CHMY 142 Syllabus Spring Semester 2021

Instructor Information.
- Professor Kent Sugden; e-mail Kent.Sugden@umontana.edu
- Office: Chem 115; Office hours: by appointment or see me following lecture

Required Materials.
1. Inquiries into Chemistry, by MR Abraham and MJ Pavelich (referred to as A&P), 3rd edition
2. A bound laboratory notebook with permanently numbered duplicate pages.
3. Safety goggles
4. Graph Paper and Pen
5. Permanent Marker (Sharpie)
6. Calculator

Course Description.
Chemistry 142 is a lab course that gives “hands-on” experience with several key topics that are covered in the first semester series of General Chemistry. These topics include: measurements, stoichiometry, energy, and molecular structure.

Course Objectives and Learning Outcomes.
1. Provide students with a lab experience that reinforces concepts presented in the lecture.
2. Develop student skills into the scientific method and the method of inquiry including:
   a. Design and implementation of experiments
   b. Interpretation of data and results, including their significance
3. Develop students quantitative reasoning skills.
4. Gain experience with various laboratory methods and techniques.
5. Gain experience graphing scientific data and relating this back to interpretation of data and results.

Table 1. Weekly Schedule of Labs

<table>
<thead>
<tr>
<th>Week 1</th>
<th>Friday Jan. 15, No lab</th>
<th>Section in book</th>
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<tbody>
<tr>
<td>Week 2</td>
<td>Friday Jan 22, Measurement II</td>
<td>A&amp;P B-1</td>
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<td>Week 3</td>
<td>Friday Jan 29, Gas Relationships</td>
<td>A&amp;P E-1</td>
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<td>Week 4</td>
<td>Friday Feb 5, Mass Relationships I</td>
<td>A&amp;P C-1</td>
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<td>Week 5</td>
<td>Friday Feb 12, Mass Relationships II</td>
<td>A&amp;P C-2</td>
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<tr>
<td>Week 6</td>
<td>Friday Feb 19, Mass Relationships III</td>
<td>A&amp;P C-4</td>
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<td>Week 7</td>
<td>Friday Feb 26, Energy Relationships I</td>
<td>A&amp;P D-1</td>
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<td>Week 8</td>
<td>Friday Mar 5, Lab Midterm Exam</td>
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<tr>
<td>Week 9</td>
<td>Friday Mar 12, Energy Relationships II</td>
<td>A&amp;P D-2</td>
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<tr>
<td>Week 10</td>
<td>Friday Mar 19, Energy Relationships III</td>
<td>A&amp;P D-3</td>
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<tr>
<td>Week 11</td>
<td>Friday Mar 26, Molecular Geometry</td>
<td>A&amp;P H-1</td>
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<td>Week 12</td>
<td>Friday Apr 2, No class</td>
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<td>Week 13</td>
<td>Friday Apr 9, Chemical Properties</td>
<td>A&amp;P F-1</td>
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<td>Week 14</td>
<td>Friday Apr 16, Lab Final Exam</td>
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<td>Week 15</td>
<td>Friday Apr 23, Check-out/Net ionic eqns</td>
<td>worksheet</td>
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<tr>
<td>Week 16</td>
<td>Finals Week; no labs</td>
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Grading.

Grades are assigned on the classic 90-80-70-60 (A,B,C,D etc) percentile basis. Plus and minus grades are given at the discretion of the instructor and should not be viewed as punitive e.g. a grade of A- could be given in lieu of a grade of B for an 89% in the course.

Your final grade is based on your lab reports (11 at 100 pts each) and a lab midterm and final each worth 100 pts (a total of 1300 pts are available). The format and grading of this report, late lab reports, and other topics will be described by your Graduate TA during your first lab period.

There are no makeup labs. However, your lowest lab grade will be dropped from the 1300 pts available and your overall average will be determined from the best 10 lab grades plus the midterm and final exam scores (1200 pts total). Missing a lab for any reason, sickness, family issue etc will automatically count as the dropped lab grade.

Safety.

Laboratory safety is extremely important. Serious injuries and even death have occurred when laboratory safety rules are ignored. As such, we take lab safety very serious and will strongly enforce all of the following rules. Failure to comply with these rules will lead to your removal from the lab for your own safety, and that of your fellow students.

1. Lab Safety goggles must be worn at all times while the lab is in progress. There may be times when we are doing a “dry-lab” and this rule may be suspended but only by direct decree of your Teaching Assistant.
2. You are responsible for knowing where all the safety equipment is within the lab. This includes fire extinguishers, eye wash fountains, safety shower etc. You should be familiar with all entrances and exits in case you need to quickly leave the area.
3. Proper clothing should be worn at all times. We will often use strong acids and bases that can cause serious burns if left on exposed skin. Long pants and close-toed shoes are strongly recommended as well as tying back all long hair.
4. Please do not deviate from the assigned laboratory exercise unless authorized to do so by your Teaching Assistant.
5. Never touch, taste or smell any laboratory chemical.
6. Eating, drinking, vaping or use of tobacco products is prohibited in the laboratory. Do not have open bottles or food of any kind on the lab bench.
7. Please store all books, coats and backpacks against the walls and away from any emergency egress areas.
8. Do not use chipped or cracked glassware. If you glassware is chipped or cracked notify your Teaching Assistant and get it replaced.
9. Be careful of any open flames. Many chemicals are highly flammable as well as loose clothing and hair.
10. No horseplay allowed in the lab.
11. Do not pipet by mouth.
12. Dilute acids and bases by adding them to water. Do not add water to acids and bases.
13. Dispose of chemicals safely. If unsure, ask your Teaching Assistant.
14. Dispose of broken glassware safely. Broken glassware thrown in the trash has the potential to cut and injure the custodial staff.
15. Specific labs may contain additional safety instructions. Adhere to these at all times.
16. If you know or suspect that you are pregnant please consult with Professor Sugden.
Graphing.

Graphing is an important part of the data interpretation associated with this lab. Learning how to graph correctly by hand is one of the more important skills you will learn in this course. Your TA will instruct you on the graphing expectations for each exercise. General graphing rules are given below:

1. Graphing must be done by hand. Computer-generated plots are not allowed.

2. Graph paper with a light green or blue background must be used. Dark-lined graph paper such as that at the back of Abraham & Pavelich is not permitted. The grid lines must be light enough so that data points made with pencil can be easily and clearly seen.

3. The independent variable—the measured quantity that is being manipulated by experimental design—is plotted on the x-axis. The dependent variable—the measured quantity that depends on the value of the independent variable—is plotted on the y-axis.

4. Each axis must be scaled so that the range of your data is represented by half of the length of the page or more. Round-number values must be used on major grid lines.

5. Each axis must have a label that describes the variable being plotted and states the unit in which the quantity was measured.

6. The graph must have a title that accurately and succinctly summarizes the nature of the plot.

7. Data points are to be made by placing a dot on the page and then circling that dot.

8. An estimated line of best fit must be drawn by eye so that the sum of the distances from the points to the line in each direction is minimized. The line must be drawn with a straight edge tool.

9. The equation of the line of best fit must be expressed in terms of the actual quantities and their units, not y and x.