

## **Chem 162 General Chemistry II**

3 credits (CRN 61057)

MW 11:30 – 12:45 pm Imiloa 111

<b>INSTRUCTOR:</b>	<b>Leticia Colmenares, Ph.D.</b>
<b>OFFICE:</b>	<b>Imiloa 116</b>
<b>E-MAIL:</b>	<b>Leticia@hawaii.edu</b>
<b>OFFICE HOURS:</b>	<b>MW 10:00-11:00 pm, TR 11:30-12pm</b>
<b>TELEPHONE:</b>	<b>236-9120</b>
<b>EFFECTIVE DATE:</b>	<b>Fall 2017</b>

### **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**

Second course of a two-course sequence designed to meet the one-year General Chemistry requirement for pre-med, science and engineering majors. Topics include thermochemistry, kinetics, acid-base equilibrium, solubility equilibrium and electrochemistry. Emphasis on problem solving. Concurrent registration in CHEM 162L is required.

*Prerequisites:* A grade of "C" or better in CHEM 161, credit or concurrent registration in MATH 135, or instructor's consent.

*Co-requisite:* Concurrent registration in CHEM 162L

*WCC:* DP

### **STUDENT LEARNING OUTCOMES**

1. Predict properties (boiling point, melting point, osmotic pressure, vapor pressure) of solutions based on concentrations.
2. Determine reaction rate law and calculate rate constants and half-life based on experimental data.
3. Calculate the equilibrium concentration of chemicals in solution involved in precipitation, acid-base and redox reactions.
4. Predict spontaneous reactions based on enthalpy and entropy considerations.
5. Determine the electrochemical potential of redox reactions.

### **COURSE TASKS**

- Assignment (Laulima and Masteringchemistry)
- Daily Quizzes & Attendance
- Four long exams
- Cumulative Final exam (ACS National Standardized)

## LEARNING RESOURCES

1. Required **Notes: Chemistry 162 Lecture Notes** Fall 2016 by Colmenares (sold at WCC Bookstore)
2. Required: [Masteringchemistry.com](http://www.masteringchemistry.com) for assignment (purchase access code **online**). **To register**, go to [masteringchemistry.com](http://www.masteringchemistry.com), *input* "COLMENARES17" course (without the quotation marks) and *select* "*Tro, Chemistry: A Molecular Approach, 4e*" as the "textbook." *Your old access code might still work.*
3. Required: *Tro, Chemistry: A Molecular Approach, 4e (etext)*
4. Required: **Voice-over PowerPoint Lecture & Livescribe on Lailima Course Content**
5. Required: **Scientific Calculator (cell-phone calculator not allowed)**
6. Highly Recommended: **Supplemental Instruction**
7. Highly Recommended: OLA (Online Learning Academy) <http://manoa.hawaii.edu/ola/>
8. Highly Recommended: BRAINFUSE ([login MyUH, My Tools](#))

## GRADING POLICIES

1. Your performance (in %) in each of the 8 categories (shown below) will be determined. Note that the cumulative final exam (ACS Standardized) is counted as two categories. However, your course grade will be based on the **average of the highest 7 categories only**. The lowest category % will be dropped.

Categories
1. Lailima & Masteringchem Assignment
2. Quizzes & Attendance
3. Midterm 1
4. Midterm 2
5. Midterm 3
6. Midterm 4
7. Final Exam
8. Final Exam

Your course grade will be assigned as follows:

Average	Course Grade
100-90 %	A
89-80 %	B
79-70 %	C
69-60 %	D
below 60 %	F

Curving might be employed if deemed necessary.

**N Grade:** The 'N' grade indicates that the student has worked conscientiously, attended regularly, finished all work, fulfilled course responsibilities, and has made measurable progress but has not achieved the minimal student learning objectives and is not yet prepared to succeed at the next level. Or, the student has made consistent progress in the class but is unable to complete the class due to extenuating circumstances, such as major health, personal or family emergencies. **Students requesting for N grade must provide a formal letter of request before the final examination with supporting evidences.**

The other grades **I, W, CR, NC** to be assigned are described in the current College Catalog. These options must be discussed with the instructor. The deadline to change from A-F to Cr/NC/audit option (**with Office of Admissions & Records**) is on **October 30, 2017**.

