CHEM 2H
Honors General Chemistry I
Fall 2015

Instructors: Prof. Hrant P. Hratchian — Prof. Erik J. Menke

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Office Hours: TBD

TA: TBD

Class Meeting Times: Mon., Wed., and Fri.; 12:30 am – 1:20 pm; COB 272.
Laboratory Meeting Time: Tues.; 2:30 pm – 5:20 pm; S&E 1, Rm. 108.
Final Exam: *Mon., Dec. 14; 3:00 pm – 6:00 pm.*

Course Description: CHEM 2H is comprised of lecture and laboratory components. In the lecture component, you will be introduced to basic concepts of modern chemistry. Topics considered include atomic and molecular structure, chemical bonding, stoichiometric calculations, types of chemical reactions, properties of gases, and chemical equilibrium. The laboratory component introduces general laboratory procedures and techniques, as well as acceptable data collection, analysis, and reporting practices.

Purpose and Goals: CHEM 2H is the first of a two-semester honors general chemistry sequence, which exposes the student to a lecture and laboratory experience. The focus of this course is twofold: conceptual and mathematical. The mathematical tools used in general chemistry are stressed with particular emphasis placed on stoichiometric calculations and gas phase equilibriums. The study of basic thermochemistry is an integral part of the course leading to additional insight to chemical reactivity. A conceptual approach is used to study periodic trends observed in the chemical and physical properties of the elements. The concepts of atomic structure and atomic orbital theory are examined and expanded to the molecular orbital theory leading to an understanding of covalent bonding. A laboratory section supports the conceptual and mathematical approaches emphasized in this course. The experimental procedures conducted in the laboratory are designed to reinforce and supplement lecture topics.

Learning Outcomes: Upon successful completion of this course, students will be able to:

(1) Derive names and formulas of compounds using the IUPAC system of inorganic nomenclature for binary compounds and oxyacids;
(2) Determine molecular formulas from data, balance chemical equations, predict formation of precipitates, and use stoichiometric relationships to calculate amount reactant/product with applications to limiting reagent and percent yield concepts;
(3) Analyze the energy associated with chemical reactions, perform simple chemical thermodynamic calculations, and be able to apply these concepts to the first law of thermodynamics, stoichiometric relationships, calorimetry and Hess's law;
(4) Explain the basic concepts of quantum theory and the basic theories of chemical bonding, and be able to make predictions about atomic and molecular properties;

(5) Determine whether a reaction is at equilibrium, calculate equilibrium constants and equilibrium concentrations, and apply the principles of equilibrium and reaction kinetics to gas phase systems; and
(6) Perform basic chemistry laboratory techniques, use common laboratory instruments, record data and observations accurately, and describe sources of error and uncertainty in experimental data.

Successful completion of these outcomes will be assessed by performance on quizzes, in-class exams, a cumulative final exam, and laboratory reports.

Prerequisites: Enrollment in this course requires:
(1) A CPEX score of 23 and an MPEX score of 22; or
(2) Completion of CHEM 1 with a minimum grade of B and concurrent registration in MATH 12; or
(3) A minimum score of 4 on the Chemistry Advanced Placement exam with MATH 12 as a pre- or co-requisite course or equivalent.

Required Text and Materials: A number of materials are required for the lecture and laboratory components of this course. These required materials include:
(1) *Chemical Principles*, Atkins, Jones, and Laverman, 6th Edition;
(2) Non-programmable scientific calculator (see below for information on acceptable calculators);
(3) CHEM 2H Lab Manual, 2013 Edition, available on the UCMCROPS course site;
(4) Carbonless-Copy Laboratory Notebook;
(5) ANSI Z87.1 compliant safety goggles with indirect-vent splash protection;
(6) Lab coat, close-toed shoes, and long-pants for lab; and

Calculators: Students should have a scientific calculator. Scientific calculators properly handle the order of operations and are capable of computing logarithms ("log x" and "ln x" keys), exponentials ("e^x" key), and scientific notation ("10^" or "EE" key). Calculators possessing "QWERTY" keyboards, smart phones, and programmable calculators are unacceptable and will NOT be permitted during exams or quizzes.

Grading: The grading scale for the course is as follows:

90 – 100%	A
75 – 90%	B
60 – 75%	C
50 – 60%	D
0 – 50%	E

The low end of each grade percentage will NOT be raised. However, the instructor reserves the right to decrease the low end (and the corresponding high-end percentage bracket of the next lower letter grade) of one or more grade percentage bracket(s).

Grades in the course will be based on average scores on homework, quizzes, a group project, in-class exams, the cumulative final exam, and laboratory reports. The weighting of these five components of the course grade is as follows:

Quizzes	10%
In-class exams	25%
Cumulative final exam	25%
Participation	10%
Laboratory reports	30%

Quizzes – Quizzes will be administered from time to time. These quizzes may or may not be announced in advance, will begin promptly at the beginning of the lecture or laboratory period, will be timed, and will be short (5 to 10 minutes). Each student's lowest two quiz grades will be dropped. Tardiness does not excuse a student from a quiz.

In-Class Exams – There will be three in-class exams during the semester. No exam scores will be dropped! However, if ALL of the exams have been taken and the score on the final exam is higher than the score of the lowest in-class exam, the lowest in-class exam score will be replaced by the final exam score. The dates of in-class exams are given below in the tentative class schedule. During the semester, there may be a need to reschedule exam dates; not attending class will not be an excuse for missing any such announcements. If anyone NOT registered for this course takes an exam, it will NOT be graded. Furthermore, the unregistered student will NOT be given permission to register after the exam.

