

Chem 162 L General Chemistry Laboratory II

1 credit (CRN 62445)

T 2:00 – 4:45 PM Imiloa 111 & 131

INSTRUCTOR:	David Reeves
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OFFICE HOURS:	T 1:00PM – 2:00PM
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EFFECTIVE DATE:	Fall 2013

WINDWARD COMMUNITY COLLEGE MISSION STATEMENT

Windward Community College offers innovative programs in the arts and sciences and opportunities to gain knowledge and understanding of Hawai'i and its unique heritage. With a special commitment to support the access and educational needs of Native Hawaiians, we provide O'ahu's Ko'olau region and beyond with liberal arts, career and lifelong learning in a supportive and challenging environment — inspiring students to excellence.

CATALOG DESCRIPTION

Laboratory experiments illustrating fundamental principles of chemistry (3 hrs. lab.)

Prerequisites: Credit or registration in Chem 162. *WCC: DY*

STUDENT LEARNING OUTCOMES

1. Develop an appreciation for the methods of scientific inquiry through computer-based laboratory experiments showing real-time data.
2. Apply knowledge to determine molar mass of unknown substance using freezing point data of solution.
3. Calculate chemical reaction rate and constant using graphing analysis.
4. Predict the effects of concentration and temperature changes on equilibrium mixtures using Le Chatelier's principle.
5. Determine whether equilibrium is established and calculate equilibrium concentration constants and cell potentials.
6. 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.

LEARNING RESOURCES

Required Textbook: Chemistry 162L Laboratory Manual Fall 2011, edited by Colmenares
Chemistry DVD Notes by K. Trivedi

Course Website: <http://laulima.hawaii.edu> (use UH email account login and password)

Other Requirements: Scientific Calculator, Lab goggles and Internet Access

Lab requirements: closed shoes and goggles

Lab attire: A lab gown is required if you wear shorts or low-waist pants/skirts or dress.

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:

13 Activities	70% of total
Midterm + Final Exam	30% of total
Total	100%

The lowest lab report score will be deleted. 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 and N ---- 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 online homework consisting of a reading assignment and completion of pre-lab questions and problems. The homework and pre-lab may consist of videos, websites and computer programs.

Conduct of the Lab:

First 50 min	Discuss answers to <u>pre-lab</u> 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
Last 30 minutes	Answer Post-lab questions

The activity report may be turned in at the end of the class, or at the latest at the start of the next meeting. If submitted late, a penalty will be imposed.

COURSE POLICIES AND TIPS FOR SUCCESS IN THIS CLASS

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 and in *Assignments* on Laulima 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(LM). **Be prepared** for the activity by reading **thoroughly** the background and pre-lab material on Laulima and take the online quiz. 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 and lecture textbook** to class at all times.
3. **Pre-lab Period (Imiloa 111).** You will take your *pre-lab quiz* on Laulima the day before the lab. The Pre-Lab and quiz constitutes **10% of the report grade**. Answers to the Pre-Lab problems and questions will be discussed individually with the instructor at the beginning of the lab period.
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. 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. If you arrive late, $\frac{1}{2}$ a point will be deducted from your lab score.
5. Some experiments require the use of **laptop computers** from the metal lab cart. This will be wheeled out of the Imiloa AV room before the class and returned there after class.
6. **During lab (Imiloa 131).** **Wear safety goggles and close-toed shoes at all times.** Sandals or slippers are not allowed. **You will NOT be permitted in the lab** if you are not wearing close-toed shoes. 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. Point deductions will be applied to data with incorrect precision.
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. Lab reports **will not** be accepted via email. 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**. Copying someone else's work or answers is cheating. Students involved in **cheating** will be assigned a grade of "F" and will be reported to the Dean. 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 *Rate Law Determination of the Crystal Violet Reaction, Chemical Equilibrium and LeChatelier's Principle and Titration Curves of Strong and Weak Acids and Bases* 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**. 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 return them to the instructor immediately after reviewing them. Graded labs will be returned to you to study a week before each 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

Jan 21 Martin Luther King Day	Feb 18 President's Day
Mar 1 Excellence in Education	Mar 25-29 Spring Break
Mar 21 Last Day to officially withdraw	Mar 29 Good Friday

Date	Activity	Notes
Jan 8	Laboratory Safety, Equipment & Procedures	
Jan 15	Intermolecular Forces	
Jan 22	Dry Ice and Phase Diagrams	
Jan 29	Separating Mixtures Using Chromatography	
Feb 5	Using Freezing Point Depression to Find Molecular Weight	
Feb 12	Make Your Own Demo	<i>Presentation in Class</i>
Feb 19	Rate Order Graphing Lab	
Feb 26	Rate Law Determination of the Crystal Violet Reaction	<i>Formal Lab Report</i>
Mar 5	Midterm Exam (Experiment 1-7)	
Mar 12	The Determination of an Equilibrium Constant	
Mar 19	Chemical Equilibrium and Le Chatelier's Principle	<i>Formal Lab Report</i>
Mar 26	Spring Break	
Apr 2	Acid Dissociation Constant, K_a	
Apr 9	Buffers	
Apr 16	Titration Curves of Strong and Weak Acids and Bases	<i>Formal Lab Report</i>
Apr 23	Establishing a Table of Reduction Potentials	
Apr 30	Final Long Exam (Experiment 8-14) & Check-out	

***Subject to change due to lecture alignment, etc.**