Chem 162 General Chemistry II
3 credits (CRN 63344)
MW 11:30 – 12:45 PM Imiloa 111

INSTRUCTOR: Leticia Colmenares, Ph.D.
OFFICE: Imiloa 116
E-MAIL: Leticia@hawaii.edu
OFFICE HOURS: M 10:30-11:30 pm, T 11:30-12:30 pm
TELEPHONE: 236-9120
EFFECTIVE DATE: Spring 2015

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

- Homework (weekly online and weekly paper-based)
- Daily Quizzes
- Four long exams
- Cumulative Final exam (ACS National Standardized)
GRADING

1. Grades will be based on the following categories: homework, quizzes & attendance, 4 long exams and a final exam (counted 2 times). Your performance (in %) in each category will be determined. The lowest % will be dropped. The average of the remaining seven categories will determine your course grade, as follows:

<table>
<thead>
<tr>
<th>Average</th>
<th>Course Grade</th>
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<tbody>
<tr>
<td>100-90 %</td>
<td>A</td>
</tr>
<tr>
<td>89-80 %</td>
<td>B</td>
</tr>
<tr>
<td>79-70 %</td>
<td>C</td>
</tr>
<tr>
<td>69-60 %</td>
<td>D</td>
</tr>
<tr>
<td>below 60 %</td>
<td>F</td>
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</tbody>
</table>

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 31, 2015.

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 31, 2015.

2. **Homework:** The online homework (masteringchemistry.com) is due every Sunday/Monday (even if it’s a holiday). The paper-based homework is due every Wednesday. The assignment schedule will be posted in Laulima.

**The paper-based homework** must ALWAYS show complete work, even if the problem/question does not specifically ask for it. The paper-based homework is intended to provide practice in writing out mathematical solutions, chemical reactions/equations and reasoning.

**Mastering Chem homework:** Please go to masteringchemistry.com and register in course ID COLMENARES63344 and indicate “Tro, Chemistry: A Molecular Approach, 3e as the textbook. “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 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%. Better late than never.

The paper-based homework is due at the beginning of the class period. Late homework will not be accepted. If you are not coming to class, you may turn in the
homework by email, but it must be sent before the start of class.

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 required to attend at least 5 **supplemental instruction (SI) sessions** during the semester. You will be deducted points for not meeting the minimum. You will get extra credit points for going beyond the minimum.

**LEARNING RESOURCES**

1. Required Notes: Chemistry 162 Lecture Notes by Colmenares (sold at WCC Bookstore)
2. Required: Masteringchemistry.com for online homework and tutorials (purchase access code online).
3. Scientific Calculator (cell-phone calculator not allowed)
4. Laulima course website: lecture videos
5. Optional: Any General Chemistry Textbook (WCC Library Circulation Call # QD)
6. Required: Supplemental Instruction (after every class)
7. OLA (Online Learning Academy) open everyday except Saturday.
   http://manoa.hawaii.edu/ola/

**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 familiarizing yourself with the lecture slides in the Lecture Notes and watching the videos in the course website. Make marginal notes on the slides. 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 Learning Checks (REACT problems).**

2. Use the Chem 162 Instructor Notes during class. Take notes during the lecture. Bring your calculator at all times. Ask questions if you do not understand.

3. Participate in all the in-class and inquiry-based 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 your homework 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 on the course website, do all the interactive problems, and the online **tutorials**.

6. Do additional **practice exams and other review problems** in your Lecture Notes, Modules (Laulima) and Study Area (Mastering Chemistry).

7. 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, tutorials and DVD/flash drive text.
   - 1-2 hours participating in SI sessions
   - 3-4 hours doing homework and practice problems

**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 instructor notes. (i.e. algebraic equations, exponential notations, significant figures, proportionality, percentages, logarithm). Another place to review this is in Masteringchemistry **Study Area**. 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. **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 beyond the minimum number of SI sessions.

6. You have access to your scores and grades **24/7** in **Laulima gradebook**.

7. 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.

8. **Don't cause or tolerate distractions.** Move or tactfully ask those making noise to be quiet.
9. **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.

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

11. An "F" will be assigned to students involved in **cheating** systems.

12. Any class announcement pertaining to changes in schedule will be made at least a week prior to the affected date. 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.

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

**COURSE CONTENT AND TENTATIVE SCHEDULE**

Holidays: Jan 19 (M), Feb 16 (M) Mar 6 (F), Mar 23-27 (R), Apr 3 (F)

Important Dates: 01/16/15 Last day to receive 100% tuition refund  
02/02/15 Last day to receive 50% tuition refund  
02/02/15 Last day to drop (No 'W' on transcript)  
03/31/15 Last day to withdraw from class ("W" on transcript)

<table>
<thead>
<tr>
<th>Date*</th>
<th>Chapter</th>
<th>SLO and Topics</th>
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<tbody>
<tr>
<td>1/12</td>
<td>Introduction</td>
<td>Review</td>
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<tr>
<td>1/14</td>
<td>11- Liquids, Solis &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>1/26</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>Event</td>
<td>Details</td>
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<tr>
<td>2/9</td>
<td><strong>Midterm 1</strong></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>2/18</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>3/2</td>
<td>14- Chemical Equilibrium</td>
<td>Characteristics of equilibrium, Equilibrium constant, K, Le Chatelier's principle, equilibrium calculations, reaction quotient, Q.</td>
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<tr>
<td>3/9</td>
<td><strong>Midterm 2</strong></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>3/16</td>
<td>15- Acids &amp; Bases</td>
<td>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, Ksp, predict whether precipitation occur.</td>
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<tr>
<td>4/8</td>
<td><strong>Midterm 3</strong></td>
<td>Determine the electrochemical potential of redox reactions. Electrochemical cells, electrolysis, anode/cathode, cell potentials, volts, coulombs. Interconvert E°, ΔG° and K for redox reactions, Use the Nernst Equation.</td>
</tr>
<tr>
<td>4/13</td>
<td>17- Spontaneity, Entropy and Free Energy</td>
<td>Balancing nuclear equations, types of radiation, review first order reaction, half life, radiocarbon dating</td>
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<td>4/20</td>
<td>18- Electrochemistry</td>
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<td>4/29</td>
<td>19- Nuclear Chemistry</td>
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<tr>
<td>5/4</td>
<td><strong>Midterm 4</strong></td>
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<tr>
<td>5/6</td>
<td><strong>Review</strong></td>
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<tr>
<td>5/13</td>
<td><strong>FINAL EXAM</strong></td>
<td>11:30-1:30 P.M.</td>
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* Assignment/exam calendars may be changed due to institutional, weather or class problems.