Lab Instructor Information & Office Hour Information

Instructor: Jingtuo Zhang, Email: jingtuo@mtu.edu
Office Hours: TR 11:00 am in either Rm 503 or 508, depending on my location

Lab instructors are teaching assistants (TAs) selected by the Department of Chemistry and are well educated in the field of chemistry. In addition to giving you an introduction to each experiment, your instructor is responsible for overseeing your safety while in the lab and for assisting you in your lab work. Your instructor can be your biggest asset in this course. Don’t hesitate to ask your instructor questions, however s/he is not a substitute for preparation and will not do your experiment for you or give you answers to complete your reports.

Lab Supervisor Information

Supervisor: Lorri Reilly, MS
Office Location: 508B Chem Sci
Phone: 906-487-2044
Email: lareilly@mtu.edu
Acting Supervisor: Aparna Pandey, MS
Office Location: 508A Chem Sci
Phone: 906-487-3481
Email: apandey@mtu.edu

The lab supervisor is responsible for course design and administration and assists instructors and students as needed. Please feel free to contact her if you have an issue that you don’t wish to discuss with your instructor. Note that she will be off campus May 11th through June 8th and can be contacted by email however her location will be 6 hours earlier than ET. Please contact the acting supervisor if you are unable to reach the supervisor.

Course Identification

Course Number: CH1151 L01
Course Name: University Chemistry I Lab
Course Location: Chem Sci Rm 503S
Class Times: TR 12:35 – 3:25 pm
Co-requisite: CH1150

Course Description/Overview

CH1151 is the laboratory component that emphasizes CH1150 lecture material (introduces the foundations of chemistry, including electronic structure of atoms and molecules, intermolecular forces, states of matter, chemical reactions, organic chemistry, chemical equilibria, kinetics, and acid-base chemistry).

Course Learning Objectives

Chemistry is a laboratory science and experimentation is the foundation of chemical knowledge. The experiments were chosen to emphasize material covered in CH1150 lecture and the lab is designed to provide you with practical experience in conducting tests and making observations. As you progress
through this course you will develop and enhance the skills needed to collect meaningful data, interpret the results and draw conclusions.

Course Resources

Access to lab grades: Talk to your lab instructor when labs are in session.

Required Text: University Chemistry I Laboratory Manual (CH1151), Academic Year 2011-2012, Department of Chemistry, Michigan Technological University


Course Fees: $182; includes lab fee, lab manual, eye protection
$25 fine for failure to check out drawer equipment by end of session A
See page 7 for costs associated with missing or broken equipment

Course Supplies: Proper attire required- Wear clothing that provides the most protection. Shorts, skirts or dresses must be knee length or longer. Open shoes (sandals) are not allowed, even with socks underneath. Students dressed inappropriately will be sent home to change.

Calculator- Bring one with you to lab.

Grading Scheme

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
<th>Grade pts/credit</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>≥ 90%</td>
<td>4.00</td>
<td>Excellent</td>
</tr>
<tr>
<td>AB</td>
<td>85% – 89%</td>
<td>3.50</td>
<td>Very good</td>
</tr>
<tr>
<td>B</td>
<td>80% – 84%</td>
<td>3.00</td>
<td>Good</td>
</tr>
<tr>
<td>BC</td>
<td>75% – 79%</td>
<td>2.50</td>
<td>Above average</td>
</tr>
<tr>
<td>C</td>
<td>70% – 74%</td>
<td>2.00</td>
<td>Average</td>
</tr>
<tr>
<td>CD</td>
<td>65% – 69%</td>
<td>1.50</td>
<td>Below average</td>
</tr>
<tr>
<td>D</td>
<td>60% - 64%</td>
<td>1.00</td>
<td>Inferior</td>
</tr>
<tr>
<td>F</td>
<td>≤59%</td>
<td>0.00</td>
<td>Failure</td>
</tr>
<tr>
<td>I</td>
<td>Incomplete; given only when a student is unable to complete a segment of the course because of circumstances beyond the student’s control. A grade of incomplete may be given only when approved in writing by the department chair or school dean.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>X</td>
<td>Conditional, with no grade points per credit; given only when the student is at fault in failing to complete a minor segment of a course, but in the judgment of the instructor does not need to repeat the course. It must be made up within the next semester in residence or the grade becomes a failure (F). A (X) grade is computed into the grade point average as a (F) grade.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Grading Policy 100 lab points total, see following point distribution:

