

Course syllabus for Chemistry 1C

General Chemistry: Kalju Kahn

Class meets: MWF 11:00 – 11:50 AM Chem 1179

Spring 2006

Textbook: Steven S. Zumdahl, Chemical Principles, 5th Ed., Houghton Mifflin Company, 2005

Instructor: Dr. *Kalju Kahn*, Office: PSB-N 1511,
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Office Hours: M,R 12:00-1:00 PM or by appointment
Course website: <http://www.chem.ucsb.edu/~kalju/chem1C>

TENTATIVE LECTURE SCHEDULE

<i>Week</i>	<i>Date</i>	<i>Topics</i>	<i>Chapter</i>
1	April 3 – 7	Molecular structure: VSEPR Covalent bonding: hybridization and shapes of molecules Bonding in diatomic molecules, electron delocalization	13 14
2	April 10 – 14	Orbitals and electronic spectroscopy Intermolecular forces: dipole-dipole and London dispersion Liquids: properties and structure	14 16
3	April 17 – 21	Molecular solids, ionic solids Atomic solids: Metals, alloys, superconductors Network atomic solids, ceramics, semiconductors	16
4	April 24 – 28 Exam 1	Change of state: vapor pressure, phase diagrams Introduction to solutions: composition, thermodynamics Exam 1 Fri. Apr. 28	17
5	May 1 – 5	Properties of solutions: Henry's Law, Raoult's law Colligative properties, osmotic pressure Colloids, the Tyndall effect, ferrofluids	17
6	May 8 – 12	Transition metals: general properties and uses Chemistry of Ti, Cr, Mn, Fe, and Cu Coordination chemistry: ligands, isomerism, chirality	20
7	May 15 – 19	Coordination chemistry: the crystal field model Bioinorganic chemistry: heme The nucleus: radioactive decay, isotopes, dating	20
8	May 22 – 26 Exam 2	Organic molecules: alkanes, isomerism, conformations Organic molecules: alkenes, alkynes, aromatic compounds Exam 2 Fri. May 26	22
9	May 29 May 31 – June 2	Holiday May 29 Organic molecules: oxygen-containing functionalities Synthetic and natural polymers	22
10	June 5 – 9	Biochemical molecules Representative elements: N, O, S, P, the noble gases	22 18-19

Chem. 1C FINAL EXAM: Thursday June 15 12 noon – 3 PM Chem. 1179

Expectations of Students in Chem 1C: (Dr. Kahn, Spring 2006)

- 1) Attendance and taking good lecture notes is expected. Supplementing the lecture notes with study notes based on the textbook is a good way to improve your chances to be successful in this course. You should dedicate at least one hour reviewing/supplementing the lecture notes for each lecture session.
- 2) The practice problems in the book are an excellent way to independently verify that you understand the material. The suggested problems are on the next page. Work them out as you read the textbook. The answers to these problems are not to be turned in, but you are likely to do well in the exam when you can independently answer majority of the practice problems. You should dedicate at least an hour and half each day for independent work on the practice problems.
- 3) If you did not follow suggestions in 1) and 2), it is *theoretically possible* that you could pass the course if you spend at least 27 hours on review and 40 hours of problem-solving just before the final exam.
- 4) “Caffeine” problems are two un-graded weekly (except mid-term weeks) homework assignments that you are strongly encouraged to solve independently. They will be posted on the course website at the beginning of each week and are “due” each Friday; answer strategies will be discussed in the Friday class.
- 5) Graded quizzes are unannounced (i.e. “pop” quizzes). The quiz questions will be very similar to the “caffeine” problems that we have worked out in the class. The highest three quiz grades will be counted in your final grade. At least 5 quizzes will be given during the quarter. If you miss a quiz for any reason, this will be one of your dropped scores.
- 6) There are no make-up exams. If you know in advance that you will have a legitimate reason (UCSB sports team, field trip, surgery, etc.) to miss an exam, inform the instructor at least one week in advance and provide the appropriate written documentation. In case of medical emergency, provide a verifiable doctors excuse stating that you “could not take the exam due to an illness”.
- 7) Course grades will be determined based on the fraction of points you collect from two midterms, the final, and the pop quizzes. Each midterm is worth 60 points, the final 150 points, and the three quizzes together 30 points. The maximum number of points is 300 and students collecting at least 150 points are expected to pass the course with grade C or better.
- 8) Honesty and academic integrity must be always preserved. While working with others is encouraged outside the classroom, you must answer the quiz and exam questions individually. All exams will be closed book.
- 9) No student shall give, sell, or otherwise distribute to others or publish any electronically available course materials or recordings made during any course presentation without the written consent of the instructor.

