

General Education Course Proposal

Proposed Course: Chem ¹⁶ Chemistry and Society Units 4
Prefix No. Title

Department: Chemistry School: Natural Sciences

GE Category (Indicate one category only):

Foundation: A1___; A2___; A3___; B4___
Breadth: B1 X; B2___; C1___; C2___; D___; E___
Integration: B X; C___; D___; International/Multicultural___

Existing Course ___; Revised Course X; New Course ___

Course Included in Current GE Program yes

New courses require the Undergraduate Course Proposal form in addition to this form.

Revised courses require the Undergraduate Course Change Request in addition to this form.

Proposed catalog description: Limit course description to 40 words using succinct phrases. Include prerequisites, limitations, lecture/lab hours. Indicate former course number, e.g., (Former Biol 105)

Not open to students with credit in college chemistry; for non-science majors.

Prerequisite: General Education Area B4 completed. The significance of chemical principles in contemporary society; benefits and hazards relative to areas such as energy, health, diet, environment and agriculture. General Education BREADTH, Area B1 (3 lecture, 3 lab hours)*

Enrollment limit per section: 72 lect. 24 lab

Expected number of sections per semester – Year 1 2-3; Year 3 2-3 (1 lect., 2-3 lab sect.)

Attachments:

1. A statement presenting the ways in which this course meets the Specifications provided in the appropriate section of the General Education Policy as well as in the Policies for Inclusion and Evaluation of General Education Courses.
2. A statement of elements common to all sections of this course, identifying content, objectives, required student activities, grading policy, representative texts, and an approximate schedule for the course. Required student activities include such things as papers, research projects, homework, laboratory and/or studio performance, recitations, participation, attendance, and exams.
3. A typical syllabus for a particular offering of the course.
4. Any special cost factors associated with this course.

Approval for Inclusion in General Education

JR Candel 8/13/98 Stuammer 9/2/98
Department Chair Date School Curriculum Committee Date

Stanley M. Zeit 9/2/98 Peck 12/15/98
School Dean Date General Education Subcommittee Date

Brandt Kehoe 12/22/98
Associate Provost Date

Common Course Elements

Common Course Format

Chemistry 1 is a 4 unit course consisting of 3 lecture and 3 laboratory hours. There is typically 1 lecture and 2-3 laboratory sections each semester. Laboratory instruction is coordinated by the lecture instructor.

Common Course Content

Chemistry 1 generally covers chemical principles by introducing real world chemical topics and issues. Though these topics vary from semester to semester, the primary chemical concepts and principles covered vary very little. All offerings of this course include the following topics. A short description is provided after each to indicate the depth of coverage common to all offerings of this course. Individual instructors will cover some topics in more detail than presented here, and may cover additional topics not mentioned in this list.

- atomic structure: fundamental concepts surrounding the structure of the atom including primary components (protons, neutrons, electrons), electron energy shells, atomic number, atomic mass number, isotopes, electric charge.
- Writing chemical equations: expressing chemical reactions in the form of a chemical equation, definitions and identification of reactants and products, balancing chemical equations, determination of limiting reagent, classes of chemical reactions (combustion, acid/base, oxidation/reduction).
- Chemical nomenclature: systematic naming of binary (two-element) covalent compounds, systematic naming of binary (two-element) ionic solids, names of common polyatomic ions and the systematic naming of compounds composed of atomic and polyatomic ions.
- Chemical bonds: descriptions of three major types of chemical bonding (covalent bonding, ionic bonding, hydrogen bonding), strengths of each type, recognizing the type of bonding exhibited by a molecule.
- The periodic table: the development of the periodic table by Mendeleev, periodic trends including size, electronegativity, ionization energies, electron filling.
- Molecular structure: drawing Lewis electron dot structures for simple molecules, predicting simple molecular shapes, Valence Shell Electron Pair Repulsion Theory, molecular properties and how they are affected by shape.
- Acids and bases: definitions, the pH scale, calculations of pH from ionic concentrations, calculations of ionic concentrations from pH, acid-base neutralization reactions.

- Stoichiometry: Avogadro's number, calculation of molar mass, calculation of grams from moles and moles from grams, mole ratios in chemical equations.
- Solutions: Definitions of solvent and solute, the structure of liquids, expressing and calculating solute concentrations, solubility.
- Basic thermochemistry: using bond energies to calculate reaction energies, definition of exothermic and endothermic.
- Molecular spectroscopy and light/matter interaction: a review of the electromagnetic spectrum (ultraviolet, visible, infrared, microwave ranges in particular), relationship of wavelength to frequency and energy including calculations, brief descriptions of several spectroscopic techniques including infrared spectroscopy (absorption of light which excites molecular vibrations) and UV/Vis (absorption of ultraviolet and visible light which results from the excitation of electrons).
- Introduction to organic chemistry: identification of functional groups, properties associated with functional groups, isomers of simple hydrocarbons, hydrocarbons as fuel (combustion), organic polymers.
- The scientific method and data interpretation: observation, hypothesis, experiment and experimental design, theories, predictions, scientific models, scientific laws, presenting physical data in charts and graphs, interpreting charts and graphs.

Typical Course Grading Format

The structure and weighting of assignments in Chemistry 1 varies with the instructor teaching the course. However, each semester the course contains the following common elements:

- Laboratory (typically 20-30% of final grade)
- Homework (typically 5-15% of final grade)
- exams and/or quizzes (30-50% of final grade)
- term paper and/or other written assignments (typically 10-25% of final grade)
- a comprehensive final exam (typically 15-40% of final grade).

Laboratory attendance is mandatory and students must pass both the lecture and laboratory portions of the course in order to receive a passing grade.