Experimental (graded primarily on effort): 72 pts
(7 of the experiments will be graded @12 pts each, which 7 is unknown to you, lowest score dropped)

Quizzes (2 @ 14 pts each, graded on correctness) 28 pts

Experimental: You are expected to attend every lab session and complete all of the experiments. Every report will be collected and reviewed, however only seven will be graded. You will not know
which seven. Each is worth 12 points and will be graded as described below. Your lowest experimental score will be dropped. For each non-graded experiment missed and not made up, 5 points will be deducted from your total points at the end of the semester.

- Three points for the following:

**Effort in preparing for each lab** (coming to lab on time, with approved eye protection and drawer combination, properly dressed, and prelab assignments completed) Note that prelabs MUST be submitted before your instructor begins the introduction or you will lose all 3 pts.

**Effort during lab** (knowledge and understanding of the procedure and chemistry involved; organization and ability to budget time, common equipment check in/out procedures followed, cooperation and attitude)

**Safety rules followed** (approved eye protection worn at all required times, proper waste disposal, clean work areas, labware cleaned at completion of experiment)

- Six points for effort in completing the report sheet (data and observations recorded correctly and comprehensively, one example of each calculation performed shown in detail, appropriate graphs; values shown in data and calculations have the appropriate number of significant figures, units and labels; data recorded in ink, one single line through mistakes). Grading criteria for these points will differ for each experiment and may include points for obtaining accurate and precise results.

- Three points for effort in completing the postlab questions (clear, concise and comprehensive answers)

**Lab Quizzes:** Quizzes (2 ea) will be graded on correctness. See the experiment schedule on the last page of this syllabus for dates. You will need a calculator and may use a pencil on the quizzes. Dedicated language translators are permitted for use during a quiz.

**Course Policies**

**ABSENCES:** Report absences IMMEDIATELY by emailing your instructor. In the event of a university sponsored activity or planned absence, students should report the anticipated absence *before* the missed lab session. In case of illness or other unplanned absence, report it as soon as it is known that the lab session will be missed, and no later than the following lab session. Your instructor may allow a makeup session if your circumstances justify it, however exceptions may require consultation with the Dean of Students.

**SAFETY:** Chemistry as an experimental science is an exciting subject, however, experimentation in a chemistry lab has an element of danger and risk associated with it. This is particularly true if the surroundings, tools, or techniques are unfamiliar to you. It is important to be prepared and to think safety - both for yourself and others in the lab. If in doubt about the safety of any procedure, ASK the instructor before proceeding. To keep the risk to a minimum, you are expected to adhere to the following rules, regulations and safe techniques. This information applies to laboratory students in all chemistry teaching labs.
RULES, REGULATIONS AND SAFE TECHNIQUES

1. Do not enter the teaching laboratory until an instructor or supervisor is present. Guests are not allowed in the lab. The Prep Room, Rm. 506, is off limits to students.

2. On the first day of lab, determine the location and use of all emergency and safety equipment: safety shower, eye wash and fire extinguisher. Ask your instructor if you are uncertain. Locate the nearest emergency exit. Know the emergency evacuation route (posted on the lab door).

3. Wear approved eye protection at ALL times while in the lab, even during clean up. Contact lenses are not recommended.

4. Wear clothing that provides the most protection - a lab coat or apron is recommended. Shorts, skirts or dresses must be knee length or longer. Open shoes (sandals) are not allowed. Confine long hair and sleeves when working. Do not wear your favorite clothing to lab.

5. Do only the assigned experiment.

6. In case of chemical contact with skin or eyes, flush affected area with running water for 15 minutes. Use faucets, safety showers or eye wash, as necessary. Remove all contaminated clothing immediately.

7. Food and beverages are prohibited in the lab. Never eat, drink or taste anything (food, beverages, or chemicals) while in the lab. Do not place fingers, pencils, pipets, etc. in your mouth. Never rub your eyes.

