

Chemistry 122, Autumn 2016

General and Inorganic Chemistry Laboratory

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Course design and objective: This course is designed to satisfy the chemistry laboratory requirements for the Missoula College nursing program. CHMY 121, or equivalent, is a prerequisite or corequisite. Students will develop their laboratory skills, gain hands on experience and bring abstract concepts to the lab bench. Even though the main emphasis of both CHMY 121 and 122 is general and inorganic chemistry, CHMY 122 will advance into organic chemistry that may be of interest to nursing students and others in the medical field. To that end, CHMY 122 will advance more quickly than CHMY 121 and may be 2-3 weeks ahead of the lecture in CHMY 121. The labs are designed to introduce new concepts and provide detailed information to guide students through the experiments and lab reports.

Required materials: Splash-protection safety goggles must be purchased. The labs will be handed out the prior week.

Lab Schedule:

Week	Date	Experiment or activity
1	Aug 29	Introduction
2	Sept 5	Holiday - Labor Day
3	Sept 12	Check Into Lab, Safety Quiz & Exp 1 - Density Measurements
4	Sept 19	Exp 2 - Precipitates
5	Sept 26	Exp 3 - Hydrates and Flame Test
6	Oct 3	Exp 4 - Synthesis of an Iron Coordination compound
7	Oct 10	Exp 5 - Determine the Ideal Gas Constant
8	Oct 17	Exp 6 - Synthesis of Copper Coordination Compound
9	Oct 24	Exp 7 - Spectroscopic Analysis of Copper
10	Oct 31	Exp 8 - Titration of NaOH with KHP
11	Nov 7	Exp 9 - Evaluation of Antacid Tablets by Titration
12	Nov 14	Exp 10 - Synthesis of Aspirin
13	Nov 21	Exp 11 - Saponification of Lipids
14	Nov 28	Exp 12 - Preparation of Esters
15	Dec 5	Check out
16	Dec 12	Study Session

Grades: Each of the 12 labs is worth 50 points for 600 points. The Safety Quiz is worth 20 points. Safety monitor is also worth 20 points. Each student will volunteer once during the semester for safety monitor, which is basically clean up duties. It's important to keep the lab clean. The lowest lab score may be dropped. As usual, 90% will guarantee an "A," 80% will guarantee a "B," and so forth.

This syllabus, selection of experiments and grading policy may be changed during the semester.

Learning Outcomes

This lab provides hands-on experience with chemicals, laboratory glassware and techniques. It is designed to reinforce the connection between real-life observations and abstract chemical concepts. Students completing the course will demonstrate that they have learned to:

1. Work with laboratory glassware and equipment such as beakers, flasks, graduated cylinders, volumetric pipets, burets, and a laboratory balance. They learn techniques such as vacuum filtration using a Buchner funnel, heating a compound in a crucible over a bunsen burner and how to make spectroscopic absorption measurements. Students learn how to use safety equipment and work safely in the laboratory.
2. Apply abstract, theoretical chemical concepts (such as volume, mass, moles, molar mass and molarity) to observations in the laboratory. Students make measurements, perform calculations and compare with their theoretical predictions.
3. Write chemical equations from observations of chemical reactions undergoing color change, mass loss or formation of a precipitate
4. Develop the techniques required to synthesize various organic and inorganic compounds, such as heating, decanting, crystallization, filtration and drying. Students determine the percent yield and purity of their product and evaluate the results.
5. Master the technique of acid-base titration. Students perform a titration to prepare a standardized sodium hydroxide solution and then do a second titration to determine the carbonate content in an antacid tablet. Finally, the students compare their experimentally determined value with the milligrams of calcium carbonate content stated on the label.
6. Perform spectroscopic analysis using UV/Vis absorption. Students prepare standard solutions of copper, measure the absorbance of the standard and samples, prepare a calibration curve of absorbance versus concentration, determine the concentration of copper in the sample solution, and finally, determine the copper content in the original solid sample.

Disabilities

The University of Montana assures equal access to instruction through collaboration between students with disabilities, instructors, and Disability Services for Students (DSS). If you think you may have a disability adversely affecting your academic performance, and you have not already registered with DSS, please contact DSS in Lommasson 154. I will work with you and DSS to provide an appropriate accommodation.

Legal Notices

This course syllabus is not a contract; it is a tentative outline of course policies. Changes may be made before, during, or after the semester at my discretion.

All students must practice academic honesty. Academic misconduct is subject to an academic penalty by the course instructor and/or a disciplinary sanction by the university. All students need to be familiar with the Student Conduct Code. The Code is available for review online at: <http://ordway.umt.edu/SA/VPSA/index.cfm/name/StudentConductCode>.