		Matrix connecting common elements to course syllabus and area B1 specifications	
	weelxet chapte	chemical topics(mentiond on pgs 3-4)	Area B1 Specifications
1	1	chemical reactions and equations (fundamental principles of chemistry, matter, laws of interaction) , nomenclature, air pollution (materials of the physical universe,ethical issues)	1, 2,5b,5e,5f
2	2	atomic structure(fundamental principles of chemistry, matter, laws of interaction), chemical bonding - covalent (fundamental principles of chemistry, matter, laws of interaction), molecular spectroscopy and the electromagnetic spectrum	1,2,4,5a,5b,5c,5e,5f
3	2	the periodic table (fundamental principles of chemistry, historical) , molecular structure (fundamental principles of chemistry, matter), chemical reactions, the ozone layer (societal issues, scientific debates, evaluating sci. information.)	"
4	3	molecular spectroscopy - infrared (fund. prin. of chemistry, matter), stoichiometry (fund. prin. of chemistry), molecular shape (fund. prin. of chemistry, matter), global warming (societal issues, scientific debates, evaluating sci. information.)	1,2,4,5a,5b,5c,5e,5f
5	3	"	"
6	4	thermochemistry (fundamental principles of matter, chemistry, laws of interaction), energy (fund. prin. of matter) , chemical reactions - combustion (fundamental principles of matter, chemistry, laws of interaction)	1,2,4,5a,5f
7	4	"	"
8	5	solutions (fundamental principles of chemistry, matter, laws of interaction), chemical bonding - ionic and hydrogen (fundamental principles of chemistry, matter)	1,2,4,5a,5f

9	6	acids and bases(fundamental principles of chemistry, matter), chemical reactions - acids and bases (fundamental principles of chemistry, matter, laws of interaction) , acid rain (societal,ethical issues)	1,2,4,5a,5b,5c,5d,5f	
10	6	"	"	
		introduction to organic chemistry - pharmaceuticals - molecular structure and chemical reactions (fundamental principles of chemistry, matter, laws of interaction, societal and ethical issues, critical evaluation of material presented as scientific.)	1,2,4,5a,5b,5c,5e,5f	
11	11			
12	11	"	"	
		introduction to organic chemistry - foods (fundamental principles of chemistry, matter, societal and ethical issues, critical evaluation of material presented as scientific.)	1,2,4,5a,5b,5c,5e,5f	
13	12	"	"	
14	12			
15	spec. topics			
16	spec. topics			
		Specification 3: exploration of analytical and quantitative methods used in chemistry is demonstrated throughout the course and actively explored in the laboratory		
		Specification 4: chemistry 1 utilizes and emphasizes the physical principles and math necessary for understanding the chemical processes throughout the entire course. Students perform calculations in the lecture through homework and regularly in the lab.		
		Specification 5f: the entire course is placed in the context of how chemistry is relevant to society. We believe that this encourages students to develop a lasting curiosity about science and furthermore, that it makes science more accessible to nonmajors		

Representative Texts

1. Chemistry in Context, Applying Chemistry to Society, American Chemical Society, 2nd edition, c. 1997. (used F96, F97, S98)
2. The Extraordinary Chemistry of Ordinary Things, Carl H. Snyder, Wiley. (used S95)
3. The World of Chemistry, Josten and Wood, Saunders College Publishing. (used S96, S97)
4. Chemistry for Changing Times, John W. Hill and Doris K. Kolb, Prentice Hall. (used F95)

2000 Word Writing Requirement

Chemistry 1 typically includes a number of written assignments. In order to allow our instructors to choose pedagogical methods which they believe will work best with their students and with their teaching style, the 2000 word writing requirement will be met in one of several ways of the lecture instructors' choosing.

- one 10 page (2000 word) term paper
 - one 5-7 page (1000-1400 word) term paper plus 1-2 formal laboratory reports (600-1000 words).
 - one 5 page (1000 word) term paper plus various smaller writing assignments (may include newspaper article commentaries, formal lab reports, reaction papers, homework and postlaboratory questions, etc.).
 - several 1-3 page writing assignments (200-600 words each), totaling at least 1000 words of multiparagraph prose plus various smaller assignments to meet the 2000 word total.
-

Current Course Format

The current course syllabus is attached.

The format for the current (Spring 1998) offering of the course is provided here as an example of a typical grading scheme and writing assignment schedule.

Chemistry 1 is currently using a 90%-80%-70%-60% grading scale based on 1000 points.

- *30 Minute Quizzes (6) - 300 points, 30%*
- *Problems Sets (7) and Other Assignments (3) - 150 points max, 15%*
- *Web Project - 150 points, 15%*
 - *Web Workshop - 10 points*
 - *Web Search and Evaluative Bibliography - 50 points*
 - *500 Word Web Article - 50 points*
 - *Article Rewrite - 25 points*
 - *Peer Review of Other's Articles - 15 points*
- *Final Exam - 180 points, 18%*
- *Laboratory - 220 points max, 22%*
 - *Prelab Assignments (13), 26 points*
 - *Laboratory Participation and Calculations (13), 78 points*
 - *Postlaboratory Assignments (13), 78 points*
 - *2-3 Page Formal Laboratory Report, 20 points*
 - *Laboratory Instructor Evaluation, 20 points*

As an example of what a more complex writing assignment schedule might look like, the Spring 1998 writing assignments are presented below.

