### Instructor: Mrs. Tracy Halmi
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Office Hours: M 10:10 – 11:00 am, M 1:25 – 2:15 pm, F 10:10 – 11:00 am and by appointment

### Labs can be downloaded from website: [http://chemistry.bd.psu.edu/halmi/](http://chemistry.bd.psu.edu/halmi/)

<table>
<thead>
<tr>
<th>Week of</th>
<th>Experiment</th>
<th>Points</th>
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<tr>
<td>Jan 22</td>
<td>Check-in and Laboratory Safety</td>
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<td>Jan 29</td>
<td>Measurements of Mass, Volume and Density</td>
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<td>Feb 5</td>
<td>Properties of Hydrates</td>
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<td>Feb 12</td>
<td>Determining the Empirical Formula of an Oxide</td>
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| Feb 19  | Ionic Reactions in Aqueous Solution  
Formal Written Lab Report for this experiment | 20     |

**NOTE: YOU NEED YOUR CARBON COPY NOTEBOOK FOR THE WEEK OF FEB 26.**

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<thead>
<tr>
<th>Week of</th>
<th>Experiment</th>
<th>Points</th>
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| Feb 26  | Analysis of Commercial Antacids  
Containing Calcium Carbonate |        |
| Mar 5   | Analysis (continued)  
Formal Written Lab Report Due | 20     |
| Mar 12  | NO LAB!!!! |        |
| Mar 19  | Molecular Weights and the Ideal Gas Law | 20     |
| Mar 26  | Thermochemistry and Hess’s Law  
Graphing assignment for Hess’s Law data | 20     |
| Apr 2   | Synthesis and Analysis of a Coordination Compound  
Graphing assignment for Hess’s Law data due  
Formal Written Lab Reports Returned | 10     |
| Apr 9   | Synthesis (continued)  
Rewrites on Formal Written Lab Report Due |        |
| Apr 16  | Synthesis (continued) | 30     |
| Apr 23  | Check-out |        |
Policies

Lab Safety: All students must wear goggles in the laboratory at all times. Each time it is necessary for the instructor to remind a student of this, two points will be deducted from you lab courtesy points. If all of your courtesy points are used up, then deductions will be from your lab reports. If you refuse to put your goggles on, then you will be asked to leave the laboratory with a score of zero for that particular lab. You must dress appropriately. This means no open toed shoes, sandals or shorts/skirts unless wearing a lab coat. Long hair must be tied back.

Prelabs: At the start of each lab you will be required to hand in a prelab assignment. It will cover material that you are going to have to know for that particular experiment. Each prelab is worth 10 points and there will be a total of 8 prelabs handed in. For labs that last two or three weeks, only one prelab is handed in the first week.

Lab Reports: You are expected to download and read the day’s experiment before you come to the lab. All data should first be recorded in the appropriate pages of your laboratory manual. Each lab report is to be handed in at the end of the lab period. This will enable you to ask questions since your instructor will be present. In the case of experiments that last more than one week, you must show your data sheet with all of your calculations up to that point to your instructor. In experiments where you work in pairs, each student must submit separate lab reports. This does not mean two copies of the same report, it means doing your own work. Lab reports will be graded on experimental technique, quality of results, treatment of data and overall quality of work. Any labs that are missed must be made up during that week or by special arrangement with the instructor. In experiments where you work in pairs, each student must submit separate lab reports. This does not mean two copies of the same report, it means doing your own work. Lab reports will be graded on experimental technique, quality of results, treatment of data and overall quality of work. Any labs that are missed must be made up during that week or by special arrangement with the instructor. Any lab not made up within the allotted time will be recorded as a score of zero. There are 20 points for lab courtesy. This includes safety awareness as well as behavior in the laboratory, which includes arriving to lab on time and being prepared for lab.

Quizzes: There will be a quiz at the beginning of each laboratory session with the exception of the first week of experiments. They will be worth 10 points each and will cover material from the laboratory experiment performed the previous week. If you are late for a quiz, you may not make it up at any other time.

Graphing Assignment: You will be asked to graph your data for the Hess’s Law experiment. The assignment will be due the week after the Hess’s Law lab is performed. This assignment is worth 10 points.

Formal Written Lab Report: You will be required to write a formal lab report for one of the laboratory experiments that you perform. Your lab report will be typed and instructions on the procedures for writing your formal lab report is at the end of this syllabus and also available on the website. If you receive an unsatisfactory grade on your lab report, you may rewrite it to receive up to one third of the points you missed. When you hand in your rewrite for your formal written lab report, you must also hand in your original report as well.

NOTE: At a certain time in the semester you will no longer be filling in blanks of results sheets but will start recording you prelab questions, data, observations and any post lab questions in a carbonless copy notebook. This will start with the last four experiments and is noted on the first page of your syllabus.
**Grading:**

- Laboratory Reports 170
- Prelabs 80
- Quizzes 100
- Graphing Assignment 10
- Formal Written Lab Report 30
- Lab Courtesy 20
- Total 410

**Grades:**

- A 93-100%
- B 83-86%
- C 70-76%
- A- 90-92%
- B- 80-82%
- D 60-69%
- B+ 87-89%
- C+ 77-79%
- F 0-59%

**Other Comments:**

1. Always be on time for lab. Constant tardiness will not be tolerated.

2. Do not be afraid to ask questions, that is what your instructor is there for. You could also be saving everyone from a potential disaster. **ONE EXCEPTION IS THAT YOU ARE NOT ALLOWED TO ASK QUESTIONS ABOUT THE PRELABS ONCE YOU HAVE ENTERED THE LABORATORY FOR CLASS.**

3. Proven cases of academic dishonesty will result in an F for the course. This includes being caught having old quizzes and lab reports from previous semesters in your possession in the laboratory.