Laboratory Safety Rules, Practices & Procedures

1. Splash-protection safety goggles must be worn in the laboratory whenever anyone is performing an experiment. Goggles must provide full protection, including top and side. Goggles must be worn over your eyes (not your forehead).
2. You may not perform any laboratory work until your TA arrives and authorizes you to begin work.
3. Safety is the responsibility of everyone in the room. In an emergency you might be the person closest to someone in need of assistance. You are responsible for knowing the location and proper use of all safety equipment such as the fire extinguishers, eyewash fountains, and safety shower. You must also know the fire escape routes.
4. Proper lab clothing covers your skin past the elbow and to the knee and helps protect your skin from damage. Sandals are not appropriate for the lab. Long hair should be confined. Contact lenses are not recommended. You may leave an old pair of tennis shoes, an apron or lab coat in your lab locker to make sure you are properly covered in lab.
5. Do not touch, or taste, any laboratory chemical. Odor testing is to be done with caution. Wash your hands before you leave the lab.
6. Read chemical labels very carefully. If in doubt, call the instructor.
7. You may not drink or eat in the laboratory.
8. Do not use an open flame without the permission of your laboratory instructor.
9. Never pipette by mouth.
10. Dilute concentrated acids and bases by adding them to water. Do not add water to a concentrated solution of an acid or base.
11. Never return unused or excess reagents to the reagent stock bottle. Follow directions on the amount of substances to be taken.
12. Never insert your equipment into stock reagent containers. This is the major source of contamination. Replace lids on all containers after use.
13. Clean up all spills immediately: at the reagent table, in the hood, the balance stations, and at your lab bench. If you are not certain how to clean a large spill, ask your instructor. Spills in the lab, even water spills, are a safety issue. A safety monitor with clean-up duty will be assigned and posted on a rotating basis each week for the balance area, sinks, hoods and reagent table.

14. To protect staff that disposes of trash, broken glass is to be placed in the boxes marked 'Broken Glass.'
15. Do not work with damaged glassware. If you have cracked or chipped glassware, bring it to the attention of your laboratory instructor.
16. Dispose of all chemicals as directed.
17. All safety instructions specific to an experiment must be followed. This includes verbal instructions from your lab instructor.
18. Any behavior inappropriate to the laboratory situation will result in immediate dismissal from the laboratory and a grade penalty.
19. You may not conduct any experiment without prior approval of your laboratory instructor. You may work in the lab only during your scheduled laboratory class.
20. The laboratory closes promptly at the end of each session. Please plan your work so that you will finish by the end of the laboratory session. Several classes use CP 401 and we do not have the resources to staff makeup sessions. There are no make-up lab periods.
21. If you know you will miss a session, discuss this with Dr. Olbu before the absence is recorded. In case of an emergency leave a message for Dr. Olbu as soon as possible. When more than two laboratory periods are missed, it is not possible to properly evaluate the work of a student and dropping the course is recommended.
22. All grading disputes should be resolved with your lab instructor. If a satisfactory resolution cannot be agreed upon, Professor Olbu will make the final decision.
23. Any student in this course who has a disability that may prevent the full demonstration of that student's abilities should contact the lab instructor, and Professor Olbu as soon as possible so we can discuss accommodations.
24. Check on how you are doing, periodically, do not wait until the last week to seek help.
25. If you withdraw from the course, make sure you checkout of your lab locker on, or before, the checkout day to avoid an assessment for the contents of the locker. This charge will be included in your fees for the next registration, or transcript request. You are not automatically dropped from any class roster just because you stop coming. Only you can withdraw yourself.
26. Your laboratory handouts, goggles and this syllabus will be needed each week. You will also need to know your locker number and combination each week.
27. Sign the Safety Agreement at the end of this syllabus.

End-of-Lab Safety Condition Check List

Each person is responsible for the contents of their own locker, the workbench area used and proper treatment of the room's facilities (this includes equipment, chemicals, and balances). As a part of general lab safety practices, each person is to perform the following clean-up procedures, before leaving the lab.

Workbench Areas

1. Wash glassware & return equipment to locker.
2. Return any 'temporary' equipment to its source.
3. Discard any solid debris into the plastic lined trash cans.
4. Put broken glass in the 'Broken Glass Only' Box.
5. Unless directed otherwise, unused liquids can go down the sink, followed by water.
6. Wash and wipe your workbench area.
7. Place your safety goggles in your locker.
8. Close and lock up your locker.

Balances & Balance Area

1. All balances are turned off, brushed free of solid debris, and the 'canister lids' are replaced.
2. The tops are replaced on all solid reagent containers at the balance area counter, scoops are sitting on the tops of the containers.
3. The balance surface area has been swept free of solid debris.

Reagent Table

1. The tops are returned to reagent containers.
2. Temporary equipment is back in the provided containers.
3. All debris has been put into the plastic lined trash containers.
4. The surface has been washed with water & wiped down with paper towels.

Hoods

1. The tops have been returned to reagent containers.
2. Temporary equipment is back in the provided containers.
3. All debris has been put into the plastic lined trash containers.
4. The surface has been washed with water & wiped down with paper towels.

Sinks

1. Solid debris (for example: matches, paper, or boiling chips) should be removed from the sinks and put in the trash. Be especially careful of any broken glass in the sink. Use a paper towel to protect your fingers and hand when removing broken glass. Broken glass goes into the box labeled 'Broken Glass Only.'

Each week two or three students will be assigned laboratory safety monitor duties and will have responsibility to make sure the balance area, reagent table, hoods and sinks are clean. This assignment is worth 20 points.

Chemistry 122 Lab Safety Agreement

I have read and understood the rules for safe conduct in the chemistry laboratory. I agree to abide by these rules, and I understand that I may be dismissed from the laboratory if I violate these rules.

Signature

Printed Name

Section Number