

## Principles of Chemistry Laboratory II (CHM 218-203/204): Spring 2014

Course description: A laboratory course that demonstrates the application of concepts introduced in CHM 212.

Credit: 2.00 hours

Prerequisite or Corequisite: CHM 212

Instructor: Rosalynn Quiñones, Ph.D.; Science 496; 304-696-6731; [quinonesr@marshall.edu](mailto:quinonesr@marshall.edu)

Office hours: MTW 9-11am; or by appointment. I welcome drop-in visits, but cannot guarantee that I will be available to help you during non-office hours. Simple questions can be answered via email.

Required text: CHM 218 Laboratory Manual 2014-2015 Edition (Marshall University/Stadium Bookstores)

Other required items: chemical splash goggles, bound laboratory notebook, paper towels, lock

**Mandatory Safety Training:** Before 2:00 pm on Tuesday January 21, complete the Safety Training Course online: go to <http://www.marshall.edu/muonline/>. Students failing to complete this requirement (includes submitting the signed form which must be printed) will not be permitted to work in the lab.

### Safety

1. Read the laboratory safety rules (pp v-viii) and chemical disposal rules (p xi) in the lab manual. There will be questions concerning this on quizzes and exams.
2. Read and sign one copy of the Chemistry Laboratory Questionnaire and keep a second copy (the one in your manual) for reference. The questionnaire must be signed before check-in is permitted.
3. You are required to comply with all safety rules and all safety-related instructions at all times. Failure to do so is grounds for dismissal from the laboratory.
4. Safety goggles must be worn at all times. Wearing of contact lenses in lab is strongly discouraged. If contact lenses must be worn, a Contact Lens Waiver Form must be signed and given to the instructor.
5. Slacks or dresses cut below the knee are required. Substantial shoes with low heels covering the entire foot must be worn. Avoid very loose clothing or unnecessary items of clothing. Jewelry should be removed.
6. Know the locations of all safety equipment in the lab. You will be tested on this.
7. All injuries, no matter how trivial, must be reported to the instructor immediately. Any accident or near-miss will require a written report discussing how the incident might have been prevented.

**Calculators:** Those with alphanumeric and/or graphing capabilities are **not permitted** during quizzes or exams.

**Electronic Devices:** Cellular telephones and other electronic devices must be silenced during class. **This means from 2:00 pm until you have finished work and left the laboratory for the day.** The only use permitted is for keeping time.

**Course Performance:** Except in highly unusual circumstances, **no make-up of quizzes or experiments is permitted.** Missed quizzes or experiments are considered “lowest”. The lowest quiz and report scores will be dropped so that an unavoidable absence will not jeopardize one’s grade. Excused absences (for policy, see link on next page of syllabus) must be arranged in advance (if possible).

Computation of final numerical grade: Quizzes (~6-9) 15%, Mid-term Exam 20%, Final Exam 25%, Post-lab Write-ups and Experimental Results 20%, Laboratory Notebook 15%, Instructor Evaluation 5%

Answers to pre-lab questions are due at 2:00 pm the day of the experiment; evaluation will be part of the report, which is submitted a week later. **Do not attach pre-lab questions to reports submitted the same day.** Post-lab write-ups and experimental results (produced using a program such as Microsoft Word) are due at 2:00 pm the period following completion of the experiment. **Late reports are not accepted.** Printing is responsibility of the student: **reports submitted as email attachments will be disregarded.** The report format is as follows:

1. Name, date, course and section numbers, collaborators (if any).
  2. Title.
  3. Table of content- (numbered each page in lab report)
  4. Introduction – a short paragraph describing the experiment.
- Pre-lab Question-

Use complete sentences and number as in the manual. 5. Data – raw experimental data presented in the format used in the laboratory manual. 6. Calculations 7. Results and Discussion – graphs and processed data with some meaningful analysis of the results. 8. Post-lab Questions -Use complete sentences and number as in the manual 9. Summary - paragraph summarizing lab results and discussion (no more than 200 words)

Follow the guidelines for maintaining a laboratory notebook (manual, pp xii-xvi). Notebooks will be inspected at least twice. Be prepared to submit them at the end of any laboratory period.

Quizzes will occur during the first 10 minutes of the laboratory period. No extra time will be allowed if one is late. A quiz may cover any previous experiments as well as the experiment of the day.

