure of the Course

A typical **lab session** will consist of:

- Roll Call
- Problem-Solving
- Pre-Lab Discussion
- Student run experiments

Lab handouts are provided in Blackboard for students to download and print prior to class and lab.

Course Requirements

You must attend lab to perform the lab experiments. If you miss more than two labs, your grade will drop one letter grade. The last day to withdraw from the course with a grade of “W” is February 27, 2012. If you withdraw after this date you will receive a grade of “WF”. If you stop attending without officially withdrawing, you will receive a grade of “F”.

Prior to coming to lab make sure that you have read the lab ahead of time, answered pre-lab questions, and have appropriate lab materials. The laboratory is an essential and required component of this course and a failing grade for the lab will automatically result in failure of the course.

Students are required to prepare for and actively participate in laboratory sessions each week.

Although you will work in groups of 2- 4 students, each student needs to take an active role in the experiments. Students who do not actively participate in the experiments will be warned and/or have points deducted from their grade for that experiment. Assigned lab reports must be submitted on time. Each student must submit an independent lab report for each experiment; group work is encouraged but must be reported as such.

Students will practice safety in the lab at all times. A safety orientation will be given and students will be required to complete a safety quiz before performing experiments in the lab. Students must bring their safety glasses each week and wear them in the lab. Students must also wear closed-toed shoes when performing experiments. Students wearing sandals or flip-flops will NOT be permitted to perform the experiment and will receive a grade of “0” for that lab. There is no eating, drinking, or smoking in the laboratory.

Students who have disabilities requiring special arrangements for class participation should notify the instructor of the need for such arrangements in advance.

You are expected to practice the highest possible standards of academic integrity. Any deviation from this expectation will result in a minimum academic penalty of your failing the assignment, and will result in additional disciplinary measures including referring you to the

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Office of Academic Integrity. Violations of the University's Honor Code include, but are not limited to improper citation of sources, using another student's work, and any other form of academic misrepresentation. For more information, see the Carolina Community Student Handbook at <http://www.sa.sc.edu/carolinacommunity/>.

Remember that the first tenet of the Carolinian Creed is, "I will practice personal and academic integrity."

V. Assessment and Grading

Your lab average is 20% of your final grade for Chem 112. The laboratory average will be computed as the mathematical average of all laboratory experiment grades, as described below. The final course average will be computed with the following weights assigned to each grade.

***Laboratory Average: Exp # 13 (40%), Exp #14 (20%), Exps #15, 16, 18, 19, 20 (40%)**

Test #1	16%
Test #2	16%
Test #3	16%
Comprehensive Final Exam	16%
Classroom Work and Homework	16%
Laboratory Average*	20%
Total	100%

Final grades will be assigned as follows:

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

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VI. Chem 112 Spring 2012 Course Outline / Course Schedule

<u>Day</u>	<u>DATE</u>	<u>CHAPTER</u>	<u>TOPIC</u>	<u>ASSIGNMENT DUE</u>
L 1	T, 1/10 Th, 1/12	Exp #1	Lab Safety Orientation	
3	M, 1/16		NO CLASS – MLK HOLIDAY	
L 2	T, 1/17 Th, 1/19	Exp #14	Molar Mass by Freezing Point Depression (handout) *Report*	Safety Certificate
L 3	T, 1/24 Th, 1/26	Exp #20	Determination of the Rate Law for a Reaction by the Initial Rate Method	Rough Draft – Exp #14 Lab Report
L 4	T, 1/31 Th, 2/2	Exp #13	Qualitative Inorganic Analysis –Cations Groups 1 and 2 (Unknown #1)	Final Draft – Exp #14 Lab Report
L 5	T, 2/7 Th, 2/9	Exp #13 (cont'd)	Qualitative Inorganic Analysis –Cations Groups 3 and 4 (Unknown #2)	
L 6	T, 2/14 Th, 2/16	Exp #13 (cont'd)	Qualitative Inorganic Analysis – Cations Groups 1, 2, 3, and 4 (General Unknown)	
L 7	T, 2/21 Th, 2/23	Exp #13 (cont'd)	Qualitative Inorganic Analysis – Anions (Anion #1 and #2)	
L 8	T, 2/28 Th, 3/1	Exp #13 (cont'd)	Qualitative Inorganic Analysis – Cations and Anions (Ionic Compound)	
L 9	T, 3/13 Th, 3/15	Exp #13 (cont'd)	Qualitative Inorganic Analysis – Cations and Anions (Ionic Compound) *Report*	
L 10	T, 3/20 Th, 3/22	Exp #15	Diprotic Acids – Identifying an Unknown by Titration	Rough Draft – Exp #13 Lab Report
L 11	T, 3/27 Th, 3/29	Exp #16	The Acid Ionization Constant (K_a) of Acetic Acid ($HC_2H_3O_2$)	Final Draft – Exp #13 Lab Report
L 12	T, 4/5 Th, 4/7	Exp #18	Identification of Metals by Measuring Potentials of Micro-Voltaic Cells	
L 13	T, 4/10 Th, 4/12	Exp #19	The Solvay Process – Preparation of Sodium Bicarbonate	
L 14	4/17, 4/19		No Labs	

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LABORATORY REPORT FORMAT

Note: Lab reports will be submitted through SafeAssign in BlackBoard. No hard copies will be accepted.

