Chem 161L General Chemistry I Lab
1 credit  CRN 64095
Tu 1:30 - 4:15 PM  Imiloa 111 and 131

INSTRUCTOR: Dave Reeves †
OFFICE: Imiloa 130
E-MAIL: dr6@hawaii.edu
OFFICE HOURS: Tu 12:30-1:30 PM
TELEPHONE: 236-9116
EFFECTIVE DATE: Fall 2009

†Course Syllabus prepared by Leticia Colmenares, Ph.D. Fall 2008

WINDWARD COMMUNITY COLLEGE MISSION STATEMENT

Windward Community College is committed to excellence in the liberal arts and career development; we support and challenge individuals to develop skills, fulfill their potential, enrich their lives, and become contributing, culturally aware members of our community.

CATALOG DESCRIPTION

Laboratory experiments illustrating fundamental principles of chemistry. (3 hrs. lab.)
Prerequisite: Credit or registration in CHEM 161.
WCC: DY

STUDENT LEARNING OUTCOMES

1. Apply laboratory safety procedures and respond to hazards.
2. Use molecular and crystal models, perform common laboratory techniques competently and computer-based experiments to verify chemistry laws on stoichiometry, thermochemistry, behavior of gases and liquids.
3. Apply and articulate the scientific method by preparing lab reports using the standard scientific format. Express in writing core chemistry principles, results of experiments and do critical thinking by synthesizing conclusions based on observations and data.
4. Make and record precise measurements, calculate results using significant figures, standard deviations and identify sources of error in laboratory experiments.
5. Use computer competently, word-processing, spreadsheet and graphing.
6. Prepare chemical solutions, perform dilutions, calculate solution concentrations and generate a calibration curve.

LEARNING RESOURCES

Required Textbook: Chemistry 161L Laboratory Manual Fall 2008, edited by L. Colmenares
Chemistry by Zumdahl, 7th edition
Course Website: https://laulima.hawaii.edu/portal (use UH email account login and...
Other Requirements: Scientific Calculator  
Internet Access

**PURPOSE OF THE LABORATORY COURSE**

The chemistry laboratory allows the student to understand some of the theories discussed in the lecture more thoroughly. In the laboratory you will be involved with the processes of scientific inquiry used to discover chemical principles. It is the only way for the student to learn the techniques that are so important in research and in most laboratories. The student will discover that doing quality work in the laboratory requires a great deal of patience and care.

**GRADING**

The final grade will be based on the following scheme:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>2 Exams</td>
<td>30%</td>
</tr>
<tr>
<td>Lab reports (Formal + Informal)</td>
<td>70%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
</tr>
</tbody>
</table>

Course grades will be assigned as follows:

- A: 90-100%
- B: 80-89%
- C: 70-79%
- D: 60-69%
- F: less than 60%

For grades I, W, Cr, NC-- See college catalog

**MODE OF INSTRUCTION**

The primary mode of instruction is through the use of hands-on laboratory activities. Each hands-on activity will be preceded by a class discussion based on a pre-lab homework consisting of a reading assignment and completion of pre-lab questions and problems. During the discussion, videos, websites and computer programs may be utilized.

Conduct of the Lab:

First 30 min  
Discuss answers and review *Pre-Lab* assignment problems and questions, review important principles and *safety* precautions, demonstrate new *techniques* needed or use of new equipment (in *Imiloa 111*)

Remaining time  
Perform hands-on activity, record observation and data, calculate results

10 min  
Clean-up

The activity report is due at the start of the next meeting.

**COURSE POLICIES AND TIPS TO IMPROVE LAB SKILLS**

1. The *Course Content and Schedule* (activity titles and corresponding dates) is listed on the
last page. Changes in the schedule will be announced in class at least a week prior to the affected date. You are responsible for obtaining this information whether or not you were present during the announcement.

2. **Before class.** Each hands-on activity is described in detail in the Lab Manual. **Be prepared** for the activity by reading *thoroughly* the scheduled activity and do the **Pre-Lab** homework **before** coming to class. This will allow you to become familiar with the experiment and to better understand the calculations involved. Bring your **Lab Manual**, **scientific calculator**, **lecture textbook** and a **stapler** to class at all times.

3. **Pre-lab Period (Imiloa 111).** **Answers to the Pre-Lab** problems and questions will be tackled first thing in class. You will review your pre-lab quiz. The **Pre-Lab** and quiz constitutes **10% of the report grade**. If you arrive late, the Pre-Lab section will count as ‘zero’.

4. **Important background information** about the experiment and **safety** will be discussed in the Pre-Lab discussion. If the chemistry concept or theory is entirely new to the class, the instructor will give a short discussion prior to grading the Pre-Lab homework. During the Pre-Lab, you are expected to ask questions regarding the procedure and calculation. However, if you have a lot of questions, get help from your study group, a tutor or from the instructor during office/consultation hours prior to coming to class.

5. Some experiments require the use of **laptop computers** in the metal cart in the AV room. This will be wheeled out of the Imiloa AV room before the class and returned there after class. Be prepared to act as computer monitor on a rotating basis.

6. **During lab (Imiloa 131).** **Wear safety goggles and close-toed shoes at all times.** Sandals or slippers are not allowed. Follow **laboratory rules and procedures** at all times. Treat all chemicals with respect and wipe up any spill, return all reagents to the proper place, replace lids on bottles and report any accident or problem to the instructor. Follow the directions in the **Procedure** precisely. Don’t take short cuts nor fake results as these are readily spotted.