Cumulative Final Exam – There will be a **CUMULATIVE** final exam. Per the University schedule, the final exam will be held on **Monday, December 16, 2015**. The final exam will take place in **COB 272**, will begin at **3:00 pm**, and will end by **6:00 pm**.

Participation – As there is a large portion of this class that involves discussion, your active participation will be evaluate and will contribute to the overall course grade. Participation grades will be based on active engagement in class summary sessions and other group based learning activities during the semester.

Laboratory Reports – The average of laboratory report grades will constitute 30% of your total course grade. No laboratory report grades will be dropped. See the section below regarding laboratory expectations for more information.

Late Lab Reports and Missed Exams and Quizzes: Late laboratory reports will NOT be accepted. Likewise, make-up exams and quizzes are not normally given. If there are extenuating circumstances that will prevent a student from taking an exam at the scheduled time, he/she must contact the instructors prior to the exam date. If the absence is excused (see below), and if possible, the student may be allowed to take the exam early. If by necessity a student misses an exam without notifying the instructors in advance, it is the student's responsibility to contact the instructors as soon as possible and certainly before the next class meeting. If the absence is excused (see below) then the final exam score will be used in place of the missed in-class exam score. Missed quizzes will be dropped if the absence is excused (see below) provided that the student contacts the instructor before the next class meeting.

In order for an absence to be considered excused, written documentation may be requested. Such documentation should be on official stationary with the telephone number of the appropriate contact person. Examples of excused absences include: sickness, family funeral, illness within the immediate family, and court appearance or other legal situations. Absences on major religious holidays are excused with at least one week's advance notice.

Homework: From time to time homework problems will be suggested. These problem sets will not be required or graded, but are strongly recommended.

Laboratory Expectations: Each laboratory will have a pre-lab assignment posted on CatCourses at least five days in advance of the scheduled laboratory meeting. Pre-lab assignments are not included in the course grade, but students will not be permitted to enter the laboratory until the corresponding pre-lab has been completed with all correct answers.

Attendance at every laboratory meeting is mandatory. Since specialized equipment is only available on a weekly basis, it is not possible to conduct experiments during any time other than the regularly scheduled laboratory period. **Passing the laboratory component is a requirement for passing the course.** Receiving 50% or less than the available laboratory scores or missing three or more experiments or reports will result in an "E" for the entire course, regardless of your overall course point total. Unsatisfactory, incomplete, or missing reports will receive zero points.

CatCourses Site: The CHEM 2H course site is found on the CatCourses learning management system and will be automatically available to all students enrolled in the course. To log in, go to the MYUCMERCED portal at https://my.ucmerced.edu and log in using your UC Merced username/password. This site will contain the course syllabus, announcements, lecture handouts, homework problems (with solutions), quiz and exam keys, and laboratory manual.

Phones and Other Electronic Devices: Cellular phones, pagers, and other electronic devices are to be turned off at all times during class and laboratory meetings. For those students whose professions and/or personal situations require a cellular phone and/or pager during class, please answer calls/pages after promptly, and inconspicuously, leaving the classroom/lab.

Academic Accommodations: Under Section 504 of the Rehabilitation Act of 1973, a post-secondary student with a disability who is in need of academic accommodations or auxiliary aids is required to notify the University of the nature of the disability and to provide appropriate documentation which supports the request for reasonable accommodations or auxiliary aids. Individuals who would like to self-identify with a disability (and have not already) or think they may have a disability and want to request accommodations should contact the Disability Services Center (KL 109; disabilityservices@ucmerced.edu) to verify their eligibility for appropriate accommodations. Also, please make an appointment with me during the first three weeks of term to discuss any appropriate academic accommodations for which you have documented eligibility.

Academic Honesty: Don't cheat! At all times you are expected to complete all of your own work. Never submit someone else's work as your own. During exams, do not bring any electronic equipment other than your non-programmable calculator. Cell/camera phones, portable music players, iPods, or any other items that use headphones, display screens, or information recording/retrieval are strictly prohibited during exams. All UC Merced honor codes apply at all times throughout the course and can be found at the Student Judicial Affairs website (http://studentlife.ucmerced.edu/what-we-do/studentjudicial-affairs).

Tentative Schedule

Date(s)	Chapter/Activity
8/26	Course overview
8/28 – 8/31	Chapter 1
9/2	Chapter 2
9/4	***Group Summary Day & Quiz***
9/7	***Labor Day Holiday – No Class***
9/9 – 9/11	Chapter 2
9/14 – 9/16	Chapter 3
9/18	***Group Summary Day & Quiz***
9/21 – 9/23	Chapter 3
9/25	***EXAM 1***
9/28 – 9/30	Chapter 4
10/2	***Group Summary Day & Quiz***
10/5 – 10/7	Chapter 4
10/9	***Group Summary Day & Quiz***
10/12	Chapter 4
10/14	Chapter 5
10/16	***Group Summary Day & Quiz***
10/19 – 10/21	Chapter 5
10/23	***EXAM 2***
10/26 – 10/28	Chapter 6
10/30	***Group Summary Day & Quiz***
11/2 – 11/4	Chapter 6
11/6	***Group Summary Day & Quiz***
11/9	Chapter 6
11/11	***Veteran's Day Holiday – No Class***
11/13	Chapter 6
11/16 – 11/18	Chapter 8
11/20	***Group Summary Day & Quiz***
11/23	Chapter 8
11/25 – 11/27	***Thanksgiving Day Holiday – No Class***
11/30 – 12/2	Chapter 8
12/4	***Group Summary Day & Quiz***
12/7	***EXAM 3***
12/9 – 12/11	Special Topics

Note that this is a tentative schedule. All lecture topics and activities are subject to change. Schedule changes will be announced in class. Absence or tardiness does not excuse one for being unaware of any such schedule modifications.

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