Chemistry 151 Laboratory  
Fall Semester 2009  

Lab Instructor: Ken Taylor (Tuesday, Wednesday, & Thursday sections)  
Email: ktaylor@physics.montana.edu  
Phone: office phone to be announced – 541-602-3976 (text)  
Office: to be announced  
Office Hours: to be announced  

Safety Policies:  
Be on time! The safety guidelines, for any given laboratory exercise, are provided at the beginning of each lab and it is mandatory that the students be present during the presentation of this information.  

Proper lab attire MUST be worn in order to participate in lab.  

Missed Lab Policy:  
If you miss a lab or anticipate missing a lab you must notify your lab instructor as soon as possible to make arrangements.  

<table>
<thead>
<tr>
<th>Week of</th>
<th>Experiment</th>
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<tbody>
<tr>
<td>August 31</td>
<td>Safety</td>
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<tr>
<td>September 7</td>
<td>Introduction to Lab, Check-In</td>
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<tr>
<td>September 14</td>
<td>Gravimetric Determination of Calcium as CaC₂O₄⋅H₂O (continued)</td>
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<tr>
<td>September 21</td>
<td>Gravimetric Determination of Calcium as CaC₂O₄⋅H₂O (finish)</td>
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<td>September 28</td>
<td>Introduction for Ammonium Decavanadate Hexahydrate: Synthesis and Characterization</td>
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<tr>
<td>October 5</td>
<td>Ammonium Decavanadate Hexahydrate: Synthesis and Characterization (continued)</td>
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<tr>
<td>October 12</td>
<td>EDTA Titration of Ca²⁺ and Mg²⁺ in Natural Waters</td>
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<td>October 19</td>
<td>The Behavior of Gases – Boyle’s and Charles’ Laws</td>
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<td>October 26</td>
<td>Calorimetry</td>
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<tr>
<td>November 2</td>
<td>No lab this week</td>
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<tr>
<td>November 9</td>
<td>Lab will meet for Wednesday and Thursday sections ONLY</td>
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<tr>
<td>November 16</td>
<td>Spectroscopy: Qualitative Analysis with Light</td>
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<tr>
<td>November 23</td>
<td>Lab for Tuesday section ONLY – Thanksgiving Holiday</td>
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<tr>
<td>November 30</td>
<td>Copper Plating</td>
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<tr>
<td>December 7</td>
<td>Check-Out</td>
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Lab Reports/Points:  

1) Gravimetric Determination of Calcium as CaC₂O₄⋅H₂O ________/100 pts  
2) Ammonium decavanadate hexahydrates: Synthesis and Characterization ________/100 pts  
3) EDTA Titration of Ca²⁺ and Mg²⁺ in Natural Waters ________/100 pts  
4) The Behavior of Gases – Boyle’s and Charles’ Laws ________/100 pts  
5) Calorimetry ________/100 pts  
6) Colorimetric Determination of Iron in Vitamin Supplement Tablets ________/100 pts  
7) Spectroscopy: Qualitative Analysis with Light Soli ________/100 pts  
8) Copper Plating attendance required  

Total ________/700 pts  

*Final lab scores will be submitted to Dr. Szilagyi and will count as 25% of the overall course grade.
Report Due Dates:
Lab reports should be turned into the proper box (listed by lab instructor) in Chemistry Modular Building room 101. **Ten** points will be deducted from the lab report for each day late.

Report Guidelines:
A lab notebook (duplicate/carbon pages) will be required and will be used for turning in lab reports. Yellow (duplicate) pages will be turned in while original pages will be retained in the lab notebook. Each individual must turn in his/her own report that has been written independently of his or her lab partner(s).

Reports should include the following sections:

**Title:**
Title of experiment.

**Purpose:**
The purpose is a brief statement of the intent of the laboratory exercise. It should be just a few sentences in length and should be written in your own words. Include how the lab relates to research or industry.

**Procedure:**
This section should describe the steps of the experiment. It is not necessary to rewrite each and every step of the experiment as in your lab handout. Include enough information that the experiment could be successfully repeated by reference to your procedure section of your report. **Leave a large left margin (roughly two inches)** such that observations can be noted, changes/corrections can be made to the procedure as given by instructor.

**Experimental Measurements and Data:**
This section will contain any data/measurements you have recorded for a given laboratory exercise. It may be helpful to use tables/spreadsheets to report your data. Data sheets from your laboratory handouts can be used for this section where appropriate. If unknowns are being used for a given experiment, the unknown number/letter must be recorded.

**Calculations and Data Analysis:**
This section will include any calculations necessary for a given laboratory. Any graphs required will be included in this section. Be sure to label all graph axes and assign a title to each graph. Label or identify any specific information obtained from a graph (i.e. melting point, boiling point, change in temperature, mL). Attached graphs or attached data pages must be referenced specifically and their importance to the experiment clearly discussed.

When calculations are required for a given experiment the following must be included: 1) example calculation with words/units only; 2) example calculation using numbers and units. Multiple trial calculations can be summarized in a data table. Report all calculated and measured values with the appropriate number of significant digits and units.

**Conclusions:**
State the conclusions drawn based on the experimental data gathered. Restate all numerical results obtained during the experiment. Restate unknown number/letter when an unknown was used. Perform a percent error calculation when appropriate. Discuss possible sources of error. Discuss precision and accuracy of data when appropriate. Include how the lab can be improved or changed.

**Title, Purpose and Procedure for each laboratory experiment must be recorded in lab notebook before arrival to lab.**

**Calculations, Data Analysis, Conclusions can be recorded in the lab notebook or typed.**