7. In the lab, you are to work in pairs. **Work cooperatively and maintain a positive attitude.** Treat it as an opportunity to learn and do **not** simply rush through an experiment in order to get out of the laboratory as quickly as possible. **Maintain a positive attitude** and work cooperatively with other students and the laboratory instructor. **Be alert** and maintain presence of mind.

8. **Inappropriate behavior** such as activated beepers and cell phones, making offensive remarks, prolonged chattering, etc. will not be tolerated. **Do not use cell phones** in the classroom or in the laboratory.

9. When recording a **measurement**, it is expected that the **value** reflect the precision of the instrument used (never round-off) and affix the correct unit. **Record all your data** neatly in ink and with units. Do not erase original data. If you make a mistake just put a line thru them.

10. Do a quick calculation to check if results are reasonable before dismantling the setup. **Repeat the experiment** if you make a mistake. Consult the instructor to **discuss** the probable **causes of error** before doing the repeat.
11. Use laboratory time efficiently and bear in mind that the experiment should be done at least ten minutes before the end of class for cleanup activity. Leave your laboratory station in good order when you are finished for the day. Points will be deducted when safety precautions, chemical transfer, clean-up and waste disposal techniques and procedures are not followed.

12. After the lab. Complete your calculations as soon as possible after the laboratory. Do not procrastinate and wait until the night before the next laboratory to write your report. Remember you will need to prepare for the new one as well.

13. Laboratory reports. You are expected to turn in an individual report at the beginning of next class. You are expected to discuss results, calculations and interpretations with your laboratory partner and classmates, but calculations and answers in the report should be completely your own work. Identical answers, word for word, and identical calculations will get automatic deductions. Hence, the student should not allow anybody to copy one’s work.

14. Formal Laboratory Reports. A formal laboratory report is required for Experiments on Boyle’s Law, Conductivity and Evaporation while an informal lab report is required for all the other experiments. Formal reports should follow the standard format (see sample formal report in Laulima course website). The rubric for grading the formal lab reports and tips on how to write a formal report are found in your Lab Manual.

15. Late Reports. If submitted one week after the due date, the lab report (only for labs the student was present) will be given a grade of 70% if complete and 65% if less than complete. The grade assigned will be zero if submitted much later.

16. The graded lab report will be returned to you in the following lab session and you are to put these in a folder. The folder stays in the lab until prior to the Exam. Monitor your class performance by keeping a record of your scores.

17. Make-up. No make-up is allowed and the student gets “zero” for the missed lab activity.

18. Attendance will be checked at the beginning of each Pre-Lab session. If you are absent, you will not get a grade for the experiment done on that date.

19. If you have any special learning needs, including hearing/visual impairment, please inform the instructor as soon as possible.

**DISABILITIES ACCOMMODATION**

If you have a physical, sensory, health, cognitive, or mental health disability that could limit your ability to fully participate in this class, you are encouraged to contact the Disability Specialist Counselor to discuss reasonable accommodations that will help you succeed in this class. Ann Lemke can be reached at 235-7448, lemke@hawaii.edu, or you may stop by Hale ‘Akoakoa 213 for more information.
## COURSE CONTENT AND SCHEDULE

Please refer to this table for the schedule of activities (and NOT the Laboratory Manual).

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Activity No. &amp; Title</th>
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<tbody>
<tr>
<td>1</td>
<td>8/25</td>
<td>1- Laboratory Safety, Equipment &amp; Procedures</td>
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<tr>
<td>2</td>
<td>9/1</td>
<td>2- Scientific Measurements &amp; Density</td>
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<tr>
<td>3</td>
<td>9/8</td>
<td>3- Thermal Energy Associated with Chemical &amp; Physical Changes</td>
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<td>4</td>
<td>9/15</td>
<td>4- Determination of Chemical Formula</td>
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<td>5</td>
<td>9/22</td>
<td>5- Stoichiometry</td>
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<tr>
<td>6</td>
<td>9/29</td>
<td>6- Types of Chemical Reactions</td>
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<tr>
<td>7</td>
<td>10/6</td>
<td>7- National Chemistry Week &amp; Mole Day</td>
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<tr>
<td>8</td>
<td>10/13</td>
<td>EXAM 1</td>
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<tr>
<td>9</td>
<td>10/20</td>
<td>8- Solution Preparation &amp; Concentration **</td>
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<tr>
<td>10</td>
<td>10/27</td>
<td>9- Determination of the Concentration of Acetic Acid in Vinegar</td>
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<tr>
<td>11</td>
<td>11/3</td>
<td>10- Boyle’s Law: Pressure-Volume Relationship in Gases**</td>
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<tr>
<td>12</td>
<td>11/10</td>
<td>11- Additivity of Enthalpy: Hess’s Law</td>
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<td>13</td>
<td>11/17</td>
<td>CFC and Global Warming ●</td>
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<tr>
<td>14</td>
<td>11/24</td>
<td>12- Conductivity of Solutions of Ionic &amp; Covalent Compounds **</td>
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<tr>
<td>15</td>
<td>12/1</td>
<td>13- Lewis Formula and Molecular Shapes</td>
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<tr>
<td>16</td>
<td>12/8</td>
<td>EXAM 2 &amp; Check Out</td>
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- **Subject to change**
- **Requires formal Lab report**