- **TITLE, NAME, DATE (5 points)**

These should be included on a single page in front of the report. The title should be centered on the page with your name below it, followed by partner names and the lab date.

- **ABSTRACT (15 points)**

In one paragraph, briefly state the purpose of the experiment, the experimental plan used, a summary of your findings, and major conclusions. Write the abstract LAST to be sure that it accurately reflects the content of your report.

- **INTRODUCTION (20 points)**

In two or three paragraphs, write a clear statement of the problem and the reason for studying it. Discuss appropriate background information, the significance of the project, and pertinent theoretical information (i.e. equations). Cite pertinent references with a superscripted number at the end of the sentence. Your references should include the lab manual and at least two other outside primary reference sources.

- **EXPERIMENTAL METHODS (20 points)**

In two or three paragraphs, identify the materials (chemicals and equipment) used in your experiment and note any hazards and precautionary handling procedures involved. Describe the experimental procedures and steps taken and note any relevant changes or problems with the procedure.

- **RESULTS AND DISCUSSION (25 points)**

In three or four paragraphs, summarize and interpret your results. Point out features and limitations of the work. Relate your results to the original purpose of the experiment. State the logical implications of your results and suggest further study or applications of this work. Be sure to include proper headings for any figures or tables used (i.e. "Figure 1. Calibration Curve for Absorbance Measurements").

- **REFERENCES (15 POINTS)**

List all numbered references in the order they were cited in your report. Use the American Chemical Society (ACS) style guidelines:

<http://pubs.acs.org/userimages/ContentEditor/1246030496632/chapter14.pdf>.

Books

1. Beall, H.; Trimbur, J. *A Short Guide to Writing about Chemistry*, 2nd ed.; Longman: New York, 2001; pp 17-32.

Journal Articles

2. Labaree, D.C.; Reynolds, T.Y.; Hochberg, R.B. Estradiol-16 α -carboxylic Acid Esters as Locally Active Estrogens. *J. Med. Chem.* **2001**, *44*, 1802-1814.

Webpages

3. ThermoDex Home Page. <http://thermodex.lib.utexas.edu> (accessed July 2001)

VII. University of South Carolina Lancaster General Education Goals

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General education is the set of fundamental skills (reading, writing, reasoning, and oral communication), the knowledge, and the capacity for thought needed to pursue further learning, to succeed in chosen fields, and to assume the responsibilities of informed and enlightened citizenship.

From a broad commitment to equity, USC Lancaster:

- seeks to make education accessible, affordable, and convenient
- encourages teaching innovation and adaptation
- encourages participatory student learning
- provides a supportive educational climate that actively and positively
- addresses intellectual and cultural diversity, and
- responds affirmatively to the needs of its students

USC Lancaster works to help its pre-baccalaureate students attain skills and attributes in the areas of communication, critical thinking, cultural literacy, and personal development. Students in the two-year occupational programs focus on those areas most appropriate to their professional education program.

Communication Skills

USC Lancaster helps its students read effectively and attain a basic familiarity with the basic texts of Western and other cultures. In the area of writing skills, USC Lancaster students work to develop the ability to write effectively for both academic and professional audiences. In addition, USC Lancaster helps its students learn to listen critically and speak effectively before a group.

Critical Thinking

USC Lancaster helps its students acquire analytical reasoning abilities and exercise informed value judgments. USC Lancaster students also work to develop mathematical and/ or computational skills.

Cultural Literacy

USC Lancaster strives to give its students an understanding of the history and culture of Western civilization as well as provide some exposure to other cultures. USC Lancaster also recognizes the centrality of science and technology to modern culture; therefore, USC Lancaster students also are offered opportunities to increase their understanding and familiarity in these crucial subject areas.

Student Development

USC Lancaster supports the intellectual, personal, physical, and social development of students, in recognition of the critical interdependency of all these areas. By providing opportunities for productive interaction with students, faculty, and staff, USC Lancaster helps students develop a spirit of curiosity, integrity, and confidence in planning and pursuing academic, career, and personal goals.