8. Report all accidents or injuries to your instructor immediately, even seemingly minor ones.

9. Always avoid unnecessary hazards. Keep working surfaces clean at ALL times. Do not sit or lean on bench surfaces. Keep the floor clear of tripping hazards. Jackets and bookbags should be stored on the coat racks. Stools and chairs are not permitted in the aisles. Drawers should be closed except when removing equipment.

10. Wash your hands and arms thoroughly before leaving the lab.

11. Read the labels on reagent bottles to make sure you have the right reagents. (Report empty reagent bottles to your instructor.)

12. Do not return excess reagents to stock containers; share with others or dispose of it.

13. Dispose of waste properly. This means:
   a. Broken glass - glass disposal container (EXCEPTION: broken mercury thermometers must be reported to your instructor for proper disposal. See #14.)
   b. Water-soluble liquids - flush down sink
   c. Paper products - waste basket
   d. Solid wastes and water-insoluble waste - properly labeled waste containers. Do not throw solid materials into sinks.
   e. If you are uncertain of the proper waste disposal, consult your instructor.
14. Report all chemical spills immediately and clean up the spill as directed by your instructor. Acid spills should be neutralized with sodium bicarbonate (baking soda) or calcium carbonate and base spills should be neutralized with citric acid before wiping them up with a damp sponge. These supplies are available in the lab. Broken mercury thermometers are treated as a chemical spill and must be reported to your instructor for proper clean up and disposal.

15. Do not test odors by direct inhalation from the container. Fan the vapors gently towards your nose.

16. Always add concentrated acid to water and acids to bases (add an acid to a base if you want to save your face). Pour slowly while stirring the mixture constantly, otherwise it may splatter.

17. Always use a suction bulb (never your mouth) when filling a pipet.

18. Do not insert pipets directly into reagent bottles. Transfer an approximate amount into a beaker or other container.

19. Do not force glass tubing and/or thermometers into rubber stoppers. Always lubricate the hole in the stopper with glycerin or soapy water and protect your hand with a towel when inserting tubing or thermometers.

20. Never use an open flame (gas burner) in the vicinity of flammable materials and never leave a lighted burner unattended.

21. Return all equipment clean and to its proper location. Do not put common equipment in your drawer. Never remove chemicals from the lab.

22. If protective gloves are issued, remove contaminated gloves immediately after use and wash your hands. Never leave the lab or touch common surfaces (faucets, door knobs, etc...) with contaminated gloves.

Remember that simple tasks, often regarded as safe, can be dangerous if done improperly. The majority of accidents reported in the laboratory involve cuts from handling broken or chipped glassware and burns from touching hot objects. Always use good judgment and care when working in the lab.

HAZARD COMMUNICATION STANDARD

By signing the Laboratory Worker Safety Agreement on your check in card, you are stating that you are aware that you have a "right to know" all safety information contained in the manufacturers Material Safety Data Sheet (MSDS) for any chemical. You can obtain this information by requesting a copy of the MSDS from Chem Stores, in Room B002, Chemical Sciences Building.

EMERGENCY BUILDING EVACUATION PROCEDURE

1. The signal to evacuate the building in case of emergency is the building fire alarm. Prepare to evacuate the building when you hear the alarm. Shut off heat sources (hot plates and gas burners), turn off lights and electricity, and close windows and doors before you depart.
2. Leave the building in an orderly manner via the evacuation route posted on the door inside the laboratory. Walk, do not run or push. Do not use the elevators. Elevators are only for the use of rescue personnel during a building evacuation. The building attendant brings the elevators to the first floor once the alarm is activated and anyone inside could become trapped.

3. Once outside, meet with your instructor at your designated meeting place. This location is different for each of the laboratories and is announced during the first lab session. If you do not meet your instructor, he or she will assume that you are trapped in the lab and send rescue workers into the building to look for you. You must stay 100 feet away from the building to enable rescue personnel to get to the site of the emergency.

4. In the event of an evacuation drill or false alarm, you may re-enter the building only when the Public Safety Officer at the scene of the emergency gives the "All Clear" on a megaphone.

