CHEM 102L Syllabus Introductory Chemistry Lab I Summer 2016

Instructors: Sarah Kohler, MEYR 564, kohler@umbc.edu

Office Hours: Kohler: By appointment - best time to reach me is between lecture and lab or after lab

Text: J.A. Beran Laboratory Manual for Principles of General Chemistry, *Custom Edition Prepared for UMBC*; Wiley.

Notebook: Bound notebook, either a formal laboratory notebook, either carbon or carbonless copies or a composition notebook. Copies of your notebook must be turned in, so unless you are prepared to either scan and print or xerox your notebook daily, you would be best served to get a formal notebook.

Safety: Safety Goggles that completely cover eyes are required. Lab Coats are recommended but not required.

Prerequisite: *Must* have a grade of C or better in CHEM 101 as 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 and Syllabus:

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 and from your instructors in lecture.

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

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 and 102.

- 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

BE PREPARED FOR LAB!!!

Absences:
This is a hands-on course, and your attendance is required to pass this class. Therefore, attendance is absolutely mandatory for both laboratory lecture and laboratory for you to pass this class. **NO MORE THAN TWO EXPERIMENTS CAN BE MISSED, EVEN IF THESE ARE EXCUSED or you will be asked to withdraw or receive an "F" if you have more than three absences.** Please contact your TA AND the instructors as soon as you know you will be missing laboratory, and be prepared to provide documentation in order to have your absence excused.

Missing laboratory classes must be justified with a documented, university-accepted excuse in order to receive any points for a given lab that you do not attend. 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.** All assignments are due one week after the missed experiment.

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, only non-graphing calculators are allowed. Cell phones and personal music players are prohibited in the laboratory. **Email messages MUST be sent to your teaching assistant (TA) and Dr. Kohler.**

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."

Assignments:
Your assignments for each lab are as follows:

1. Pre-laboratory Questions
2. Post-Laboratory Questions
3. Report Sheet
4. Lab notebook Procedures (procedures must be written out and data collection tables (if desired) ready to collect data before class - lab manuals will not be allowed after the first week of lab)

   Pre-lab questions and procedures in your lab notebooks are due at the beginning of each lab. Post-lab questions and lab report are due on Monday for both labs performed the previous week. (Note: two labs will be turned in every Monday!)

   NOTE: Except under extraordinary circumstances, and **only by special arrangement with your teaching assistant AND the instructor**, late submissions of pre-lab assignments, report sheets and post laboratory questions will not be accepted, and a zero grade will be assigned.

Grading:

Assignments

Pre- and Post- Laboratory Questions (20%)

Pre-Lab and Post-Lab Questions *MUST BE TYPED* and printed out! No e-mails! All calculations must show your work, and may be handwritten, but the final answer must be typed, with proper units and significant figures.

Pre-lab questions must be completed before class and handed in immediately upon entering the laboratory. *THESE ARE TO BE COMPLETED INDIVIDUALLY.*

Post-lab questions will be handed in on the Monday following each lab. *LAB PARTNERS MAY WORK TOGETHER ON THIS ASSIGNMENT AND SUBMIT ONE COPY PER PAIR.*

Lab Notebook (20%)

Each student will prepare their own notebook before class. Notebooks will be checked at the beginning and end of class for completeness and will be initialed and graded before you leave lab.

Data Sheet (30%)

Completed data sheets and graphs for each experiment are due on the Monday following the experiment. These must be completed in your lab notebook, and either the carbon copy or a xerox copy must be turned in. LAB PARTNERS MAY WORK TOGETHER ON THIS ASSIGNMENT, but you each turn in your own copy!

Lab Quizzes (20%)

Each lab period will begin with a 15-minute quiz on the procedure, pre-laboratory assignment, and/or any hazardous properties and safety procedures of the chemicals you will be working with. Late arrivals 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 be counted as an unexcused absence and receive a zero.

Good Practice/Implementation (10%)

As part of your laboratory experience, your general behavior and attitude are important, both for your safety and as a common courtesy for those around you. Behaviors that you are expected to adhere to include, but are not limited to:

- Good housekeeping (i.e. cleaning your immediate work area)
- Properly disposing chemicals
- Avoiding waste with chemicals and supplies
- Properly handling chemicals (i.e. cross-contamination of pipets in chemicals)
- Wearing safety goggles
- Proper disposal of waste in designated containers
- Proper disposal of broken glassware in designated containers
- Demonstrating proper experiment – specific techniques

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.

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), ballet flats, slippers midriff tops, tank 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

1. 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.
2. 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 vacuumed into filter flasks. Solid wastes are disposed of in the dedicated bottle when indicated - no paper towels or weight boats or gloves in the solid waste.
3. 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.

4. Do not leave reactions unattended.
5. Social visitors are prohibited from entering the instructional laboratories.
6. 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.
7. Do not pour reagents back into stock bottles. Take only what you need.
8. Wipe up spills immediately. At the end of the day's work, sponge off your bench and leave it clean.

Schedule of Experiments:

Date		Experiment Title		Pages		Prelab Questions
Monday, July 11, 2016		Laboratory Techniques and Measurements		pg. 21-43		
		Introduction to Methods and Basic Laboratory Techniques		Blackboard	handout	On handout
Wednesday, July 13, 2016		Check in				
		Percent Water in a Hydrated Salt		page 63-68	Experiment 5	#5 on page 66
Monday, July 18, 2016		Molar Volume of Carbon Dioxide		pg. 89-96	Experiment 13	#2 and #6 on pages 93-94
Wednesday, July 20, 2016		Solution Making –Spec Metal Ion Analysis		Blackboard	handout	On handout
Monday, July 25, 2016		Synthesis of Potassium Alum		pg. 107-114	Experiment 15	#5 on page 112
Wednesday, July 27, 2016		Limiting Reactant		pg. 69-78	Experiment 8	#4 on page 76
Monday, August 1, 2016		Volumetric Analysis		pg. 79-88	Experiment 9	#5 and 6a (part A) page 85/86
		Antacid Analysis		pg. 127-134	Experiment 17	#5a page 132
Wednesday, August 3, 2016		Potentiometric Analysis		pg. 135-144	Experiment 18	#2 page 141
Monday, August 8, 2016		An Equilibrium Constant		pg. 207-218	Experiment 34	#4 and 6a page 213-214
		Molar Solubility Common-Ion Effect		pg. 145-152	Experiment 22	#5 and 6a page 150
Wednesday, August 10, 2016		Calorimetry		pg. 175-186	Experiment 25	#4 and 5 on page 182
Monday, August 15, 2016		Galvanic Cells; Nernst Equation		pg. 195-206	Experiment 32	#4 and 5 page 201-202
Wednesday, August 17, 2016		Factors Affecting Reaction Rates		pg. 153-162	Experiment 23	#6 and 7 page 160
		Check out				