- *one 500 word "Web article", + article rewrite (see Syllabus Part 1 , Pages 6-7)*
- *one 2-3 page (approx. 400-600 word) formal laboratory report. (see Syllabus Part 2 , Page 7)*
- *3 written assignments, included with homework score. These are typically 1-2 page commentaries, summaries and response papers. Approximate word count: 600-1200. (see Syllabus Part 1 , bottom of page 4 and page 5)*
- *Additional writing assignments, estimated at 500-1000 words. These include pre- and post-laboratory assignments and answers to homework problems. (See for example, PreLab 15, Syllabus Part 2 , Page 6).*

Chemistry 1

Chemistry and Society

Syllabus - Part 1 - The Lecture

Welcome to Chemistry 1! This is a course designed for non-science majors to teach fundamental principles of chemistry in the context of how chemistry and chemicals affect our lives, our society, and our planet. Chemistry is primarily an experimental science, so we will be exploring chemical concepts in the laboratory as well as in lecture. Headlines from major newspapers, magazines and journals are interspersed throughout this syllabus to give you an idea of why chemistry is often called "The Central Science".

General Information

- Instructor:** Dr. Kimberly Lawler
Office: Science 250
Phone: 8-3346
e-mail: kimberly_lawler@csufresno.edu
Office Hours: M 4:10pm-5:00pm, T 9:10-11:00am and 2:30-3:30pm
W 5:10-6:00pm *Regular office hours begin Feb. 3*
Office hours are subject to change.
- Class Meetings:** TTh 8:10am; McLane 221
- Laboratory Instructors:** Rowena Rege, Robert Lin
Lab Sections: T 11:10am, Th 11:10am; McLane 157
You must register for both the lecture and the laboratory.
- Prerequisites:** Students must have fulfilled General Education Area B4 (Quantitative Reasoning) before enrolling in this class.
- Required Materials:** Text: *Chemistry in Context: Applying Chemistry to Society (2nd ed.)*
Lab Text: *Laboratory Manual: Chemistry in Context (2nd ed.)*
Approved eye protection for the laboratory
Scientific calculator (Only simple function calculators with small rectangular windows are allowed on the quizzes.)
- Mailboxes:** Mailboxes for lecture and lab instructors are located in the Chem Department office, Science 380 (3rd floor, south side, near lobby)

"Regulators Go After Polluting Dairies: Central Valley water endangered by cows" (*San Francisco Chronicle* 7/19/97)

"EPA Criticizes Air Agencies in California - Smog: Fines are too low to sufficiently penalize businesses, audit says." (*Los Angeles Times* 8/2/97)

"Recommended Calcium Intake Should Be Boosted, Report Says" (*Los Angeles Times* 8/14/97)

"Women's Heart Risk Linked to Kinds of, Not Total, Fat" (*New York Times* 11/20/97)

"Use of Pesticide Scrutinized: Methyl bromide found drifting far from farm fields" (*San Francisco Chronicle* 8/18/97)

The Legal Stuff - Grading in Chemistry 1

This section may seem a little long. This is for two reasons. One, I believe in giving students a lot of different ways to earn points and show their understanding of the material. Two, I try to write everything out so that both you and I know what to expect. *Please* read this and subsequent sections carefully.

Grades on all assignments will be given in points. The maximum number of points possible is 1000. Grading criteria within each of these categories varies and is discussed in the individual sections of the syllabus. Grading for the laboratory portion of the course is described in "Chemistry 1 - Syllabus Part 2 - The Laboratory".

	Points Each	Total Points	Percentage of final grade
Quizzes (6)	50	300	30%
Final Exam		180	18%
Laboratory		220	22%
Web Project			
Library Workshop	10		
Web Bibliography	50		
500 Word Article	50		
Rewrite of Article	25		
Peer Review of Articles	15		
Total Web		150	15%
Homework			
Problem Sets (7)	20		
Other Assignments (3)	10		
Total HW		150 max	15%

Grading Scale

The grading scale will depend in part on my assessment of the difficulty of quizzes and the final. However, the grading scale will not be raised above the following:

900-1000	A
800-899	B
700-799	C
600-699	D
599 and below	F

This means if you receive 900 points and complete all course requirements, you will get an A. If you have, say, 878 points (and you have completed all course requirements) you will be guaranteed *at least* a B. Students not fulfilling all course requirements are not guaranteed a particular grade. If you elect to take the course credit/no credit you must complete all course requirements and obtain a C average to insure credit (unfulfilled requirements can turn a C into a D or F, see below). Students within 15 points of the next highest grade *may* be given the higher grade at the discretion of the instructor based on consideration of a high homework percentage, regular attendance, lab instructor evaluation, and overall performance pattern.

Course Requirements

To be graded on the grading scale defined above, you must complete all the course requirements. These are listed below:

1. Pass the lecture portion of the course (468 points in lecture)
2. Pass the laboratory portion of the course (132 points in lab)
3. Have no more than 1 unexcused absence from the laboratory
4. Adhere to all safety precautions in the laboratory

5. Pass the final exam
6. Complete the web bibliography and article
7. Accumulate at least 75 homework points

Important! Please Note: Not meeting the course requirements can have a *significant* effect on your grade in the course.

- Failing either the lecture or laboratory results in failing the course (This is a Chemistry Department Policy).
- Having more than one unexcused absence from lab will result in failing the laboratory and therefore the course.
- Failure to receive a passing grade on the final, or failure to complete one or both of the web projects may result in a one letter grade penalty. In addition, the failing score being factored in to your overall percentage. (Thus, failing the final may result in failing the course, even if you have enough points to pass. Failure to complete the web projects may also result in failing the course.)
- Safety in the chemical laboratory is very important for your own well-being as well as the well-being of others. A recurring disregard for safety precautions may adversely affect your overall grade in the course by as much as an entire letter grade.
- If you do not achieve the 75 minimum homework points, your overall grade in the course may be lowered if you are within 20 points of the next lowest grade.

University policies on incompletes/drops/unauthorized withdrawals will be followed. Also, **read carefully** the Legal Notice section of the current Schedule of Courses to understand University policy regarding plagiarism, cheating, disruptive classroom behavior, drug-free workplace, nondiscrimination, and policies regarding privacy with regard to student records. All such policies will be strictly enforced.

