

CHEM 102L Syllabus Introductory Chemistry Lab I Summer 2014

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- Office Hours:** Mang : By appointment
Kohler : By appointment
- Text:** J.A. Beran. Laboratory Manual for Principles of General Chemistry, Custom Edition;
Wiley.
- Laboratory**
- Notebook:** Student Lab Notebook (Carbonless Paper) or other bound notebook.
- Prerequisite:** A grade of C or better in CHEM 101 is an absolute prerequisite for CHEM 102L. If you remain enrolled in CHEM 102L without this prerequisite you will receive an F for a grade.
- Co-requisite:** CHEM 102 is a prerequisite or co-requisite for the lab course CHEM 102L. If you are taking CHEM 102 as a co-requisite and drop it, you must also drop CHEM 102L. Failure to do so will result in an F for a grade for CHEM 102L.
- Repeating:** As a prerequisite for CHEM 351L, CHEM 102L cannot be repeated if CHEM 351L has already been taken for a grade. If you remain enrolled in CHEM 102L having already taken CHEM 351L, you will receive an F for a grade.

Course Material: The laboratory course is intended to acquaint students with common laboratory practices used to investigate chemical systems. The student gets the opportunity to observe first-hand chemical phenomena that are described in CHEM 101 and CHEM 102. Working in a chemical laboratory requires safe handling of toxic and/or corrosive chemicals. Be sure to read carefully the standard safety procedures for UMBC laboratories on the last page of this syllabus. Also note specific warnings indicated by exclamation points in the margin for each experiment.

Attendance is required at laboratory lectures. Theory, procedures, and safety considerations for the next experiment will be discussed.

Contact: All e-mails must be addressed to three people – Dr. Mang, Dr. Kohler and your TA. All e-mails must include CHEM 102L, the section number, and your TA's name in the subject line and your own name in the body of the e-mail. Failure to provide this information may result in a delayed or no response. E-mails containing questions whose answers are available on Blackboard will not be answered. *E-mails must originate from your UMBC e-mail account.* If you do not use your UMBC e-mail account, it is highly recommended that you set up mail forwarding to the address that you use most frequently. This can be done under the "Personal tab" in myUMBC. Note that UMBC does not forward to hotmail accounts! All course-related e-mails will be sent to your UMBC address. **Email messages MUST be sent to BOTH your teaching assistant (TA) and the instructors for anything pertaining missing class, or specific questions regarding the material. For personal matters, you only need to include Dr. Mang and Dr. Kohler**

You fill this in

My Section Number:

My T.A.'s Name:

My T.A.'s e-mail address:

My T.A.'s office hours:

Learning Objectives:

This course is intended to acquaint students with common laboratory practices used to investigate laboratory systems. The student observes first hand chemical phenomena that were described in CHEM 101.

- Purpose of the steps and procedures in the experiments both practically and how the procedure relates to theory
- Background theory of reaction equations, stoichiometric, kinetic and thermodynamic calculations
- Safety awareness of toxic and corrosive properties of chemicals used
- Names and formulas of compounds used in the experiments

Experiments:

July 7	Introduction to methods and laboratory techniques Basic Laboratory Operations (only parts outlined in worksheet)	Laboratory Techniques (pg. 21-46) Handout on Blackboard. Experiment 1 (pg. 47-54)
July 9	Percent Water in a Hydrated Salt	Experiment 5 (pg. 63-68)
July 14	A Carbonate Analysis; Molar Volume of Carbon Dioxide	Experiment 13 (pg. 87-94)
July 16	Solution Making and Beer's Law	Handout on Blackboard
July 21	Synthesis of Potassium Alum	Experiment 15 (pg. 55-62)
July 23	A Rate Law and Activation Energy	Experiment 24 (pg. 109-130)
July 28	An Equilibrium Constant Le Chatlier's Principle; Buffers	Experiment 34 (pg. 131-142) Experiment 16 (pg. 177-188)
July 30	Limiting Reactant	Experiment 8 (pg. 77-86)
August 4	Calorimetry	Experiment 25 (pg. 95-108)
August 6	Preface to Qualitative Analysis Qual: Common Anions	Dry Lab 4 (pg. 189-192) Experiment 37 (pg. 193-202)
Aug 11	A Volumetric Analysis Antacid analysis	Experiment 9 (pg. 143-152) Experiment 17 (pg. 159-166)
August 13	Galvanic Cells, the Nernst Equation	Experiment 32 (pg. 221-232)

BE PREPARED FOR LAB!!!

