

## Chem 162 L General Chemistry Laboratory II

1 credit (CRN 60109)

M 2:00 - 4:45 PM Imiloa 111 & 131

**INSTRUCTOR:** Leticia Colmenares, Ph.D.  
**OFFICE:** Imiloa 116  
**E-MAIL:** Leticia@hawaii.edu  
**OFFICE HOURS:** MW 9:30-11:30 am (Imiloa 116)  
TR 11:30-12:30 pm (Imiloa 116)  
**TELEPHONE:** 236-9120  
**EFFECTIVE DATE:** Fall 2015

### 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 (2 hrs. 45 min 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  
Chem 162 Instructor Notes by Colmenares

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

Other Requirements: Scientific Calculator, Internet Access, Lab goggles, closed shoes and a lab gown if you wear short pants/skirt/dress or low-waist pants/skirts.

## 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:

12 highest (out of 13) Lab Reports*	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-- See college catalog,

[https://windward.hawaii.edu/Catalogs\\_Schedules/WCC\\_Catalog\\_current.pdf](https://windward.hawaii.edu/Catalogs_Schedules/WCC_Catalog_current.pdf)

## 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 activities.

Conduct of the Lab:

First 45 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 <b>Imiloa 111</b> )
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 (final due date).

## COURSE POLICIES AND TIPS TO SUCCEED IN THIS COURSE

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 course website. Use this syllabus as your course guide throughout the semester. Login the Lulima course website at least once a week.
2. **Before class.** Take the **online pre-lab quiz** before coming to class. The online quiz is available continuously for one week. It closes 30 minutes before the class starts. Your quiz

score constitutes **10% of the lab report grade**. Please allot two hours for this activity. This will be used to study the lab manual/videos about the new experiment and taking the pre-lab quiz. You are expected to become familiar with the concept, procedure and calculations that will be done in the lab.

If you did not turn in the lab report on the day the experiment was done, you have to allot an extra hour to finalize your lab report.

3. Bring your **Lab Manual, scientific calculator, lecture textbook** and **a stapler** to class at all times.
4. **Safety** is important. Wear closed-toed shoes (preferably sports shoes) to protect from danger of spilling chemicals. Slippers, sandals or similar footwear are not allowed. **You will NOT be permitted in the lab** if you are not wearing close-toed shoes. Short (above the knee) pants/skirt/dress and low-waist pants/skirts are not allowed unless you wear a lab coat over it.
5. **Pre-Lab period (Imiloa 111)**. Please come to class on time. Important background information about the experiment and safety will be discussed in the Pre-Lab discussion. During the Pre-Lab, you are expected to ask questions/clarification about the procedure and calculation. If you have a lot of questions, please see the instructor during office hours. Please take notes during the pre-lab session.

Attendance in the pre-lab discussion will count **5% of the lab report grade**. If you arrive late, you will be deducted 0.5 points from your lab score.

**Extra Credit:** It is highly recommended to have a separate laboratory notebook. If you take notes and dates, record data, observations and calculations for each experiment in a **separate notebook** and turn in the laboratory notebook at the end of the semester, you will get an extra credit of 5 points (total).

**Other extra credit** opportunities: Participation in the WCC Ho'olaule'a (Oct 3) and Chemistry at the Mall (Kahala) on Oct 17.

6. **During lab (Imiloa 131)**. **Wear safety goggles (found in lab cabinet) as soon as you enter the lab**. Follow the **directions in the Procedure** precisely. Gather your materials and supplies from the laboratory cart and from your drawer. Don't take short cuts nor fake results as these are readily spotted. Follow **laboratory rules and procedures** at all times. Treat all chemicals with respect, replace lids on bottles and report any accident or problem to the instructor. Points will be **deducted** when safety and chemical transfer procedures are not followed.
7. In the lab, you are to work in pairs. You will have a different partner each week for the first 6 weeks. This will be randomly assigned to you. Work cooperatively and maintain a positive attitude. Treat the lab as an **opportunity to learn teamwork**. Do **not** simply **rush** through an experiment in order to get out of the laboratory. **Maintain a positive attitude** and **work cooperatively** with other students and the laboratory instructor. **Be alert** and maintain **presence of mind**.
8. **Inappropriate and disruptive 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. Please step outside if you need to make a call.