If you have a diagnosed disability or believe that you have a disability that might require reasonable accommodations for academic instruction please contact Disabled Student Services (DSS). It is your responsibility to initiate a request for services from DSS and to provide appropriate verification of disability. Please keep in mind that it is also the responsibility of the student to disclose to the instructor a disability prior to requesting reasonable accommodations. Upon disclosure of a disability verified by DSS, any reasonable accommodation will be made.

“Clinton Sharply Tightens Air Pollution Regulations Despite Concern Over Costs - Bows to the E.P.A.”
(*New York Times* 6/26/97)

“Brain Chemicals Mimic Marijuana” (Reuters News Service 8/21/97 - Source: *Science*; **1997**, 277, 1094-1096; *Nature*; **1997**, 388, 773-777)

Homework and Assignments

Problem sets will be assigned and collected on non-quiz Thursdays at the beginning of class. Guidelines for preparing homework assignments are as follows:

1. Each problem or question should be written out, with the full solutions following. This is a little more work, but it only takes a few minutes and makes it easier for the grader and easier for you to study the problem later.
2. Show all your work on mathematical problems. **NO** credit will be given for such problems if your work is not shown.
3. Final answers must include correct units.
4. Please put your name at the top, along with the day you attend lab.
5. Staple all pages together.

Because we have only two class meetings per week, you may not get your most recent homework assignment back before the next quiz. I recommend you photocopy your homework assignments. Keys to the homework will be available at the Chemistry 1 Web Site (<http://www.csufresno.edu/chem/~kimberly/chemone/>)

shortly after the class in which the assignment was due. This is easiest to access by going to the university home page (www.csufresno.edu) and following the links to the Chemistry Department's home page, where we have links to all our on-line course materials. There will be an opportunity to ask questions about the homework at the beginning of each laboratory session.

Grading of problem sets is as follows.

1. Each problem set will be worth 20 points.
2. You will receive 12 points for just attempting all the problems.
3. The remaining 8 points will be assigned based on successful completion of three or more randomly selected problems (graded problems will be the same for everyone in the class).
4. *One point will be taken off if problem statements aren't included in your assignment or if multiple pages are not stapled together.*
5. Homework and assignments are due at the **beginning** of class. After that time, they will not be accepted.

Other assignments will also occasionally be assigned. A typical assignment might involve reading a newspaper or magazine article and summarizing/commenting on it, or writing a response to a "Consider This" passage in the textbook. These will be assigned at least one period in advance and will be collected either in the laboratory or lecture. These will be worth 10 points and will be counted towards your total homework points. I will assign at least three of these assignments.

Late assignments or problem sets will not be accepted for any reason short of a catastrophic medical or family emergency (documented). However, note that the total number of possible points will be 170, 20 points more than the 150 maximum points your homework percentage will be based on. This is not "extra credit", but flexibility to cover that time you get sick, you are too busy, your book get stolen, your car breaks down, or a similar occurrence that generally happens to everyone at least once a semester.

"FDA Panel Endorses New Cancer Treatment: Lymphoma drug has few side effects" (*San Francisco Chronicle* 7/26/97)

"Don't Hold Your Breath: Global warming promises to become a large and gushing source of national hypocrisy" (*Newsweek* 7/14/97)

Recommended Problems

In addition to assigned homework which will be collected and graded, it is highly recommended that you work through all the exercises within the text as well as unassigned problems at the end of each chapter. Problems on the quizzes often come directly from the end-of-chapter problems and the "Your Turn" sections within the text.

Quizzes

There will be six 25 minute quizzes in lieu of midterm exams. Each quiz will be given at the beginning of class and may include: lecture material from Thursday of previous quiz through the Tuesday prior to the quiz, homework assignments completed since the last quiz, assigned material in the text since the last quiz, and any video segments shown in the laboratory in the previous two weeks. You are responsible for assigned reading in the text regardless of whether that material has been discussed in lecture. I will not give "pop" quizzes in lecture, however it is your responsibility to be aware of scheduled quiz dates and any rescheduled quizzes. Rescheduled quizzes will be announced in lecture or laboratory.

Quiz and Exam rules: closed book, no talking, no sharing calculators, no hats. Bring pens/pencils, scientific calculator. Only simple function, non-programmable calculators with small rectangular windows are allowed on exams. You will NOT need to bring Scantron forms. When you enter the room on quiz days, you should spread out and leave one space between you and the person next to you. I reserve the right to ask anyone to change seats to spread people throughout the room and to avoid any misunderstandings.

There are six quizzes scheduled. No quizzes will be dropped. A missed quiz (for any reason) can ONLY be made up at the end of the semester. You will be given the opportunity to make-up or re-take up to 2 quizzes at the end of the semester.

The make-up/re-take period is Wednesday, May 13th from 5-6pm. You have all semester to plan for having that time period free, so plan ahead. I will make exceptions only for those having another class at that time and for emergencies. Specific guidelines for makeup/retakes are below:

- The make-up time is Wednesday, May 13th from 5-6pm
- You may make-up up to any two of the six quizzes for any reason.
- If you did not take the quiz the first time, you must get at least 40% on the make-up quiz in order for your score to be counted. Anything under 40% will remain a zero.
- If you did take the quiz the first time and you receive a higher score on the make-up it will replace your previous score. If you receive a *lower* grade, the two scores will be averaged.
- You must inform me by Tuesday, May 12th that you wish to take a make-up quiz (or quizzes) and you must choose which ones you will be taking.

