Chem 162 General Chemistry II
3 credits (CRN 61072)
MW 11:30 – 12:45 PM Imiloa 111

INSTRUCTOR: Leticia Colmenares, Ph.D.
OFFICE: Imiloa 116
E-MAIL: Leticia@hawaii.edu
OFFICE HOURS: MW 10:30-11:30 pm, TR 11:30-12:30 pm
TELEPHONE: 236-9120
EFFECTIVE DATE: Spring 2016

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 by Colmenares (sold at WCC Bookstore)
2. Required: Masteringchemistry.com for assignment (purchase access code online). To register, go to masteringchemistry.com, input “MCCOLMENARES33888” course and select “Tro, Chemistry: A Molecular Approach, 3e” as the “textbook.”
3. Required: Voice-over PowerPoint Lecture & Livescribe on Laulima Course Content
4. Required: Scientific Calculator (cell-phone calculator not allowed)
5. Optional: Any General Chemistry Textbook (WCC Library Circulation Call # QD) or Tro, Chemistry: A Molecular Approach, 3e
6. Optional: Supplemental Instruction (after Monday class) and online

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. Your course grade will be based on the average of the highest 7 categories. The lowest category % will be dropped.

<table>
<thead>
<tr>
<th>Categories</th>
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<tbody>
<tr>
<td>1. Laulima &amp; Masteringchem Assignment</td>
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<td>2. Quizzes &amp; Attendance</td>
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<td>3. Midterm 1</td>
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<td>4. Midterm 2</td>
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<td>5. Midterm 3</td>
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<td>6. Midterm 4</td>
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<td>7. Final Exam</td>
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<td>8. Final Exam</td>
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</table>

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 **Mar 29, 2016**.

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 **Mar 29, 2016**.

2. **Assignment**: The **Masteringchemistry.com** assignment is due every Monday (even if it’s a holiday). The **Laulima** assignment is due every Wednesday (individual) and Friday (group).

**Masteringchemistry**: The schedule is found in 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 used 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 your individual 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: 0.4 points in the individual submission) and 0.6 points** (in the group submission). 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.

3. **Attendance & Quizzes.** Please prepare for a quiz everyday (1-3 questions per quiz). Please prepare a half sheet of paper for the quiz every meeting.

4. 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.

5. 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.

6. You are recommended to attend **supplemental instruction (SI) sessions or tutoring** during the semester.

The **OLA online tutoring**, [http://manoa.hawaii.edu/ola/](http://manoa.hawaii.edu/ola/) is also available everyday except Saturdays and State holidays. 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.

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. Submit your individual assignment in Laulima. 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 in the appendix in the Lecture Notes. (i.e. algebraic equations, exponential notations, significant figures, proportionality, percentages, logarithm). 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. **Assignments.** An assignment is due every week.

**How to submit individual assignment.** The individual assignment must be readable and should be saved in .doc or .docx or .pdf but NOT in .txt or .wps or .pages

**IMPORTANT. If you are using a word-processing software other than Microsoft word, please convert your submission to .pdf so I can open it and grade it.** Label the file with your family name and date and upload in Laulima “Assignments” as attachment. This is due every Wednesday. If you don’t submit an assignment, your assignment score will be zero.

**How to submit group assignment.** After uploading the individual assignment on Wednesday, you are expected to discuss the assignment with your group in Laulima Discussion. The group final answers must be posted in the “ALL GROUPS FORUM” in Discussion by Friday. Each group must have only one group submission in Discussion. In case there are multiple submissions, only the first one will be recognized. If you don’t participate in the group discussion, or if your group did not submit a group answer, then your group assignment score will be zero.

The instructor will give feedback to each assignment in the ALL Group Discussion. Go back to the “ALL GROUPS FORUM” to view the comments and scores.

6. The scavenger hunt assignment is mandatory. Please do this as soon as possible. It is very important that you become familiar with the tools in the course website: Course Content, Assignments, Discussion & Private Messages, Resources and Gradebook. Please download the scavenger hunt activity from Laulima Course Content, answer it, save it and upload in Assignments.

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 4 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. You have access to your scores and grades 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 beepers and 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. If a student takes part in disruptive behavior, the instructor reserves the
right to exclude immediately the student from that class meeting, and will be marked absent.

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 Laulima. 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 Laulima course website.
   · Laulima 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/](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:** Non-Instructional Days, Jan 18, Feb 15, Mar 21, Mar 23

**Last day for withdrawal and change grade option,** Mar 29 (T)

**Last day of instruction,** May 4 (W)

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<tr>
<th>Date*</th>
<th>Chapter</th>
<th>SLO and Topics</th>
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<tr>
<td>1/11</td>
<td>Introduction</td>
<td>Review</td>
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<tr>
<td>1/13</td>
<td>11- Liquids, Solids &amp; Intermolecular Forces</td>
<td>Dispersion, Dipole-dipole forces, Hydrogen bonding, heating curve, phase diagrams, properties of liquids, unit cell, types of solids, types of solids, semiconductors</td>
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<tr>
<td>1/27</td>
<td>12-Solution Properties</td>
<td>Predict properties (boiling point, melting point, osmotic pressure, vapor pressure) of solutions based on concentrations. Solvation, factors affecting solubility, enthalpy and entropy of solution, Henry’s law.</td>
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<tr>
<td>Date</td>
<td>Midterm</td>
<td>Outline</td>
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<td>2/3</td>
<td>Midterm 1</td>
<td>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</td>
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<td>2/8</td>
<td>13- Chemical Kinetics</td>
<td>Characteristics of equilibrium, Equilibrium constant, K, Le Chatelier's principle, equilibrium calculations, reaction quotient, Q.</td>
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<td>2/22</td>
<td>14- Chemical Equilibrium</td>
<td>Strong and weak acids and bases, conjugate acid/base, pH, salts and oxides, convert Convert between: [H₃O⁺], pH, [OH⁻] and pOH. Calculate Ka (or Kb), % ionization, pH, or [H⁺] for a weak acid or weak base solution, Predict whether a salt solution will be acidic, basic or neutral.</td>
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<td>3/2</td>
<td>Midterm 2</td>
<td>Calculate the equilibrium concentration of chemicals in solution involved acid-base reactions. Common-ion effect, Titration, Buffers, pH curves, indicators. Calculate the equilibrium concentration of chemicals in solution involved in precipitation reactions. Calculate solubility, Ksp, predict whether precipitation occur.</td>
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<td>3/7</td>
<td>15- Acids &amp; Bases</td>
<td>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: $\Delta G^\circ = -RT\ln K$</td>
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<tr>
<td>3/16</td>
<td>16- Aqueous Equilibria</td>
<td>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.</td>
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<td>4/4</td>
<td>Midterm 3</td>
<td>Balancing nuclear equations, types of radiation, review first order reaction, half life, radiocarbon dating</td>
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<td>4/6</td>
<td>17- Spontaneity, Entropy and Free Energy</td>
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<td>4/18</td>
<td>18- Electrochemistry</td>
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<td>4/27</td>
<td>19- Nuclear Chemistry</td>
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<td>5/2</td>
<td>Midterm 4</td>
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<tr>
<td>5/4</td>
<td>Review</td>
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<tr>
<td>5/11</td>
<td>FINAL EXAM Wed</td>
<td>11:30-1:30 P.M.</td>
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