DRAWER EQUIPMENT: At check in you will be assigned a drawer containing some of the equipment that you will use, and be responsible for, during the semester. The drawer contents should be inspected and compared to the equipment list that follows to determine that all items are present and in acceptable condition. If you are uncertain of the identity of any piece of equipment on the list, see the illustrations posted on the bulletin board in the lab. If an item is broken or missing, list it on an equipment replacement form (available from your instructor). After you have finished checking all of the equipment, bring the equipment replacement form to your instructor for replacement glassware. **No replacements will be made after the first day.** Sign and return the check in card when you have all the equipment. Once you sign the check in card you are responsible for this equipment and will be charged for any breakage or loss. **You must check out of your drawer by 5 pm Thursday of week 14, even if you drop the course.** Failure to check out results in a $25 fine in addition to charges for missing or broken equipment. Every item on the list must be clean and in the drawer in order to check out. Replacement supplies can be purchased from Chem Stores, Room B002 of the Chemical Science and Engineering Building. Credit and debit cards are not accepted. Prices on the following list are approximate and are subject to change without notice.

COMMON EQUIPMENT: In addition to drawer equipment, you will also use common equipment. Common equipment is equipment also used by other students. Common equipment must be signed out. Before doing so, inspect it to ensure that it is in satisfactory condition. Do not sign it out if there is something wrong with it, instead notify your instructor. Once you have accepted the equipment, you are responsible for returning it in clean and satisfactory condition at the end of the lab session. Before returning the common equipment to its proper location, bring it to your instructor for inspection. The instructor will initial its return if found acceptable. Report broken or misplaced equipment to your instructor immediately. You will receive equipment replacement instructions the following week. You are responsible for the cost of replacing such equipment. Lab fees cover the cost of expendable items such as chemicals, not breakage.
**DRAWER EQUIPMENT LIST**

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Drawer Equipment</th>
<th>Stock #</th>
<th>Cost, Each</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Beaker, 50 mL, Pyrex</td>
<td>00537</td>
<td>$2.17</td>
</tr>
<tr>
<td>1</td>
<td>Beaker, 100 mL, Pyrex</td>
<td>00538</td>
<td>$2.60</td>
</tr>
<tr>
<td>2</td>
<td>Beaker, 150 mL, Pyrex</td>
<td>00539</td>
<td>$2.11</td>
</tr>
<tr>
<td>1</td>
<td>Beaker, 250 or 400 mL, Pyrex</td>
<td>00540 or 541</td>
<td>$2.00 or 2.40</td>
</tr>
<tr>
<td>1</td>
<td>Beaker, any size, Pyrex</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note:** You need 6 beakers total.

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Drawer Equipment</th>
<th>Stock #</th>
<th>Cost, Each</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Erlenmeyer flask, 50 mL</td>
<td>00791</td>
<td>$3.42</td>
</tr>
<tr>
<td>1</td>
<td>Erlenmeyer flask, 125 mL</td>
<td>00792</td>
<td>$3.30</td>
</tr>
<tr>
<td>2</td>
<td>Erlenmeyer flask, 250 mL</td>
<td>00793</td>
<td>$3.12</td>
</tr>
<tr>
<td>1</td>
<td>Graduated cylinder, 10 mL</td>
<td>00685</td>
<td>$4.20</td>
</tr>
<tr>
<td>1</td>
<td>Graduated cylinder, 25 mL</td>
<td>00686</td>
<td>$5.22</td>
</tr>
<tr>
<td>1</td>
<td>Funnel, long stem</td>
<td>00179</td>
<td>$4.76</td>
</tr>
<tr>
<td>1</td>
<td>Large test tube, 25 x 150 mm</td>
<td>01115</td>
<td>$0.96</td>
</tr>
<tr>
<td>11</td>
<td>Small test tubes, 13 x 100 mm</td>
<td>01112</td>
<td>$0.29</td>
</tr>
<tr>
<td>1</td>
<td>Test tube rack</td>
<td>00981</td>
<td>$4.49</td>
</tr>
<tr>
<td>1</td>
<td>Test tube holder</td>
<td>00106</td>
<td>$3.00</td>
</tr>
<tr>
<td>1</td>
<td>Test tube brush</td>
<td>01121</td>
<td>$1.30</td>
</tr>
<tr>
<td>2</td>
<td>Medicine droppers</td>
<td>00227</td>
<td>$0.18</td>
</tr>
<tr>
<td>1</td>
<td>Spatula, nichrome</td>
<td>00233</td>
<td>$4.02</td>
</tr>
<tr>
<td>2</td>
<td>Stirring rods, glass</td>
<td>00244</td>
<td>$0.37</td>
</tr>
<tr>
<td>1</td>
<td>Watchglass, 3 &quot; diameter</td>
<td>01101</td>
<td>$1.31</td>
</tr>
<tr>
<td>1</td>
<td>Evaporating dish, ceramic</td>
<td>00715</td>
<td>$4.84</td>
</tr>
<tr>
<td>1</td>
<td>Crucible bottom, ceramic</td>
<td>00665</td>
<td>$2.48</td>
</tr>
<tr>
<td>1</td>
<td>Crucible cover, ceramic</td>
<td>00673</td>
<td>$2.50</td>
</tr>
<tr>
<td>1</td>
<td>Triangular pipestem</td>
<td>01002</td>
<td>$2.10</td>
</tr>
<tr>
<td>1</td>
<td>Wire gauze square</td>
<td>00312</td>
<td>$0.82</td>
</tr>
<tr>
<td>1</td>
<td>Tongs, crucible</td>
<td>00270</td>
<td>$6.05</td>
</tr>
<tr>
<td>1</td>
<td>Wash bottle, 250 mL, plastic</td>
<td>00584</td>
<td>$1.60</td>
</tr>
<tr>
<td>1</td>
<td>Storage bottle w/ cap, plastic</td>
<td>00582</td>
<td>$1.45</td>
</tr>
</tbody>
</table>