"Clinton and Global Warming: Struggling to Scare a Contented World" (*New York Times* 9/28/97)

San Joaquin River Is In Dangerous Waters: Waterway Ranked 4th on Imperiled List (*San Francisco Chronicle* 4/16/97)

World Wide Web Site Project

As part of this course, the class will add to a World Wide Web site created by students taking this course in previous semesters. The Web Site Project is worth 150 total points.

To get you familiar with the web, you will be required to attend the Library's "Searching the Web" workshop. This is offered many different times in the month of February. You will be given a card to be signed by the library staff person running the workshop. This will be worth 10 points and must be completed by Thursday, March 5th. If you are *very* familiar with web surfing, talk to me. I may allow you to substitute "Advanced Web Searching" or one of the other workshops for your 10 points. (This must be preapproved, because some workshops are not offered until later in the semester.)

Each of you will choose a question to answer from a list covering a wide range of chemical topics relevant to society. These will be questions like "What is Olestra?", "What is oxygenated fuel and why is it used?" and "How is plastic recycled?". Next, you will search the web for information relating to your topic. You will turn in a web site bibliography for your topic. This will be a list of web sites which includes: a list of Uniform Resource Locators (URLs, or "web addresses") and a description and critique of the information presented at that site. Guidelines for this will be presented in a separate handout. The bibliography will be worth 50 points.

You will be responsible for preparing a 500 word (minimum) article on your topic and placing it on the web. Articles must have at least three references, one of which must be a print reference. You will also list two "hyperlinks" to existing web sites which contain additional information on your topic at the bottom of your article. The article will be worth 50 points. Two of your classmates will then have the opportunity to comment on your article. You will have a week to rewrite your article based on the comments of the instructor and your classmates. Your rewritten article will be graded out of 25 points. At this time, your article will be "approved" for placement on the web. If your article is not approved at this time, it means it still needs some work. You must continue to resubmit your article to the instructor until it is approved. Once your article is approved, you will place the article on the web by electronic submission. You will not actually receive any of the 75 points until your article is approved AND you have placed it on the web.

You will receive an additional 15 points for reviewing and commenting on two web articles written by other students in the class.

The total number of points possible for the web projects is 150 (10 for the library workshop, 50 for the "annotated bibliography", 50 for your original article submission, 25 for your rewrite and 15 for critiquing

the articles of others). At the conclusion of the project, your articles will become part of a globally accessible web site and your name will appear on the article you authored. You will receive more information on this in the future.

“FDA Orders Halt to Antihistamine Ads” (*San Jose Mercury News* 8/21/97)

“Auto Makers See Nothing but Trouble in a Warmer World” (*New York Times* 10/16/97)

Getting Help:

We have several mechanisms for helping you complete this course successfully. I have five office hours per week which you should try to take advantage of. These are intended to be used for in-person tutoring. You may also feel free to stop by my office at times other than those posted. An open door, or the sign “In - Available” indicates I am available for questions. You may also send me e-mail at any time (kimberly_lawler@csufresno.edu), and I will generally respond via e-mail fairly quickly. Free e-mail accounts are available to CSUF students in McKee Fisk 106A. (You must bring your Student I.D.)

I do not mind phone calls. A good time to call me and actually find me in my office is after 5pm. I hate to play phone tag, and to protect your privacy, will not leave any information relating to your grade or missed assignments or quizzes on an answering machine. Please leave me a time frame when you can be reached, or specific instructions that I can leave the requested information on an answering machine. Otherwise, I may not call you back, but wait to answer your question in class.

The laboratory instructors are also very valuable resources. You have a 3 hour period with them each week. Take advantage of this! The chemistry department also offers a **free tutoring service**. Your laboratory instructors, as well as laboratory instructors for other chemistry classes take part in this. Tutoring usually begins the second week of the semester. The free tutoring is held in Science 382 (Science building, 3rd floor, south side, between the lobby and the Chemistry Department office). Tutoring schedules will be posted outside Science 382. You may seek help from *any* of the TA's, not just those listed for Chemistry 1.

The Chemistry Department also compiles a list of private tutors available for hire, this list is available outside the Department office.

Extra class handouts will be placed in the metal file box outside my office door (Science 250, 2nd floor, northwest corner) immediately following the class. In-class announcements will be placed on the web site. If you miss class, please check these for information and handouts.

“Bay Area too smoggy: EPA says Bay Area no longer meets national standards” (*San Jose Mercury News* 8/21/97)

“Should a Low-Fat, High-Carbohydrate Diet Be Recommended for Everyone?” (*The New England Journal of Medicine*; 1997, 337(8), 562-569)

The Class Web Site:

You can reach the Chemistry 1 Web Site from the Chemistry Department Web Site: <http://www.csufresno.edu/ck>. The course web site will serve as a clearing house for information regarding the course. The easiest way to access the site is by going to the university home page (www.csufresno.edu) and following the links to the Chemistry Department's home page, where we have links to all our on-line course materials (CSUF home - Departments - Chemistry - Courses - Chemistry 1). Keys to the homework will be available at the Chemistry 1 Web Site shortly after the class in which the assignment was turned in. Keys for quizzes will generally be up by the week following the quiz. Announcements made in class will also be placed on the site. Other resources will appear on the site as the semester progresses.

Tentative Schedule:

The text, *Chemistry in Context*, takes a non-traditional approach to exploring chemistry. Chemical concepts are introduced on a need-to-know basis. Many of you may enjoy this approach. However, several basic chemistry texts with more traditional approaches will be on reserve in the library should you wish to supplement your study with these additional materials. In addition, I will be supplementing the text with occasional handouts containing more examples and practice problems. We will cover chapters 1-6 and 11-12. There is some flexibility in the schedule and the dates listed in the schedule are approximate. Assuming we stay on schedule, the last week and a half will be devoted to covering either chapter 8, 10 or chapter 13. I also reserve the right to change due dates for assignments if the need arises. Any modifications other than delayed due dates will be announced well in advance.