You must enter the laboratory each week with a clear understanding of what you are to do and why you are doing it, rather than just blindly following a series of directions out of the lab manual.

The teaching assistant and or the instructor may ask you questions about the lab at any time. If you cannot answer these questions satisfactorily, you may be asked to stop the experiment.

Every day, you need to come with the following:

Your assignment each day when you come in for lab is:

- Pre-laboratory questions **must be typed** for the current days experiment (calculations may be handwritten)
- Laboratory notebook **MUST** be filled out with the protocol of the day
- Post Laboratory assignment from the previous experiment
 - This includes copies of your lab notebook and follow-up questions as assigned

Pre-laboratory questions and having your lab notebook filled out are required for participation in lab that day. Failure to come prepared for class will prevent you from participating in lab and the points associated with lab that day.

Absences:

Attendance is absolutely mandatory for both laboratory lecture and laboratory. **Missing laboratory classes must be justified with a documented University-accepted excuse.** Experiments cannot be made up, and unexcused absences result in a grade of zero for all assignments associated with the missed experiment. In the event of an excused absence, **you must still complete the assignments associated with the missed lab:** the pre-laboratory assignment is due to your teaching assistant (TA) the next lab period and the report sheet(s) (based on data obtained from your lab partner) and post laboratory questions are to be turned in one week after the missed experiment. In the event you do miss an experiment, notify your teaching assistant ASAP by e-mail and cc your message to your instructor documentation for your absence must be approved by both your teaching assistant (TA) and the instructor. **Email messages MUST be sent to BOTH your teaching assistant (TA) and the instructor.**

****Note: NO MORE THAN TWO EXPERIMENTS CAN BE MISSED, EVEN IF THESE ARE DOCUMENTED. HOWEVER, YOU ARE RESPONSIBLE FOR THE LAB ASSIGNMENTS.**

Tardiness: Arriving late to lab will not be tolerated. Your lab report and pre-lab questions are to be turned in no later than 1:00 pm or 6 pm for night classes. If you arrive late, your work will not be accepted and you may not be permitted to complete the experiment. Lab quiz will be given at the beginning of class, and tardiness will decrease the time you have to take the quiz as well.

Administration:

You are responsible for checking all deadlines for changes in audit/pass-fail grading status and for adding, dropping and withdrawing from the class. For all quizzes and the final exam, only non-graphing calculators are allowed (e.g. TI 36X, TI 30Xa, TI 30XIIS or TI 30XIIB). Cell phones and personal music players are prohibited in the laboratory. **Email messages MUST be sent to BOTH your teaching assistant (TA) and the instructors.**

Academic Integrity:

"By enrolling in this course, each student assumes the responsibilities of an active participant in UMBC's scholarly community in which everyone's academic work and behavior are held to the highest standards of honesty. Cheating, fabrication, plagiarism, and helping others to commit these acts are all forms of academic dishonesty, and they are wrong. Academic misconduct could result in disciplinary action that may include, but is not limited to, suspension or dismissal. To read the full Student Academic Conduct Policy, consult the UMBC Student Handbook."

Grading:**Experiments (85%)****Pre-Laboratory Questions (15%)**

- Pre-lab questions must be completed before class and handed in immediately upon entering the laboratory.
- Except under extraordinary circumstances, and only by special arrangement with your teaching assistant and the instructor, late submissions of prelab questions WILL NOT BE ACCEPTED and a zero grade will be assigned.
- Failure to come prepared with your pre-lab questions AND your protocol pre-written in your lab notebook will prevent you from participating in lab, and all of the points associated with it!

Experiment implementation and report (70%)

For each experiment, you will be expected to execute all the steps and skills for the experiment. This includes everything from safe and courteous lab practices, implementing the experiment with precision and care, and interpreting the results of those experiments.

- 10% - performing the experiment safely and courteously
- 10% - filling out the protocol and observations in your lab notebook
- 10% - including all calculations associated with a given experiment or interpretations of data where relevant
- 10% - post-laboratory follow-up graphs, data manipulations and questions
- 10% - correctly identifying unknowns or solving for the experimental values

As part of your laboratory experience, there are expectations of behavior including but not limited to the following behaviors. In order to help enforce these practices, points will be lost from your experimentation and report grade as indicated.