Studying for Chemistry 1C: Advice from Petra van Koppen

This is not necessarily a difficult course, but most students find that they have to spend time studying to understand the material. It is important to keep up with the schedule. Read the chapter as scheduled. As you read the chapter, stop and work all the exercises as they appear in the text. This is the only way to be sure you understand the material as you proceed through the chapter. After you have finished the chapter, work all the assigned problems given below. This is a minimum list of problems that all students should do. The solutions manual is available in the bookstore. Never look at the answers first. Always try to do the problems by reading and reviewing the material in the text.

Learning to solve Chemistry problems requires you to work the problems yourself. Watching others (e.g. instructors, tutors or other students) work problems or reading the solutions in the solution manual is no substitute for working them yourself. You must go through the reasoning process yourself until you understand each type of problem. Sufficient practice is important. If you need more practice solving problems, do problems in addition to those assigned.

Assigned Problems (Minimum List of Problems – Work More Problems on Your Own)

Fifth Edition

Chapter 13:	47,48,50,71,72,75,82,83,84,85,87,92
Chapter 14:	10,13,14,15,16,17,18,19,20,21,23,26, 27,28,30,31,34,35,57,60,61,65
Chapter 16:	7,9,11,12,13,14,15,17,18,19,20,21,22,23,29,30,31,35,38,46,70,75,76,77,79,81,86,91
Chapter 17:	12,14,15,16,17,18,20,21,32,33,34,39,42,44,47,49,51,53,54,55,57,58,59,61,66,67,70,73,75,76
Chapter 18:	2,18,33,39,40,41,47
Chapter 19:	2,5,8,9,12,14,16,36,40,41,43,44,49,52,54,55
Chapter 20:	6,7,9,17,18,19,20,21,22,23,27,28,29,30,31,33,34,36,37,38,40,41,42,43,44,45,53
Chapter 21:	2,4,11,13,15,18,19,22
Chapter 22:	1,3,4,5,7,8,9,10,11,12,18,19,20,21,22,23,24,29,30,31,32,33,34,35,36,37,38,39,42,43,45,46,47, 51,52,55,56,57,58,64,66,67,71,73,74,77,82,84,89,90,91,92,94,95,97,110,124

CHEM 1CL GENERAL CHEMISTRY LABORATORIES

Chemistry 1CL has been designed to demonstrate and reinforce the basic concepts of chemical bonding, properties of solution, synthetic organic and inorganic chemistry. The analytical methods learned in Chem. 1CL are applicable to many other scientific disciplines such as Biology, Medicine, Environmental Science, Physics and Engineering. Chem. 1CL is a one-unit course separate from the lecture course but intended to accompany it.

Laboratory Coordinator:

Petra van Koppen, PSBN 3670 B. Email: vankoppen@chem.ucsb.edu

Office hours: MW 10 – 11:15 or by appointment

Lab Manual: General Chemistry 1AL/1BL/1CL, Laboratory Manual by Petra van Koppen, Hayden-McNeil Pub. (2005-2006)

Also Required: Safety glasses and Laboratory Notebook, quadrille ruled (graph paper), with duplicate pages are available in the bookstore.

Safety glasses must be worn by all students in the laboratory at all times. You will not be allowed into the laboratory unless you have safety glasses to protect your eyes. You must check out of your lab (check all contents of your lab drawer) at the end of the course (or if you drop the course before the end). Failure to do so may result in a charge for equipment not checked in and for your technique grade you will receive zero points.

NOTE: Chem. 1C and 1CL may not be taken P/NP by science and engineering majors because these courses are required in preparation for the major. REQUIRED LAB FEE: A non-refundable \$32.00 Lab Fee is required for this Course. It will be charged to your BARC account upon confirmation of your enrollment.

APPROXIMATE LAB SCHEDULE

Week	Date	Chem. 1AL Lab Assignment
1	April 3 – 7	Check-In
2	April 10 – 14	Exp. 17 Oxidation of Alcohol; Exp. 18 Assignment
3	April 17 – 21	Exp. 17 Oxidation of Alcohol; Exp. 18 Assignment
4	April 24 – 28	Exp. 19 Determination of Avogadro's Number
5	May 1 – 5	Exp. 20 Colligative Properties: Freezing Point Depression
6	May 8 – 12	Exp. 21 Synthesis of Transition Metal Complexes
7	May 15 – 19	Exp. 21 Analysis of Transition Metal Complexes
8	May 22 – 26	Exp. 22 Synthesis of Aspirin and Oil of Wintergreen
9	May 29 May 31 – June 2	Exp. 22 Analysis of Aspirin/Check-out (No Monday Labs this week) Monday labs finish Exp. 22 next week.
10	June 5 – 9	Lab Final Review <u>Mon. Labs:</u> Exp. 22, Check-out and Lab Final Review

LAB FINAL Saturday June 10 4 – 5:30 PM* Rooms to be announced

*If you are scheduled to take a foreign language final at this time, you can take the lab final early:

Friday, June 9, 4-5:30 PM, Room to be announced.