Week #	Day	Date	Text Chpt.	Assignments Due	Quizzes	Lab Exps. for the week	Notes
1	T	Jan. 27	1			Intro	
	Th	Jan. 29	1				
2	T	Feb. 3	1			exp 1	library workshop offered
	Th	Feb. 5	2	Prob. Set. 1			Th 2/5 10:10am, F 2/6 11:10am
3	T	Feb. 10	2			exp 2	library workshop offered
	Th	Feb. 12	2		quiz 1		T 2/10 2:10pm, W 2/11 2:10pm
4	T	Feb. 17	2			exp 5	library workshop offered
	Th	Feb. 19	3	Prob. Set. 2			M 2/16 2:10pm, F 2/20 1:10pm
5	T	Feb. 24	3			exp 6	library workshop M 2/23 2:10pm
	Th	Feb. 26	3		quiz 2		Next week: W 3/4 1:10pm
6	T	Mar. 3	3			exp 7	attend library
	Th	Mar. 5	4	Prob. Set. 3			workshop by 3/5
7	T	Mar. 10	4	web bibliog.		exp 8&9	
	Th	Mar. 12	4	Prob. Set. 4			
8	T	Mar. 17	4			exp 11	
	Th	Mar. 19	5		quiz 3		
9	T	Mar. 24	5	web article		exp 12&13	
	Th	Mar. 26	6	Prob. Set. 5			
10	T	Mar. 31	6	web reviews		exp 15	
	Th	Apr. 2	6		quiz 4		
11	T	Apr. 7	-				No class this week
	Th	Apr. 9	-				Have a Wonderful Spring Break!
12	T	Apr. 14	11	web rewrites		exp 22	
	Th	Apr. 16	11	Prob. Set. 6			
13	T	Apr. 21	11			exp 23&25	
	Th	Apr. 23	12		quiz 5		
14	T	Apr. 28	12			exp 26	
	Th	Apr. 30	12	Prob. Set. 7			
15	T	May 5	tba			exp 27	
	Th	May 7	tba		quiz 6		
16	T	May 12	tba	final lab/lecture assignments due			Review session in Lab this week
	Th	May 14	rev				Quiz Make-up 12/10 5pm
17	Th	May 21	-				Optional review session - Q&A Format Final Exam 8:45 am

Table 1: Tentative Schedule - Chemistry 1 - Spring 1998

Chemistry 1 - Syllabus Part 2 - The Laboratory

Chemistry and Society Laboratory

General Information

Lab Instructors: Rowena Rege, Robert Lin
Course Instructor: Dr. Kimberly Lawler
Text: *Laboratory Manual - Chemistry in Context*
Lab Sections: T 11:10am, Th 11:10am; McLane 157
Required: Approved eye protection

Grading

Grades on all assignments will be given in points. The maximum total points possible in the laboratory portion of the course is 220. Your points will be added into your overall course score and your overall percentage will be calculated. Your laboratory grade will count towards 22% of your final course grade.

Point Breakdown

Assignment	points each	total possible
Data and Calculations(13)	6	78 points
PostLab assignments (13)	6	78 points
PreLab assignments (13)	2	26 points
Final Formal Lab Report	20	20 points
Instructor Evaluation	20	20 points
Total Points Possible		222 points 220 max

General Policies

Absences

Laboratory attendance is mandatory. Chemistry is an experimental science and some features of chemistry can not be demonstrated outside of the laboratory. **More than 1 unexcused absence will result in failing the laboratory** and therefore the course. Absences will be excused only in the event of illness or family or personal emergency. Such events must be documented to have an absence excused. A student with an unexcused absence forfeits all points for that experiment.

A student with an excused absence may complete the prelaboratory assignment for 1/2 credit (1 points) and may complete the postlaboratory assignment for full credit (graded out

of 6 points). In order to receive credit for the postlab the student will also have to complete all the calculations using data from other students in the lab, however they will not receive any points for doing so. More than 2 total absences (excused or unexcused) will result in failing the laboratory and the course.

We have no facilities for making up missed labs. However, if you know you must miss a laboratory class ahead of time, your laboratory instructor may choose to grant you a "transfer pass" and you may attend another Chem 1 laboratory that week. You must have your laboratory instructor sign a green "transfer pass" form, which you will take to the class you are attending that week. The new instructor will grade your prelab and data sections, record those grades on your "transfer pass", sign the "transfer pass", which you will then return to your original instructor. It is your responsibility to be aware of and complete your own instructors' postlaboratory assignment. It is also your responsibility to return your "transfer pass" to your instructor.

Safety

Safety in the chemical laboratory is very important both for your own well-being as well as the well-being of others. A recurring disregard for safety precautions may adversely affect your **overall grade** in the course by as much as a entire letter grade.

Eye protection in the laboratory is **MANDATORY**. No exceptions. If you do not have approved eye protection, you will be asked to leave and will receive an unexcused absence for that laboratory.

Lab Cleanliness

Two different chemistry labs are often held in McLane 157. It is important to clean up all glassware and return all chemicals and equipment to the Chemistry 1 bins. Your laboratory instructor may institute a policy to insure cleanliness in the lab, and that policy may affect your lab grade, either through point deduction or your instructor evaluation.

Instructor Evaluation

Factors which may influence your evaluation include: participation in class discussions, attendance, following proper safety precautions, effort, understanding, cleaning up after yourself in lab, and the overall quality of your laboratory work. Instructors may, at their discretion, institute pop quizzes, lab practicals, or other evaluation tools to assist them.