### Conduct of the Course

1. Attendance is required. For the policy concerning excused absences and other pertinent University policies (academic dishonesty, inclement weather, disabilities) go to the Academic Affairs website ([www.marshall.edu/academic-affairs](http://www.marshall.edu/academic-affairs)) and click on the link to Marshall University Policies.
2. Pre-lab presentations (in S-473) are generally brief. Pertinent material from the CHM 211-212 textbook should be read in preparation for an experiment (and possible quiz). Consult MSDS (available online) or other source to learn about any chemical substance being used in an experiment. The lab period will not be extended for those who fail to prepare adequately in advance. This lab has been designed so that lecture and lab topics occur at roughly the same time, emphasizing the interplay between theory and experiment.
3. The bound notebook is for the immediate recording of all experimental operations and any observations made during the laboratory period. Use of pencil and felt-tip pens is forbidden: this is a permanent record written using ink that is not water-soluble.
4. Do not attempt laboratory work if fatigued, hungry, ill, or pregnant.
5. To avoid mishaps, be deliberate. Efficiency and productivity are best achieved without undue haste. Think before acting, and be mindful of classmates.

### **Schedule of Experiments**

<u>Experiment/Assignment</u>	<u>Performed</u>	<u>Report Due</u>
Lab Check-In, Safety Information	Jan 14	
#1-Introduction to Graphing	Jan 14	Jan 21
#3- Synthesis and Characterization of a Triboluminescent Compound	Jan 21	Jan 28
#4- Protein Extraction and Folding: Investigating Intermolecular Forces	Jan 28	Feb 4
#5- Kinetics of Decomposition of Hydrogen Peroxide	Feb 4	Feb 11
#6- Studying LeChâtelier's Principle	Feb 11	Feb 18
#7- Quantitative Analysis: How Accurate Can a Titration Get?	Feb 18	Feb 25
#9- Determination of Water Hardness	Feb 25	Mar 4
<b>Mid-Term Exam</b>	Mar 4	
#12- Gibbs Free Energy: Solubility and Spontaneity	Mar 11	Mar 25
#10-pH Dependence of Drug Absorption	Mar 25	Apr 1
#11-Qualitative Analysis: What Metal Ions Are in This Solution?	Apr 1, 8	Apr 15
#13-Isolation of Copper Metal from Malachite Beads	Apr 3, 10	Apr 17
#2-Beer's Law: Determining Mass % of Acetylsalicylic Acid in Aspirin	Apr 15	Apr 22
#14-Synthesis of a Coordination Compound	Apr 22	Apr 29
<b>Final Exam; Lab Check-Out</b>	April 29	

Learning Objectives (1) Learn basic laboratory skills. (2) Understand the connection between the laboratory experience and the principles and concepts studied in the lecture course. (3) Know the rules which must be followed to assure a safe laboratory environment and experience. (4) Know the location of all safety equipment in the laboratory room and be able to operate it if necessary. (5) Understand the concepts of accuracy, precision, significant figures, and experimental error.

ACS Academic Safety Guide link:

[http://portal.acs.org/portal/PublicWebSite/about/governance/committees/chemicalsafety/publications/WPCP\\_012294](http://portal.acs.org/portal/PublicWebSite/about/governance/committees/chemicalsafety/publications/WPCP_012294)

### **Academic Honesty**

The university policy will be enforced. See page 69 of the 2013-14 undergraduate catalog. Some examples of academic dishonesty include (but are not limited to) copying another student's assignment, lying about being ill on the day of a test, using a cell phone or other communication device during a test, quoting an author's writing (including material found on the internet) without giving due credit.

[http://muwww-new.marshall.edu/catalog/files/2013/07/UG\\_13-14\\_preliminarypublished\\_noplans.pdf](http://muwww-new.marshall.edu/catalog/files/2013/07/UG_13-14_preliminarypublished_noplans.pdf)

### **Incomplete Coursework**

The university policy will be enforced. See page 92 of the 2013-14 undergraduate catalog.

[http://muwww-new.marshall.edu/catalog/files/2013/07/UG\\_13-14\\_preliminarypublished\\_noplans.pdf](http://muwww-new.marshall.edu/catalog/files/2013/07/UG_13-14_preliminarypublished_noplans.pdf)

### *D/F Repeat Rule*

See page 87 of the 2013-14 undergraduate catalog.

[http://muwww-new.marshall.edu/catalog/files/2013/07/UG\\_13-14\\_preliminarypublished\\_noplans.pdf](http://muwww-new.marshall.edu/catalog/files/2013/07/UG_13-14_preliminarypublished_noplans.pdf)

### **Accommodations for Disabilities**

Students with disabilities must contact the Office of Disabled Student Services in Prichard Hall 117, phone 696-2271 to provide documentation of their disability to ensure proper accommodation. Please visit

<http://www.marshall.edu/disabled> for additional information.