9. When recording **measurements**. The **value must** reflect the precision of the instrument used. **Never round off measurements**. 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 strikethrough line. Point deductions will be applied to data with incorrect precision and units.
10. Do your calculations to check if results are reasonable before dismantling the setup. Show your calculation to the instructor. **Repeat the experiment** if there was a mistake. **Discuss** the probable **causes of error with the instructor** 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. When you are finished for the day, clean your glassware, dispose waste in proper containers, cap reagent bottles, and return materials, glassware, Vernier equipment and laptop computer to their proper storage areas. Clean the weighing balance and your bench-top. Points will be **deducted** when clean up and waste disposal techniques and procedures are not followed.
12. **After completing the lab**. Answer all questions (use internet resources if needed) and turn in your report if you are done by the end of the period.

If you have not completed your lab report before the end of class period, you can turn it in at the beginning of the next lab period (final due date). Cautionary note: In the past, students who don't turn in their reports on the day the experiment was conducted usually incur late penalties.

13. **Laboratory reports**. You are expected to turn in an **individual** report for each lab experiment. Please include all data and calculations, and answer ALL questions. Points will be deducted for every omission or incorrect answer.

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.

14. A **formal** laboratory report is required for Experiments on *Rate Law Determination*, *Chemical Equilibrium* and *Titration Curves* while an **informal** lab report is required for all the other experiments. **Formal reports** should follow the standard format. The **rubric for grading** the formal lab reports and tips on **how to write a formal report** are found in your Lab Manual. A sample formal lab report is accessible at Laulima course website.
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. After reviewing your graded report, return them to the instructor. They will be returned to you the week before the exam. These will be your primary review materials for the exam. **Monitor your**

*class performance by keeping a record of your scores on the table of contents page of the Lab Manual.*

17. **Make-up.** Chemicals and supplies are available only on the day of the lab activity. Hence, no make-up is allowed and the student gets “zero” for the missed lab activity. You cannot turn in a lab report for a missed activity.
18. **Attendance** will be checked at the beginning of each Pre-Lab session.
19. If you have any **special learning needs**, including hearing/visual impairment, please inform the instructor as soon as possible.
20. Please communicate with the instructor if you can't attend class 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](mailto:lemke@hawaii.edu), or you may stop by Hale 'Akoakoa 213 for more information.

### COURSE CONTENT AND SCHEDULE

Important Dates: **Last day for withdrawal, 10/30 (F)**

**Last day of instruction, 12/10 (F)**

Date*	Experiment Title	Notes
Aug 24	1- Laboratory Safety, Equipment & Procedures	
Aug 31	2- Intermolecular Forces	
Sep 7	<i>Labor Day Holiday</i>	
Sep 14	3- Dry Ice and Phase Diagrams	
Sep 21	4- Separating Mixtures Using Chromatography	
Sep 28	5-Using Freezing Point Depression to Find Molecular Weight	
Oct 5	6- Rate Order Graphing Lab	
Oct 12	7- <i>Rate Law Determination of the Crystal Violet Reaction**</i>	Formal Lab Report
<b>Oct 19</b>	<b>Midterm Exam (Experiment 1-6)</b>	
Oct 26	8- The Determination of an Equilibrium Constant	
Nov 2	9- Field Trip	Field Trip Report
Nov 9	10- <i>Chemical Equilibrium and Le Chatelier's Principle**</i>	Formal Lab Report
Nov 16	11- Buffers	
Nov 23	12- <i>Titration Curves of Strong and Weak Acids and Bases**</i>	Formal Lab Report
Nov 30	13- Establishing a Table of Reduction Potentials	
<b>Dec 7</b>	<b>Final Long Exam (Experiment 7-13) &amp; Check-out</b>	

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