Chemistry 111 – Laboratory Policies

The chemistry lab is a rich learning environment that also contains some hazards. We will do our best to learn a lot, be safe, and have “fun” during our warm spring afternoons/evenings.

Chemistry 111 laboratory consists of an introductory exercise and experiments selected to demonstrate a variety of chemical concepts and laboratory techniques. Preparation for laboratory exercises will require some time – at least one hour before lab! Your complete record of each experiment, including the written procedure, will be entered into your laboratory notebook.

Laboratory Policies & Conduct

Attendance:
- You must attend every lab on your assigned day. No substitutions will be allowed without prior approval from the instructor (which is a RARE event).
- Do not skip a week of lab. You may only make up a lab missed due to illness or other approved reason. There are not many opportunities for make-up labs in summer quarter.

Chemicals, Cleanliness, Materials, & Practice:
1. Do not pour any chemical down the sink without checking first. We will usually have waste disposal bottles available on the center island. If you are not sure, ASK!
2. Recap all bottles after YOU use them. If you do not, there may be cross contamination between bottles.
3. Clean up any spillage on bench tops, floor and around balances IMMEDIATELY.
4. Do not take reagent bottles to your desk.
5. Never put extra chemicals back in the stock bottle.
6. Do not weigh reagents directly on the balance pans. Use weigh paper, beaker or other container. Keep the balance area clean.
7. NEVER place anything directly into the reagent bottles. Only exception to this rule, a dropper that came with the bottle.
8. Before you leave lab, wash your lab ware and lock it in your drawer. Make sure your bench area must be clean and turn off the computer.
9. If you are not sure how to do something, ASK!
The Laboratory Notebook

Your laboratory notebook is a complete record of your work in Chemistry 111 laboratory. It is used to write out experimental procedures prior to beginning experiments, to record observations and data in the laboratory, to complete all calculations, and to create a report on the results of each experiment. All written work connected with Chemistry 111 laboratory must be done in your notebook. The laboratory notebook must be permanently bound, not loose leaf or spiral. The pages should be lined (or graph) and preferably numbered. If you purchase a notebook with unnumbered pages, you must number each page before using the notebook in lab.

Notebooks must be done in ink, not pencil. Record data directly in your notebook, never on loose pieces of paper for later transcription. If an incorrect entry is made, it should be crossed out with a single line which does not obliterate the entry, and the correction made next to or above the crossed out entry. Never write over a number; later it may be impossible to determine which number was correct. Do not crowd data in your notebook; entries should be well spaced and clearly labeled. Pages should never be torn out of a scientific notebook; if you wish to have a page disregarded draw a single diagonal line across it.

Save the first page of your notebook for a Table of Contents and keep it up to date. This means that lab work should start on page 3. As you prepare your notebook, allow sufficient pages for data, calculations, and summary of results. The report must be placed on the right hand pages only. Blank left hand pages allow a convenient place for data if the experiment must be repeated. Finally, you should date procedure sections and data as these entries are made in your notebook.

What to put in your lab notebook.

FRONT COVER

Write your name, the course number, and your lab section clearly on the front cover of your lab notebook.

INSIDE COVER

At the top of the inside the front cover, you will record your lab drawer number, buret number, and balance number. Reserve the rest of the inside cover for your laboratory safety map.

PAGE 1 - TABLE OF CONTENTS

You are required to use Page 1 of your notebook for the table of contents. As you prepare for lab each week, record the experiment number, experiment title, and the page number of each experiment. The figure shows a sample from several years ago. We will record the drawer number on the inside cover, not on this page.
LABORATORY EXPERIMENTS

The rest of your notebook is where you record information about your experimental work. Each experiment in your notebook should have six sections described below.

1. **Title of the Experiment**
2. **Purpose** A brief statement of the purpose of the experiment.
3. **Procedure** This is a step-by-step account of every operation in the experiment. It should be detailed enough that the entire experiment can be carried out without using other sources; *it will be your only reference* during the experiment. A balanced chemical equation should be included for any step which involves a chemical reaction. You are *not required* to copy steps for data analysis at the computer, only “wet” chemistry work.
4. **Pre-lab Exercises (if required)** Refer to the individual lab handout to see if there is a pre-lab assignment. Answer all questions (show your work for computations) in your lab notebook, then copy the results to the pre-lab page to turn in.
5. **Data** All measurements and other observations should be directly recorded in this section. Where possible, data should be tabulated for easy future reference. In all cases, data must be clearly labeled so their meaning will be obvious to any reader of the notebook. Also be sure to date all data entries in your notebook. The sample to the right is one option for arranging your data. Note how mistakes are corrected with a single line – not scratched out.
6. **Results** In this section, the final results are calculated from the experimental data. For experiments involving quantitative analyses, results for each individual determination as well as a mean and a relative standard deviation are computed. For each type of calculation, a sample calculation, using your measured data, should be given in detail including proper significant figures and units for all numerical quantities. Finally, the identifying number of your unknown should be clearly given in this section.
7. **Conclusion** Explain **HOW** you met the objective of the lab. Did you learn anything new?

Complete items 1-4 and prepare your data table (item #5) before coming to lab. This process can take up to an hour (or more if you get stuck). You will not be allowed to work in lab without proper preparation.

*Note:* Once the “wet lab” work is done (everything but calculations and the report) you may refer to the lab manual – don’t copy the procedure for data analysis and calculations.
**Lab Report Format**

When the experiment is complete, you will neatly fill out a lab report on a sheet of engineering paper. Most of the work on your report is copied from your lab notebook. Unless otherwise specified for a given experiment, the lab report include the following information:

1. **Your name and your partner(s)’ name**
2. **Title and Date of the lab**
3. **Objective of the lab** – in your own words
4. **Data**: All quantitative and qualitative observations.
5. **Calculation(s)**: Any analysis done with the data including graphs and drawings. You must show calculation(s) at least once.
6. **Summary**: Summary of data and calculations in a tabular form plus ID of your unknown (if any). Include theoretical results if known. Make sure this section completely summarizes the lab.
7. **Conclusion**: Explain **HOW** you met the objective of the lab. Did you learn anything new?
8. **Answers to questions** in the laboratory handouts (if any).

A sample report for the Density & Calibration will be provided to help you understand the format.

**Pre-Lab**

The goal of the pre-lab exercises is to prepare you for the lab calculations. A typical pre-lab involves a simplified set of data from the lab. The pre-lab questions will involve the same calculations as the experimental data. Make sure you understand the calculations so your in-lab time is spent with the chemistry – not the math.

**Lab Grade**

Lab reports are at the beginning of the next lab period. The Beer’s law report is due at the beginning of class on Wednesday, August 18 (it’s a relatively short report).

Each lab report is worth 25 points. These points are based on a combination of completing the lab, on-time report, correct calculations, correct format, and experimental results. Pre-lab and notebook preparation are required but have no formal points associated with them. To pass the class (C- or better), you must complete all of the labs with at least a 66% (16.5 point) average.

Graded labs from the previous week are given back in lab each week. A “R” grade (redo) indicates that your report has an error that you must fix before receiving a grade. If necessary, consult with Kim to fix the report. You have 1 week to redo reports except at the end of the quarter. All lab work must be turned in by August 18.