If you drop out from the course without any notice, you will get 'F' grade. To avoid this, please be sure to withdraw **officially (through MyUH)** by **October 30, 2017**.

- 2. Assignment:** The **Masteringchemistry.com** assignment is due every Monday (even if it's a holiday). The **Laulima** assignment is due every Wednesday (to discuss in group) and Friday (ALL Groups).

**Masteringchemistry:** The schedule is found in [masteringchemistry.com](http://masteringchemistry.com). All chapter assignments are now open. The set deadline is based on the projected date that the entire chapter will be discussed in class. You are **always** allowed to view hints, without penalty. You have bonus points when you don't use hints. You are allowed to rework the problems after the due date however the new score is not saved. **Late submission is penalized 10% per day**, but the total overall penalty is capped at 50%. It is better late than never.

**Laulima assignment.** This is composed of REACT problems found in the Lecture Notes. Upload and discuss your work in *Laulima Assignments* by Wednesday. Then, discuss the assignment with your group (**in Laulima Discussion**) and post your group's final assignment in Discussion by Friday. **Each React problem is worth one point.** Only one submission (the first one in case of multiple submissions) per group is allowed in Discussion. All members who participate in the group discussion will receive the same group score in Discussion. **You are expected to ALWAYS show complete work or explain your answer, even if the problem or question does not specifically ask for it.** If you don't participate in the discussion for the final answers, your score is zero. If your group does not post the final answers, the whole group gets zero.

- 3. Attendance & Quizzes.** Please prepare for a pop quiz everyday (1-3 questions per quiz). Please prepare a half sheet of paper for the quiz every meeting.
- There will be **four long exams**, each of which will cover approximately one-fourth of the course. Each will last for about **100 min**. Some of these will be conducted in the WCC Testing Center.
- The **final exam** (ACS Standardized Exam) will **cover all topics** (cumulative) 2 hrs. long. This is the National ACS Standardized exam (70 multiple-choice questions). The dates of these assessments are given in the Course Schedule (see last page). All these exams will be closed book.
- It is mandatory to attend at least 5 **supplemental instruction (SI) sessions** or **tutoring** during the semester. You will receive 1 extra credit point per 1-hour session. The SI Leader will communicate the SI schedule via email. If it is impossible for you to attend SI sessions, please use OLA (<http://manoa.hawaii.edu/ola/>) or BRAINFUSE (in MyUH). Students should use tutoring from the very beginning of the semester **before** running into difficulty.

## HOW TO STUDY FOR THIS COURSE

Nothing is more important to your academic success than strong study skills. On average, you should spend about **seven hours per week outside** the classroom to study for this course. Please apply the tips here: <http://www.developgoodhabits.com/study-schedule/>

1. Prepare for each class by reading the **Lecture Notes** or watching the **videos/voice-over PowerPoints in the course website**. Make marginal notes on the Lecture Notes. Identify and define unfamiliar terms. Reading beforehand will help you to listen more actively in class and give an advanced indication of any difficulties that you can then clarify in the lecture. **Do ALL problems.**
2. Use the **Lecture Notes** during class. Take **notes** during the lecture. Bring your **calculator** at all times. Ask **questions** if you do not understand.
3. **Participate** in the discussion and the in-class quizzes and **group activities**.
4. **Review** your notes soon after class. Attend the **supplemental instruction** sessions held **before** the lecture in the classroom. This is a good place to edit your notes, find and fill in missing points, and get tips on how to solve the assignment and review for quizzes and exams. Be sure to summarize the main point of the lecture in a few sentences.
5. Watch the videos and multimedia (including Livescribe) on the course website, do all the interactive problems, and the online **tutorials**.
6. Do all REACT problems in your Lecture Notes. Post your assignment in your group Discussion forum. Discuss with your group and help arrive at a consensus. Take turns in posting the group final answers.
7. Complete the **Masteringchemistry.com chapter assignment** before the due date.
8. Please spend **at least 7 hours per week outside of class**. Here is how your time will be allocated during most weeks:
  - 2-3 hours reading chapter notes and multimedia.
  - 1-2 hours participating in **SI sessions** and **online group work**.
  - 3-4 hours doing Laulima and masteringchem assignments

