

Chemistry 218
Principles of Chemistry Laboratory II

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The purpose of this course is to (1) introduce you to the basic laboratory skills of careful measurements and handling of experimental data, (2) provide laboratory experience which emphasizes and reinforces the principles and concepts of chemistry given in the general textbook, and (3) acquaint you with the quantitative thinking and procedure encountered in elementary physical chemistry and analytical chemistry with emphasis on the interplay between theory and experiment. Towards that end, this lab has been designed so that lecture (CHM 212) and lab topics will occur at roughly the same times.

Course Description: A laboratory course that demonstrates the application of concepts introduced in Chemistry 212. (CR or PR: CHM 212).

Student Learning Outcomes	How students will practice each outcome in this course	How each outcome will be assessed in this course
Students will know and follow safety rules in the chemical laboratory.	<ul style="list-style-type: none">• safety training at MU Online• reading laboratory manual	<ul style="list-style-type: none">• online safety quiz• midterm and final exams• instructor's evaluation
Students will learn how to properly use and care for laboratory equipment.	<ul style="list-style-type: none">• reading laboratory manual• prelab lecture• laboratory experiments	<ul style="list-style-type: none">• midterm and final exams• instructor's evaluation
Students will learn how to record and communicate laboratory experiments and results.	<ul style="list-style-type: none">• reading laboratory manual• prelab lecture• laboratory experiments	<ul style="list-style-type: none">• lab notebook• lab reports
Students will apply concepts introduced in chemistry lecture (CHM 212).	<ul style="list-style-type: none">• reading laboratory manual• laboratory experiments• laboratory calculations	<ul style="list-style-type: none">• pre- and postlab questions• lab reports• midterm and final exams

Materials Needed

1. The CHM 218 Laboratory Manual, a combination lock for your lab drawer, and a roll of paper towels. Our lab drawers are indicated by **purple** tape.
2. A bound (sewn, not spiral) laboratory notebook. All experimental data must be recorded directly in this notebook during your laboratory period using blue or black ink. You may use your CHM 217 notebook, if it is this type of notebook.

3. Safety goggles: Contact lenses should not be worn in the chemistry laboratory. If they are absolutely necessary, you must notify your instructor and the teaching assistants in writing. Furthermore, you must remind them weekly that you are wearing contact lens.
4. An apron/lab coat is optional, but is desirable if you wear clothing you do not want to risk being damaged.
5. You will need access to the general chemistry course textbook (*Principles of General Chemistry*, 3rd Edition by Silberberg). The introductions to the experiments are generally brief. You are expected to have read the pertinent material from the textbook in preparation for the day's quiz and experiment.
6. ACS academic lab safety guide (for reference only)
<http://www.acs.org/content/dam/acsorg/about/governance/committees/chemicalsafety/publications/safety-in-academic-chemistry-laboratories-students.pdf>

Safety Precautions

1. Anyone who has not signed the statement acknowledging one's full understanding of the required safety measures will not be permitted to work in the laboratory. Sign only one copy and turn it in. The second is for you to keep. The sheets will be handed out in class.
2. You must pass the online safety quiz in MUOnline/Blackboard before the beginning of the second lab period or you will not be allowed to enter the lab.
3. Use care in following the directions of your instructor and laboratory text. Do not alter the experimental procedures without being instructed to do so by either myself or the teaching assistants.
4. **Protective eye goggles must be worn in the laboratory at all times.** Failure to do so will constitute sufficient grounds for dismissal from the laboratory. We **do not** lend goggles to students, so make sure that you bring them with you or keep them securely locked in your laboratory drawer.
5. Clothing: Clothing must cover the entire torso and legs down past the knees (pants are best). Shoes covering the bridge of the foot and toes must be worn. (No ballet flats or sandals.) You will not be allowed to work while violating either of these rules. It is best to avoid very loose clothing. Because some of the chemicals you will work with are corrosive, we recommend that you remove any rings while in the lab.
6. Cell phones, MP3 players, and similar electronic devices may not be used while in the lab.
7. Know the locations of all safety equipment in the laboratory. You will be tested on this.
8. All injuries, no matter how trivial, must be reported to the instructor immediately.
9. We will discuss safety of individual labs in the pre-lab. If you miss the pre-lab (or come in late), you must check in with me (Dr. Castellani) before beginning the lab. Failure to do so, may result in you being sent home for the day and earning a zero on that day's lab.

Conduct of the Course

1. Attendance is required in this course. Quizzes will be given at the start of class. Coming to class late means you will have less time to work on your quiz. Furthermore, all assignments are due promptly at 8:00 depending on the time your section begins. Any assignment turned in after that will be considered late. *The Department of Chemistry policy requires that students complete at least 75% of laboratories to receive course credit. A student will not receive course credit if he/she misses 4 or more laboratories, whether excused or unexcused.* If you know that you will miss a lab in advance, please contact the instructor in advance. It may be possible to make prior arrangements to complete the lab in the same week with a different section and instructor.
2. The first half hour to one hour of each period will be spent in a discussion by the instructor on the experiment to be done in that period and the chemical principles related to it.
3. The bound notebook is for the immediate recording of all experiment operations and observations made during the laboratory period. Laboratory notebooks will occasionally be turned in for grading of experimental results.
4. Lab reports are due the period following completion of the experiment.

Course Grade

Quizzes (5-10)	20%
Midterm exam	15%
Final exam	20%
Post-lab write-ups and experimental results*	35%
Laboratory notebook	10%

*lowest score dropped

Grading Scale: 90-100% = "A," 80-89.99% = "B," 70-79.99% = "C," 60-69.99% = "D," less than 60% = "F"

Assignments turned in late will have a 10% per class day (or any portion thereof) point deduction on the assignment. Late assignments will not be accepted more than one week after due date.

During quizzes talking and sharing of calculators is forbidden.

Calculators with alphanumeric and/or graphing capabilities are **not** permitted for quizzes or the exams.

There are no make-up quizzes or exams. A missed quiz can be used as your dropped grade.

Excused absences must be arranged in advance.

Office hours: Wednesday 11:00 a.m. to 12:00 p.m.

During office hour I may be in either my office or laboratory (Science 408). Please check both places for me.

In general, if my office door is open, I'm on the floor. Wait a few minutes to see if I find my way back, if not feel free to look around the floor for me.

If you cannot come by during the scheduled office hour or if you have questions at other times, please feel free to drop by my office or schedule an appointment.

If you have questions that you believe can be answered by email and would like to use that method, please feel free to send them to me. I check my email regularly during the day.

Schedule of Experiments

<u>Week</u>	<u>Experiment</u>	<u>Title</u>
1	1	Laboratory Check-In Introduction to Graphing
2	2	Absorption Spectroscopy
3	3	Beer's Law
4	8	Kinetics
5	4	Protein Extraction and Folding
6	10	Le Châtelier's Principle
7		Mid-Term Exam
8	7	Bonding and Acidity
9	6	Quantitative Analysis –Titration
10	9	pH Dependence of Drug Absorption
11	11/12	Qualitative Analysis and Isolation of Copper Metal
12	11/12	Qualitative Analysis and Isolation of Copper Metal
13	13	Gibbs Free Energy
14		Thanksgiving Break
15	14	Synthesis of a Coordination Compound
16		Lab Check-Out Final Exam

Experiments will be conducted on the day listed above. Post-labs are due at the beginning of class the following week. S1 is due at the beginning of the second lab period.