**PREPARATION:** Meaningful lab experiences require pre-laboratory preparation. Refer to the experiment schedule on the last page of this syllabus to determine which experiments will be performed each week. A scientist ordinarily begins with a literature search. You should begin by reading the introductory information provided with each experiment. Additional reading may be assigned within the introductory material or by your instructor.

You must answer the prelab questions before coming to lab; otherwise you will not be permitted to begin the experiment and will lose 3 points, 25 % of the experimental grade. The prelab will help clarify your understanding of the reading. If you have any questions concerning the prelab, seek help from the lab supervisor. Her office hours are shown on page 1. When you arrive in lab, turn in your prelab immediately, and then check your answers with the posted key. The answer key is a useful tool if used properly. You may use it to check your answers, but not to get your answers.

Read through the experimental procedure and review the postlab questions before coming to lab. This will help you use your time more efficiently in the lab and minimize the frustration associated with not
knowing what is going on. The experiments can be completed in the allotted amount of time if you come to lab prepared.

It is important that you come to lab on time. Your instructor will give a brief introduction before you begin to work, noting key points about the experiment and special safety considerations.

Remember that some experiments must be extremely precise while others need only be approximate. Scientists and engineers must always keep in mind that unnecessarily careful measurement can steal time from other work. On the other hand, the results of rough measurement can be misleading. It is important, therefore, to select the correct instrument and operate it skillfully to have a successful outcome.

University chemistry laboratory does not require a high degree of mathematical sophistication, but reasonable skill in problem solving is necessary to complete the calculations and reports. The math skills required include: algebraic manipulations, dimensional analysis (factor-label method), manipulation of exponents, scientific notation, graphing and significant figures. You should review these topics and seek assistance as needed.

REPORTS AND RECORD KEEPING: A report form comes with each experiment. Accurate reporting of experimental results is very important in laboratory work. Responses should be thorough and clearly written. If you were to refer to your report months later, you should be able to remember what you did, accurately. Points will be deducted from laboratory reports that fail to comply with the following criteria:

- Completed prelab questions are due at the beginning of each lab session and will be returned to you with your completed report the following session. After you have turned them in, check the prelab answer key to see if you were on the right track before you start the experiment.
- Each data and postlab page must be completely blank before you begin work.
- Reports must be written in permanent ink and must be written legibly.
- Record all your data and observations directly on the report sheet at the time they are obtained. Tables are provided to help you organize your numerical data. Blank spaces are provided for observations. Record initial and final observations whether a change has occurred or not. All observations are important!
- Data should be reported to the correct number of significant figures and include units and labels.
- No erasures are to be made on the report sheet. White-out (liquid paper) should not be used either.
- Corrections must be made by drawing a single line through the erroneous data and entering the correct data next to it. Complete obliteration of the erroneous data is not acceptable. See the examples posted in the laboratory of acceptable and unacceptable work.
- Reports and postlab questions are due the day the experiment is completed and must be turned in to your instructor before leaving the lab.
Where calculations using data are involved, show one example of each type of calculation using data from your first trial. Always use units and labels in your calculations and pay attention to significant figures.