## OTHER POLICIES

1. The topics and exam schedule are found in the **Course Schedule** on the last page.
2. It is expected that you have the required **mathematics skills** for the course. Please check the math review section on pp 110-112 in the Lecture Notes. (i.e. logarithms, line equation, graphing). Please let me know **immediately** if you have any problems with any of these.
3. If you are **absent**, the quiz you missed will be counted as **zero**. There is no makeup for missed quizzes.

4. **Missed Exam.** Only one missed *long exam* (with requisite doctor's note, police report or obituary notice) **can** be made up, if you notify the instructor **in advance or on the day of the exam**. There will be **no make-up** for the **final** exam.
5. A **scavenger hunt & syllabus quiz is mandatory**. This will be given on August 23, 2017. It is very important that you become familiar with the tools in the course website: Course Content, Discussion, Resources and Gradebook.
6. **Laulima Group Assignments.** The purpose is to learn through interactions and feedback from other students. Laulima assignments (REACT problems) will be posted in Laulima Homepage every week. Each student must complete **individual** assignment by Wednesday midnight. Copy and paste the assignment in Laulima Discussion by Wed 11:59 pm. If another group member had already posted a set of answers, what you have to do is go over the answers and write your comments. Ask, if you don't know how to get the correct answers. State, which answers you don't agree with and explain why. State what you think the correct answers are and hash it out with group members. If you agree with all the answers, state that, and respond to any other questions posted there. After hashing out controversial questions, the group arrives at a consensus on what the final answers will be. The group leader must post the group final answers in the "ALL GROUPS FORUM" in Discussion by Friday midnight. Each group must have only one group submission in Discussion. In case there are multiple submissions, only the first one will be recognized.

Instructor feedback will be provided on your group submission. **Please go back to the "ALL GROUPS FORUM" to view the comments and scores.**

All **who participated** in the group discussion will receive the same score. Those who did not participate will get a score of zero. If your group did not submit a group answer, then everyone in your group will get a score of zero. Each group must have a back-up leader to check that the final answers are posted before the due date.

7. **Extra Credit.** You can earn extra credit up to a **maximum of 20 points =2% of total grade**. For example, attendance in a chemistry forum with a written summary of the topic is 3 points. The forum schedule will be posted at [http://www.wcc.hawaii.edu/chemistry\\_forum](http://www.wcc.hawaii.edu/chemistry_forum). Other opportunities include participation in chemistry outreach projects, and attending SI/tutoring sessions.
8. Your scores and grades are accessible 24/7 in **Laulima gradebook**.
9. Communicating with instructor. If you use "email," please ALLOW 24 HOURS for responses to emails or messages. In emergencies, please call at 236-9120. Please utilize my office hours in Imiloa 116, or you may schedule a special appointment.
10. **Don't cause or tolerate distractions.** Move or tactfully ask those making noise to be quiet.
11. **Disruptive behavior** leads to loss of learning time. Examples are activated cell phones, checking /sending text messages, making offensive remarks, eating or drinking in the classroom, packing of books, making noise, leaving class early, sleeping in class, prolonged chattering, reading other materials not relevant to this

class, etc. Disruptive students will be warned ONCE but if disruptive behavior continues, the instructor will exclude the student from that class meeting, and will be marked absent and reported to the Dean. Cell phones, when used in class, will be confiscated.

