

## Principles of Chemistry Laboratory II (CHM 218-207/208): Spring 2010

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

Credit: 2.00 hours

Prerequisite or Corequisite: CHM 212

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Office hours: MWF 8-9, 10-12; TR 12-2; or by appointment

Required text: Chem 218 Laboratory Packet (Marshall University Bookstore)

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

**Mandatory Safety Training:** Before 2:00 pm on Wednesday January 21, complete the Safety Training Course online: go to <http://www.marshall.edu/muonline/>. Students failing to complete this requirement (which 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 (p 3) and chemical disposal rules (p 4) 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 must be worn. Shoes covering the bridge of the foot and the toes must be worn. Avoid very loose clothing or unnecessary items of clothing. Rings 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.
8. Food and beverages are not permitted in the laboratory.

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 turned off during class. **This means from 2:00 pm until you have finished work and left the laboratory for the day.**

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 the online catalog, p 121 at <http://www.marshall.edu/ucomm/catalog/interim.htm>) must be arranged in advance (if possible).

Computation of final numerical grade: Quizzes (~6-8) 25%, Mid-term Exam 20%, Final Exam 25%, Post-lab Writeups and Experimental Results 20%, Laboratory Notebook 5%, 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. Post-lab writeups and experimental results (typed except for calculations) are due at 2:00 pm the period following completion of the experiment. **Late reports are not accepted.** The report format is as follows, and remember to follow the guidelines for maintaining a laboratory notebook (manual, pp 6-10).

1. Name, date, course and section numbers, collaborators (if any)
2. Title
3. Introduction – a short paragraph describing the experiment.
4. Data – raw experimental data presented in the format used in the laboratory manual.
5. Calculations
6. Results and Discussion – graphs and processed data with some meaningful analysis of the results.
7. Questions – use complete sentences (include the question in the answer) and number as in the manual.

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 10-20 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.
2. Pre-lab presentations (in S-465) are generally brief. Pertinent material from the CHM 211-212 textbook should be read in preparation for an experiment (and possible quiz). 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	
Introduction to Graphing	Jan 14	Jan 21
Beer's Law: Determining the Mass % Acetylsalicylic Acid in Aspirin	Jan 21	Jan 28
Synthesis and Characterization of a Triboluminescent Compound	Jan 28	Feb 4
Protein Extraction and Folding: Investigating Intermolecular Forces	Feb 4	Feb 11
Isolation of DNA from Strawberries	Feb 11	Feb 18
Kinetics of Decomposition of Hydrogen Peroxide	Feb 18	Feb 25
Studying LeChatelier's Principle	Feb 25	Mar 4
<b>Mid-Term Exam</b>	Mar 4	
Quantitative Analysis: How Accurate Can a Titration Get?	Mar 11	Mar 18
pH Dependence of Drug Absorption	Mar 18	Apr 1
Qualitative Analysis: What Metal Ions Are in This Solution?	Apr 1, Apr 8	Apr 15
Isolation of Copper Metal from Malachite Beads	Apr 1, Apr 8	Apr 15
Gibbs Free Energy: Solubility and Spontaneity	Apr 15	Apr 22
Synthesis of a Coordination Compound (Handout)	Apr 22	Apr 29
<b>Final Exam; Lab Check-Out</b>	Apr 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.

Policy for Students with Disabilities Marshall University is committed to equal opportunity in education for all students, including those with physical, learning and psychological disabilities. University policy states that it is the responsibility of students with disabilities to contact the Office of Disabled Student Services (DSS) in Prichard Hall 117, phone 304 696-2271 to provide documentation of their disability. Following this, the DSS Coordinator will send a letter to each of the student's instructors outlining the academic accommodation he/she will need to ensure equality in classroom experiences, outside assignment, testing and grading. The instructor and student will meet to discuss how the accommodation(s) requested will be provided. For more information, please visit <http://www.marshall.edu/disabled> or contact Disabled Student Services Office at Prichard Hall 11, phone 304-696-2271.