4. If you miss a laboratory class, you must have a university approved excuse. You are also required to show documentation to your instructor supporting your excuse. Failure to do either one of these will result in your not being able to make up the missed laboratory experiment.

5. Penn State Erie puts a very high value on academic integrity, and violations are not tolerated. Academic integrity is one of Penn Stare’s four principles to which all students must abide. Any violation of academic integrity will receive academic and possible disciplinary sanctions, including the possible awarding of an XF grade which is recorded on the transcript and states that failure of the course was due to an act of academic dishonesty. All acts of academic dishonest are recorded so repeat offenders can be sanctioned accordingly. More information on academic integrity can be found at: [http://www.pserie.psu.edu/faculty/academics/integrity.htm](http://www.pserie.psu.edu/faculty/academics/integrity.htm).

6. Failure to check out will result in a lowering of one letter grade for the course.
Laboratory Notebook

A laboratory notebook is a chemist's most valuable tool. It contains the permanent written record of a researcher's mental and physical activities from experiment and observation, to the understanding of new phenomena. A laboratory notebook is a researcher's diary. The act of writing the notebook forces one to stop and think about what is being done in the laboratory. After the experimental data is recorded, the researcher begins to study, analyze, evaluate, and interpret the notebook. New ideas and questions are written down and the laboratory notebook evolves into an expression of the Scientific Method.

There are important legal reasons for keeping a good notebook. A laboratory notebook is admissible in a court of law for patent claims. In cases of suspected fraudulence, the FBI will confiscate laboratory notebooks as physical evidence. In industry, a researcher's laboratory notebook is the property of the company. It is witnessed, signed, and collected each working day. The proprietary information the notebook contains rarely leaves the building. In this course, your laboratory notebook will be part of your grade. The main criteria for evaluation will be how clearly you indicate what you did and saw. It should be written so that if the notebook was sent to a chemical laboratory in anywhere in the United States, they could understand what you did and repeat the experiment.

Your data and observations are the heart of the experiment where you actually record data and observations that you make during the course of the experiment. These notes and data will allow you to test hypothesis and apply the Scientific Method in the data treatment and discussion section of your formal written lab report. Record the data as completely as possible in your notebook and leave interpretations for later. Don't be embarrassed about writing down mistakes or accidents---if you drop your product on the floor, record in your notebook "Oops, I dropped my product on the floor!" Write down everything!! Your results hinge on exactly what you do, not how nicely you sugar-coat them in the notebook. A few general notes which you should specifically pay attention to in this course:

1. Observations of chemical tests go here. Include balanced reactions (if not determined from the observations), data collected and maybe some derived quantities. If numerical data is obtained, it should be tabulated (with proper number of significant figures and units) in clearly labeled columns.

2. Use the proper names for labware and vessels. Was the sample weighed in a crucible, beaker or flask? What kind of flask? Was the volume measured with a graduated cylinder or a pipet? In what sequence were reagents mixed? Was "A" added to "B" or vice versa? How precisely were the reagents measured? Was the balance significant to 0.01 gram or 0.00001 gram?

3. How long did any reaction take? Did the color change occur immediately or after hours, minutes?

4. Make corrections by drawing a single line through the incorrect data. Be sure to leave the unwanted entry legible, as it may turn out to be correct.

Your name and course is written on the cover. All entries are recorded with a black or blue ball-point ink pen. The key to writing a good notebook is simple clarity: clear layout, clear descriptions, and good penmanship. A notebook which is filled with scribbles and scrawls will waste your time when you look for something and may actually be misleading.
Formal Written Laboratory Report

There are three main parts to your formal written lab report:

1. **Purpose and Introduction**
2. **Data and Observations**
3. **Data Treatment and Discussion and Conclusion**

The following is a guide, with comments, on how to organize your report. **The following headings (underlined) are to be given exactly as indicated.**

Before each part is discussed there are a few writing instructions that must be given. When a report is written, never write using a first person reference. For example, the words I, we, you, they etc are not written in the laboratory report. When writing chemical formulas, you must write subscripts. For example water is H$_2$O, not H2O. You can do this in whatever word processor program you use. When equations need to be written, you can use equation editor to write them and it makes your equations look nice and neat. You should use equation editor to show the calculations that were performed in the laboratory. You can also make tables that are nice and neat by using the directions for your word processor program. Your laboratory report should have a cover page with your name, the date and the name of the experiment performed.

**Purpose:** State the reason you are **going** to do the experiment. It might be to learn a technique, to try a particular type of reaction, to analyze a compound or sample, to determine a constant, to verify a theory or a combination of these. **Be specific.** This should only be one or two sentences.

**Introduction:** This section includes the background of the problem, theory of a technique, theory to be investigated, or **known** reactions that you will be performing. Use sources (referred at the end of the section) other than the laboratory manual, including your lecture textbook and the web.

**Data and Observations:** This should include your data shown in a table and observations that you made during the experiment.

**Data Treatment and Discussion:** This is where you interpret your data, make calculations and tabulate the answers. This section contains sample calculations, charts and graphs of treated data (clearly labeled as any notebook page), rearranged data and/or interpreted data. A connection should be made with the **purpose.** You should summarize the goal of your work, what was done and what was learned. Did the technique work as expected? How do you know? List possible sources of error and suggestions for eliminating them. Do not list vague things like "poor technique", "human error" or "bad equipment". What could have been done differently (better?) and how could we improve this experiment. What additional questions did this experiment suggest? New ideas can also be recorded here.

**Conclusion:** Clearly summarize the **specific** results of the data treatment. The first sentence should be an answer to the purpose (often numerical). Your conclusion should not be more than two to three sentences long.