Dressed appropriately	1 point first infraction (10 points second)
Wore goggles entire time	1 point first infraction (10 points second)
Maintained safety in the lab	1 point each infraction – multiple infractions will lead to removal from lab
Proper waste disposal	1 point
Proper handling of chemicals to avoid cross-contamination	1 point
Bench cleaned	1 point
Equipment returned/put away	1 point
Proper disposal of glass	1 point

- Data sheets/Lab Notebook for an experiment must be initialed by your teaching assistant (TA) before you leave the lab. Completed data sheets, graphs, and post-lab questions for each experiment **are due one week after** the date of the experiment. **LATE LAB REPORTS WILL BE PENALIZED 5 POINTS/DAY LATE. Late reports must be signed and dated by a faculty/staff person and placed in your teaching assistant (TA)'s mailbox.**
- A grade of zero will be given if evidence of straight-copying is apparent

Lab Quizzes (15%)

Each lab period will begin with a 15-minute quiz on the previous lab's experiment. Late arrivals (after 15 minutes) will not be given extra time to complete the quiz. Students arriving more than a half hour late will not be allowed to conduct the experiment and will receive a grade of zero.

Final Grades:

A	=	100 – 90
B	=	89 – 80
C	=	79 – 70
D	=	69 – 60
F	=	Below 60

Safety:

Safety is a primary concern in the chemical laboratory. Chemicals are almost all potentially dangerous. However, with the correct precautions, all the work you will be asked to do may be performed safely. It is important that you know how to handle both the chemicals and the apparatus you will be using. In addition, you must know what to do if an accident occurs. Your text has a general section on safety and special cautions associated with each experiment. Read them and learn them. Anyone who fails to follow correct safety procedures will not be permitted to complete the course and will not receive credit for the course.

The following rules generally apply to all laboratory courses at UMBC. In addition in each of your laboratory courses the professor will outline rules and procedures and the textbook will have general sections on safety and first aid and, usually, special cautions associated with each experiment. Pay heed, read, and learn all precautions. Anyone who does not follow correct safety procedures will not be permitted to complete department laboratory courses. Safety information from the American Chemical Society is presented in videos at Blackboard.

Personal Protection

1. You must wear eye protection in lab at all times. Even if you are not working, others may be. Safety goggles are required for general chemistry and organic chemistry lab courses; safety glasses are acceptable for other lab courses. Eye protection must be worn over prescription glasses. Eye protection can be purchased in the bookstore.
2. Do not wear sandals or other open shoes, midriff tops, or shorts. Long hair must be tied back. Wear old clothes to the laboratory or use a lab coat. Store personal effects in the areas provided not at the bench.
3. Treat all chemicals as toxic: do not taste them or touch them.
4. Wear protective gloves as recommended. Realize different glove materials are required depending on the chemical exposure and must be matched to the properties of the chemical. Latex gloves only offer protection against some solids and weak aqueous corrosives so nitrile gloves are provided for the organic labs.
5. Know that the immediate response to spills of corrosives on your person is to wash the area thoroughly with water. Do not wash chemicals from the skin with organic solvents; use water only.

Safe Laboratory Practices

6. Know the location of all safety equipment in the lab such as fire extinguishers, eye-wash, shower, and acid-spill and base-spill wash bottles.
7. Do not dispose of organic solvents, mercury, or strong acids or bases in the sink. Waste chemicals are disposed of in separate waste cans. Spilled mercury can be vacuumed into filter flasks. Solid wastes, including paper towels used for organic spills, are disposed of in the dedicated bottle.
8. Broken glass must first be washed free of water soluble residue or rinsed free of organic residue with acetone into the appropriate waste bottle, whichever is applicable. Residue-free glassware is then disposed of in the dedicated boxes. Trash is the only material discarded in the trash cans.
9. Do not leave reactions unattended.
10. Social visitors are prohibited from entering the instructional laboratories.
11. Never add anything TO concentrated acid, caustic or strong oxidant. Instead add acid, caustic or oxidant slowly and carefully to the other reagents. Do not hold your face directly over a container when noting the odor. Instead waft vapor carefully toward you with your hand.
12. Do not pour reagents back into stock bottles. Take only what you need.
13. Wipe up spills immediately. At the end of the day's work, sponge off your bench and leave it clean.