**Collaboration/Plagiarism Rules**

**ACADEMIC INTEGRITY AND HONESTY:** One of a scientist's (person's) most prized possessions is integrity. A scientist records all data and observations exactly as they occur, even if the unexpected is observed. Do not change data or observations to what you think they should be, but rather, try to explain the unexpected. Scientists learn by discussion with one another. You may also profit by discussion with your classmates, but not by copying from them. Cheating is considered a serious offense and is not tolerated in the lab. Examples of cheating for this course follow. The Office of Student Affairs (OSA) will be notified if a student is detected cheating. The OSA will take action consistent with procedures set forth in the MTU Academic Integrity policy. Possible sanctions include an academic integrity warning, failure of the course, suspension or expulsion.

- Copying raw data for a lab without actually participating in the work resulting in the raw data, or without the permission of the instructor in charge of the course.
- Inventing raw data.
- Filling in parts of lab reports that require the raw data for calculations or interpretation before the data is collected.
- Holding discussions so thorough that they result in identical methods and numbers for problems for lab reports, and homework assignments.
- To use old lab reports for anything more than format purposes without the permission of the instructor in charge of the course. (Because there is no need for formatting lab reports in this course, old lab reports are forbidden in the laboratory. Possession of old reports will be construed as an intent to cheat.)
- Allowing anyone to copy a lab report, homework, assignment, or test, either now or in the future, without the permission of the instructor in charge of the course. Except for those experiments where you work with a partner or in a group, you are expected to collect data and observations and answer questions independently. Even in a team experiment, your report should be prepared independently, in your own words.

**University Policies**

Academic regulations and procedures are governed by University policy. Links follow.

- Academic dishonesty cases will be handled in accordance with the University's policies as described earlier. Additional information is available at the Academic Integrity link: [http://www.studentaffairs.mtu.edu/dean/judicial/policies/academic_integrity.html](http://www.studentaffairs.mtu.edu/dean/judicial/policies/academic_integrity.html)

- If you have a disability that could affect your performance in this class or that requires an accommodation under the Americans with Disabilities Act, please see your lab supervisor so appropriate arrangements can be made. Additional information is available at the Disability Services link: [http://www.mtu.edu/dean/disability/policies/](http://www.mtu.edu/dean/disability/policies/)
- For other concerns about discrimination, you may contact your advisor, department head or the Affirmative Action Office, at 487-3310. Affirmative Action link: [http://www.admin.mtu.edu/aaoc/](http://www.admin.mtu.edu/aaoc/)


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**CH1151 Experiment & Quiz Schedule**

<table>
<thead>
<tr>
<th>Date</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tues, May 8</td>
<td>Introduction, Safety, Check In</td>
</tr>
<tr>
<td>Thurs, May 10</td>
<td>Techniques of Measurement &amp; Observation</td>
</tr>
</tbody>
</table>
| Tues, May 15  | Valence Electrons & Lewis Structures (lecture topic 2)  
*Get handout for Molecular Geometry, not in manual* |
| Thurs, May 17 | Molecular Geometry (lecture topic 2)          |
| Tues, May 22  | Sequence of Copper Reactions (lecture topic 3) |
| Thurs, May 24 | Chemistry of Toys                            
*Get handout for Spectrophotometric Analysis of a Food Dye, not in manual* |
| Tues, May 29  | Spectrophotometric Analysis of a Food Dye (lecture topic 4)  
& Quiz 1                                             |
| Thurs, May 31 | Acidity of Fruit Juices (lecture topic 4)     |
| Tues, June 5  | H₂O₂ Decomposition- Determination of R (lecture topic 6) |
| Thurs, June 7 | Phase Diagram of t-Butyl Alcohol (lecture topic 6) |
| Tues, June 12 | Factors Affecting Reaction Rates (lecture topic 8) |
| Thurs, June 14 | Clean up, Check out, & Quiz 2               |