Class Time

The laboratory is 2 hours and 50 minutes long. Do not plan other activities during this time, assuming you will "get out early". During the laboratory, you will complete 1-2

experiments from the Laboratory Manual. Each day will be counted as one “lab” for the sake of point calculation.

Laboratory time may also include one or more of the following: a homework question and answer session, a class discussion, a short lecture on the laboratory experiment, or a short video segment.

When you are finished, make sure there are no additional activities planned for the laboratory that day and have your instructor grade your data and calculations **before you leave the lab**. The instructor may also choose to ask you to clean up your workbench and/or some of the common area before leaving. Failing to do so may impact your grade. It is advisable to complete the as much of the postlaboratory assignment as you can before leaving as well.

Assignment Overview

Prelaboratory Assignments

Prelaboratory assignments are due at the beginning of the laboratory period. You are expected to read the laboratory directions before coming to the lab as part of the prelab assignment. You may do your prelab assignment directly in your lab book or on a separate sheet of paper. Your instructor will work his or her way around the classroom and assign points for your prelab in class. In some cases, the laboratory will begin with a class discussion of the prelab. **Prelaboratory assignments are included near the end of this handout.** prelabs will graded out of 2 points. You will receive 2 points for a complete and correct prelab, 1 point for an incomplete or incorrect prelab, and zero points for no prelab.

Data and Calculations

The laboratory manual we are using has data collection and calculation pages built in. These should be completed before leaving the laboratory, as directed by your instructor. They will be graded for completeness, data quality and computational correctness **before you leave the laboratory**. Do not rip these pages out of your notebook. Your lab instructor may choose to deduct points from this section if your are excessively late to class or if you do not participate actively in the lab. If you do not follow the safety rules or neglect to clean up your workspace, they may also deduct points. You will have the opportunity to earn 6 points per laboratory period. In order to receive all six points, all your calculations must be correct and you must have participated actively in lab. Fewer points will be given to students presenting incorrect calculations for grading and to students who did not actively participate in the laboratory activity. If you participate and make only minor calculation mistakes, you should receive all 6 points.

Postlaboratory Assignments

Postlaboratory assignments for each experiment are due the following lab period (with the exception of the last week). These should be written out on a separate sheet of paper and turned in at the beginning of the next lab period. Unless otherwise stated by your laboratory instructor, the postlab assignment is to answer all the questions in the "Question" section at the end of each experiment. It may be useful to try to answer most of these before leaving the laboratory on the day the experiment was performed. Your answers to these questions will be graded on effort and the quality of your answers. Postlaboratory quizzes or alternative assignments may be substituted for the postlab questions at your instructor's discretion to enhance active student participation.

You will have the opportunity to earn 6 points per postlab. In order to receive a 6, you must clearly demonstrate that you understand the questions and provide thoughtful analysis beyond the minimum requirements. A postlab paper which is mostly average but shows significant insight in a particular area will receive a 5. An average postlab paper (attempted all problems, minimal analysis) will receive a 4. Incomplete postlabs will receive 3 or fewer points.

Late postlabs will be accepted the following laboratory period for half credit. Late postlabs will **only** be accepted in the laboratory and will **only** be accepted the lab period *immediately following* the original due date.

Formal Laboratory Report

One formal, complete laboratory report will be required. You will pick one of the experiments you have performed (from a select subset of experiments) to turn into a formal report. More details are provided at the end of the syllabus.

The Prelaboratory Assignments

- Prelab 1:

1. Complete *Consider This 1.2* and *Consider This 1.3* in the lecture text *Chemistry in Context*
2. Describe the safety precautions necessary for performing this laboratory experiment.

- Prelab 2: Complete *Chemistry in Context* problem 21 from chapter 1.

- Prelab 5:

1. Argon is one of the primary components of our atmosphere. Argon is a **monatomic** gas. That is, it is stable as a single free atom which is not bound to any other atom. The chemical formula is Ar. Oxygen (O₂) and nitrogen(N₂) exist primarily as diatomic gases (two atoms bound together). Why is a single argon atom stable, whereas a single oxygen or nitrogen atom has a limited lifetime? *Hint: How many valence electrons does an argon atom have? How about nitrogen? Oxygen?*
2. Count up the number of valence electrons and draw the lewis structure of the following compounds. Tuesday: Silane, SiH₄; Thursday: Nitrogen trichloride, NCl₃

- Prelab 6: Suppose I have an empty balloon that weighs 2 grams and has a potential volume of 2 liters. Will it float if I fill it (to 2 liters) with Helium? Helium (He) has an atomic mass of 4 g/mol. Air has an average molecular mass of 29 g/mol and 2 liters of air weighs about 2.36 grams (at 25°C and 760 mm Hg, see chart on 3-6). If it won't float, how much lighter would the balloon have to be? If it will float, will it still float if I tie a string weighing 0.5 grams to it?

- Prelab 7: Calculate the molecular masses of NaHCO₃ and NaCl.

- Prelab 8/9:

1. Write combustion equations for each of the three fuels which will be tested in the laboratory.
2. What is incomplete combustion and how might it affect this experiment? (see *Chemistry in Context*, Chapter 1)

- Prelab 11: *Note: You may need to read ahead in chapter 6 to answer these questions. Also, be sure to read the lab introduction in the lab manual.*