12. If you have any *special learning needs*, including hearing/visual impairment, please inform the instructor as soon as possible.
13. An "F" will be assigned to students involved in *cheating* systems.
14. Any class announcement pertaining to changes in schedule will be made at least a week prior to the affected date and posted on Lulima. However, **you are responsible** for knowing these changes, whether or not you were in class for the announcement. If you were late or missed class please borrow notes from your classmate and SI leader.
15. Software requirements for Lulima course website.
  - Lulima and Bb Collaborate (for online SI) are best used in Firefox.
  - Videos are in mp4 format. Use video players such as VLC player and Quicktime Player.
  - Powerpoints and Livescribe notes are in PDF format. Best viewed in Adobe Reader.
  - Make sure Java is up to date. Downloads are available at <https://www.java.com/en/download/>

#### 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. **Also, inform your instructor ASAP.**

#### COURSE CONTENT AND TENTATIVE SCHEDULE

**Important Dates: No classes on Sep 4 (M), Nov 10 (F), Nov 23-24 (RF)**

**Last day for withdrawal and change grade option, Oct 30 (M)**

**Last day of instruction, Dec 7 (R)**

Date*	Chapter	SLO and Topics
8/21	Introduction	Review
8/23	11- Liquids, Solids & Intermolecular Forces	Dispersion, Dipole-dipole forces, Hydrogen bonding, heating curve, phase diagrams, properties of liquids, unit cell, types of solids, types of solids, semiconductors
8/30	12-Solution Properties	Predict properties (boiling point, melting point, osmotic pressure, vapor pressure) of solutions based on concentration. Solvation, factors affecting solubility, enthalpy & entropy of solution, Henry's law.

9/13	<b>Midterm 1</b>	
9/18	<b>13- Chemical Kinetics</b>	Determine reaction rate law and calculate rate constants and half-life based on experimental data. Reaction mechanism, activation energy, catalyst, intermediate, Arrhenius equation, collision theory
9/27	<b>14- Chemical Equilibrium</b>	Characteristics of equilibrium, Equilibrium constant, K, Le Chatelier's principle, equilibrium calculations, reaction quotient, Q.
10/11	<b>Midterm 2</b>	
10/16	<b>15- Acids &amp; Bases</b>	Strong and weak acids and bases, conjugate acid/base, pH, salts and oxides, convert between: $[H_3O^+]$ , pH, $[OH^-]$ and pOH. Calculate $K_a$ (or $K_b$ ), % ionization, pH, or $[H^+]$ for a weak acid or weak base solution, Predict whether a salt solution will be acidic, basic or neutral.
10/23	<b>16- Aqueous Equilibria</b>	Calculate the equilibrium concentration of chemicals in solution involved acid-base reactions. Common-ion effect, Titrations, Buffers, pH curves, indicators. Calculate the equilibrium concentration of chemicals in solution involved in precipitation reactions. Calculate solubility, $K_{sp}$ , and predict whether precipitation occurs.
11/8	<b>Midterm 3</b>	
11/13	<b>17- Spontaneity, Entropy and Free Energy</b>	Predict spontaneous reactions based on enthalpy and entropy considerations. Second Law of Thermodynamics, Free energy, Third Law of Thermodynamics. Calculate $\Delta G^\circ$ from K and perform the reverse operation: $\Delta G^\circ = -RT \ln K$
11/20	<b>18- Electrochemistry</b>	Determine the electrochemical potential of redox reactions. Electrochemical cells, electrolysis, anode/cathode, cell potentials, volts, coulombs. Interconvert $E^\circ$ , $\Delta G^\circ$ and K for redox reactions, Use the Nernst Equation.
11/29	<b>Midterm 4</b>	
12/4	<b>19- Nuclear Chemistry</b>	Balancing nuclear equations, types of radiation, review first order reaction, half-life, radiocarbon dating
12/6	<b>Review</b>	
12/13 Wed	<b>FINAL EXAM 11:30-1:30 P.M.</b>	ACS National Standardized Exam

*\*This syllabus is subject to change. Please bring any error to the attention of the instructor.*