COLLEGE CHEMISTRY
(CH 103)
COURSE OUTLINE
SPRING SEMESTER 1499

Bülent Terem

Course Objectives:

To introduce general principles of **chemistry** and relate them to socio-economic and environmental issues familiar to every college student.

Supplementary Books:

Schwartz, A.T.; Bunce, D.M.; Silberman, R.B.; Stanitski, C.L.; Stratton, W.J. and Zipp, A.P., ***Chemistry*** *in Context: Applying Chemistry to Society,* Wm. C. Brown Publishers, 1997.

Exams and Grading: Three 45-minute midterms, quizzes, homework assignments, class discussions, and a ninety minute comprehensive final.

Course Grade (all grades in percentages)

_ + .20 (average of the three midterms)
+ .20 (average of the two highest midterms)
+ .1 S (average of assignments)
+ .15 (class discussion grade)
+ .30 (final)

Office Hours:

MWF 11:00 - 12:00 and/or by arrangement

Office:

Henry Hall 45 (Ph: 735-4806)
e-mail: terem@gold.chem.hawaii.edu

Date	Chapters in Text	Subject
1/11	1	Introduction... Why chemistry is called the central sciences?..
1/13	1	Chemicals... Elements, Atoms, Molecules, Compounds... Chemical symbols... States of matter... Chemical reactions...
1/15	1	Molecular formulas... Balancing a chemical equation... The air we breathe... Pollutants, are they all man made?
1/20	2	Ozone: Structure; Environmental significance... Subatomic particles... Lewis structures...
1/22	2	Radiation... **Destruction** of the ozone layer... Chloro-fluorocarbons...
1/25	3	Greenhouse effect and global warming... "The Greenhouse Gases" and What's shape got to do with it?.. Molecular geometry... Molecular vibrations...
1/27	3	The carbon cycle... Quantifying chemical processes... Moles and molar masses... What do we do with global warming?
1/29	4	Thermodynamics: Social and molecular perspectives... Heats of reactions
2/1	4	Energy of life... Energy and technology... Laws of thermodynamics...
2/3	5	Water: Molecular structure; Physical properties... Water and energy... Ionic compounds...
2/5	5	Purification of water... Social and legal issues concerning water...
A	5	**Review**
2/10		FIRST MIDTERM EXAM
2/12	6	Acid Rain... What is acidic about an acid? Acids and bases... Molarity... **pH**...
2/17	6	Acid precipitation... Ecological damage... Politics of acid rain...
2/19	7	Onandaga Lake: A case study... Mercury poisoning...
2/22	8	Origin of radioactivity... The problem of nuclear waste...
2/24	8	Nuclear Fission... Hazards of radioactivity...
2/26	9	Sun: The ultimate source of energy... Heat transfer... Is water also a heat source?
3/1	9	Electrochemistry and electron transfer...
3/3	9	Cells and batteries...
3/5	9	What is fusion?.. Cold Fusion: Breakthrough or fiction?
3/8	**10**	Polymers... Monomeric units of polymers... Polyethylene...

Date	Chapters in Text	Subject
3/10	10	Chain branching... Important polymers...
3/12	10	Condensation polymers... Polyamides... "Paper or plastic?"
3/15	10	Polymers and ecology...
3/17		SECOND MIDTERM EXAM
3/19	11	What the doctor said... Should we consult a ***kahuna*** too? Do we expect miracles from drugs?
3/22-26		Spring Break
3/29	11	Organic chemistry clarifies a number or myths... Functional groups... **Stereochemistry**...
3/31	11	How aspirin works... Hormones... Steroids... "The pill"
4/5	11	Ethical considerations: Class discussion
4/7	12	Nutrition: What is a balanced diet?.. The macronutrients...
4/9	12	Carbohydrates and their metabolism...
4/12	12	Fats: Saturated and unsaturated... Cholesterol: facts and fiction...
4/14	12	Proteins... Lipoproteins...
4/16	12	Metabolism: The thermodynamics of the body... Vitamins...
4/19	12	The hunger problem in the world... Food preservation; food additives... Ethical issues...
4/21		THIRD MIDTERM EXAM
4/23	13	What chemists are promising for the future: Superconductors; Non-invasive diagnosis;
4/26	13	Catalysis... Enzymes...
4/28	13	Chemistry and beyond: Molecular **biology**…
416	13	Nucleic acids... DNA... Genetic engineering...
5/6	Thursday	FINAL (10:30 AM)

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Objectives:
This lab course is designed to convey to students a general understanding of experimental work in a chemistry laboratory while sampling certain broadly used techniques. During the semester "hands-on" experience will be emphasized along with demonstrations, computer simulations, and work-shops.

Lab Safety:
Students will be expected to take the required safety precautions in the chemistry labs. This in itself is hoped to be educational. Safety glassed and adequate clothing and footware should be worn at all times during lab sessions. The consumption of food and beverages is strictly forbidden in the lab. Students are allowed to work in the lab only in the presence of the instructor.

Grading:
It is hoped that students will learn and benefit from the lab course by efficient use of time during lab sessions. Therefore, 50% of the grade is based on participating in the lab session and on completing the experiment. Other factors are lab write-up / report (when assigned) 20%; lab exam(s) 20%; and discussion of experimental results 10%.
There will be ample time to complete written work during lab periods.

No make-up labs will be offered with the exception of unforeseen circumstances such as a verified (by a doctor) medical excuse.

Chemistry is fun and enlightening...

SCHEDULE OF EXPERIMENTS

Week	Dates	Experiment	Assignment
2	1/20	Weighing Air and Cooling Water: A Graphic Experience	CIC: pp. 2-1
3	1/27	Photochemical Bromination; Types of Electromagnetic Radiation	hand-out Computer Simulation
4	2/3	Preparation and Properties of Gases in a Breath	CIC: pp. I-1
5	2/10	Visibly Delighted: A Spectrophotometric Study of Colored Solutions	CIC: pp.3-1
6	2/17	Chemical Moles: Converting Baking Soda to Table Salt	CIC: pp.7-1
7	2/24	Comparison of the Energy Content of Fuels	CIC: pp.9-1
8	3/3	Analysis of Vinegar	CIC: pp.1 l-1
9	3/10	The Ubiquitous Styrofoam Cup	CIC: pp.19-1
10	3/17	The Classification and Identification of Common Plastics	CIC: pp.20-1
11	3/22-3-26	SPRING BREAK	
12	3/31	Salt in Soups and Pickles	CIC: pp.25-1
13	4/7	Synthesis of Aspirin	CIC: pp.22-1
14	4/14	Fats in Potato Chips and Hot Dogs	CIC: pp.23-1
15	4/21	Isolation of DNA	CIC: pp.28-1
16	4/28	Lab Exam	