1. What is an acid? What is a base?
2. What is an indicator and how will it be used in this experiment?

- Prelab 12/13: **(continued on next page)**

1. What kinds of things is your drinking water likely to contain in addition to H₂O?

2. Bring in one small sample of water to test. Possibilities include bottled water of various brands, purified water from a home purifying system, stream/river water, mineral water, and maybe even pool water. You may bring in tap water if you live outside of the Fresno water system or your water comes from a local well.
- Prelab 15: Pick **one** of the following assignments. (In the suggestion section, concentrate on designing ways to deal with the effects of acid rain, rather than ways to combat acid rain itself.)
 - Write a paragraph describing some of the potential effects of acid rain on materials. In another paragraph suggest ways to protect materials from acid rain. Be creative!
 - OR–
 - Write a paragraph describing potential health problems which might be caused by acid rain. In another paragraph, suggest ways to assess and combat this potential problem.
 - Prelab 22: Look at the ingredients in 4 common cold/flu/allergy/sinus/pain multi-symptom medications that each contain *at least two different* active ingredients. These products might be something like NyQuil, DayQuil, Sudafed Sinus, Sinarest, Contact, etc. These types of products contain several different chemical compounds - each to relieve different symptoms. Fill out a table like the one below. Once you have your table, try to identify the pain-killers in each. See if you can determine the purpose of any of the other compounds (decongestant, antihistamine, etc.) by seeing which active ingredients and claims the products have in common. Also, can you identify any compounds which might make you drowsy?

#	Product Name	Form (liquid, caplet, gelcap, etc.)	Claims to Do What or Relieve What Symptoms? (decongestant, etc.)	Active Ingredients
1	Joe's Sinus Stuff	tablets	decongests, pain relief, no drowsiness	acetaminophen pseudoephedrine hydrochloride
:				
:				
4				

- Prelab 23/25: Pick two food products in your home with moderate to high fat content. List the brand name and product type for each one. What is the total fat content per serving? What percent of the total fat is *saturated* fat? Burning 1 gram of fat costs about 9 calories. How many calories from fat are there in 1 serving? What percentage of the calories are from fat?
- Prelab 26: Taking doses which greatly exceed your daily requirements of some vitamins (like vitamin A) is considered a bad idea. For other vitamins, like vitamin C, this is

not such a problem. What is the difference? How is excess vitamin C removed from the body?

- Prelab 27: Read the laboratory text for this experiment over a second time very carefully. This lab is a bit longer and more complicated than most experiments in the course. Plan out how you will use your time (note the long waiting periods necessary in part I). Before class, prepare an outline of the major tasks which need to be performed, and note approximately how long each should take. Can you fit some tasks into the waiting time required for others? (Your outline will be checked for prelab credit.)

Formal Lab Report Guidelines

The formal lab reports are due May 12th in lecture. This assignment replaces a 15th lab course meeting. (The minimum number of meetings to meet the requirements for a semester unit for a 3 hour lab.) The final lab report is a 2-3 page typed summary of one of the experiments from the course. You may choose any one of the following laboratories: Experiment 11, 12, 13, 22, 23, 25, 26 or 27. An outline for you to follow is provided here.

1. Introduction: State the purpose of the experiment and a little bit of background information. (2-3 sentences) did.
2. Experimental: Report the experimental procedure you used in your own words. Someone reading the report should have a clear idea how to replicate the experiment. (little details, such as the size of glassware used, may be left out.) (1-2 paragraphs)
3. Data: The data you collected - this can be in the form of a table, if you wish. All the data that relates to your discussion must be included.
4. Results and Discussion: Report and discuss your results. Show your calculations and discuss your result. Does it tell you anything about the system? Is the result higher or lower than you expected? What may have contributed to errors? (1-2 paragraphs)
5. Conclusion: State the primary conclusion/results succinctly and make any suggestions for improving the experiment or expanding it to other substances or types of samples. (1 paragraph)
6. References: List the lab text plus and other materials you used.

Laboratory Schedule

The laboratory schedule is given on the following page. The laboratory schedule is designed to complement the topics we are discussing in the lecture portion of the course. The schedule is subject to change due to equipment concerns or to keep current with the lecture. Make sure you read the laboratory and finish the prelaboratory assignment before the beginning of the laboratory period.

Table 1: Tentative Schedule - Chemistry 1 Laboratory - Spring 1998

Week #	Dates	Lab Exps. number	Title	What's Due?
1	Jan 27,29	Introduction	Safety, Lab Intro Web Survey	-
2	Feb. 3,5	exp 1	Preparation of gases in a Breath	prelab 1
3	Feb. 10,12	exp 2	Weighing Air and Cooling Water	prelab 2 postlab 1
4	Feb. 17,19	exp 5	Chemical Bonds, Molecular Shapes and Molecular Models	prelab 5 bead postlab
5	Feb. 24-26	exp 6	Weighing Gases to find Molar Masses	prelab 6 postlab 5
6	Mar. 3,5	exp 7	Chemical Moles: Converting Baking Soda to Table Salt	prelab 7 postlab 6
7	Mar. 10,12	exp 8&9	Energy Conservation (8) Energy Content of Fuels (9)	prelab 8/9 postlab 7
8	Mar. 17,19	exp 11	Analysis of Vinegar for Acid Content	prelab 11 postlab 8/9
9	Mar. 24,26	exp 12&13	Water Hardness/ Chloride in River Water	prelab 12/13 postlab 11
10	Mar. 31, Apr. 2	exp 15	Reactions of Acids with Common Substances	prelab 15 postlab 12/13
11	Apr. 7,9	●●●	No lab this week●●●	postlab 15 due in lab next week
12	Apr. 14-16	exp 22	Synthesis of Aspirin	prelab 22 postlab 15
13	Apr. 21-23	exp 23&25	Fat in Potato Chips...(23) and Salt in Soups...(25)	prelab 23/25 postlab 22
14	Apr. 28-30	exp 26	Vitamin C Content in Fruit Juice	prelab 26 postlab 23/25
15	May 5,7	exp 27	Determination of Iron Content in Foods	prelab 27 postlab 26,27 (finish in lab)
16	May 12,14	●●●	No Lab This Week●●●	Formal report due in lecture Tuesday