

Chemistry 102

Winter 2009

Instructor/phone contact	Office/email	Lecture/Location
Dr. Greg Santillan (323) 343-2313	Physical Sciences 610 gsantil@calstatela.edu	MW 4:20 – 5:35 p.m. PS 158 (Section 01)
Dr. Krishna Foster (323) 343-2309	Physical Sciences 623 kfoster@calstatela.edu	MWF 9:50 – 10:40 a.m. PS 158 (Section 02)

Office hours are posted outside the instructor's office and in the Chemistry Department office, PS 616.

Required Materials

- Chemistry, Moore, Stanitski, Jurs 3rd Ed.
- Username and password purchased with textbook for website at <http://owl2.thomsonlearning.com>
- Experiments for General Chemistry (4th) edition, *Goldwhite and Tikkanen*
- Bound laboratory notebook
- Periodic Chart
- Scientific calculator
- Ability to access the Chemistry department web site:
<http://www.calstatela.edu/dept/chem/classes-notes.htm>
- NIS e-mail account
- Ability to access internet site for electronic homework assignments
- Safety glasses or goggles that meet the Z-87 specification ("Z-87" will be imprinted somewhere on the glasses if they meet it)
- Chemistry Breakage Card (from CHEM 101 or \$10 at cashiers office (Adm.128))
- Blue examination book (available in the bookstore)

Suggested Materials and Supplies

- Molecular models kit
- Lab jacket or apron

Course Description

Chemistry 102 is a rigorous 5-unit course that demands approximately 20 hours of study per week in addition to lecture, recitation and laboratory attendance. Chemistry 102 is the second quarter of a three-quarter sequence that provides a foundation in the chemical sciences suitable for premedical, pre-pharmaceutical, engineering and science majors. Students are required to have received a grade of C- or better in the prerequisite Chemistry 101 course or its equivalent, covering approximately the material in Chapters 1 through 8 of the assigned text. Students are required to be concurrently enrolled in one lecture section, one lab section and one recitation section.

Electronically graded homework (EHW) will be assigned on a weekly basis and these scores incorporated into your final grade. Each student's homework set will be identical in difficulty, but different in the problems' specifics. You will need to be vigilant in the completion of these assignments—the computer may be set to give you a limited number of tries to obtain the correct answer. The deadline to complete each EHW set will be Sunday of each week at 11:59 p.m. PST. Homework sets completed after the deadline will not be accepted. You may begin work on EHW sets any time before the weekly deadline. It will be of great help to you and your grade if you review some of the problems at the end of each chapter and the tutorials and practice problems available on the OWL site before attempting the EHW sets. EHW sets can be accessed at <http://owl.thomsonlearning.com/>.

Human graded homework will be due weekly at your recitation meeting. These problems will be *more* difficult than the e-graded homework and will bear a stronger resemblance to the types of problems you should expect on your examinations. These will be graded by your instructor and returned to you on a schedule set by your instructor. Solutions to the homework will be posted on the bulletin board outside PS 155, and at the library limited loan desk.

Course Goals and Objectives

The goals of this course are to contribute to the scientific literacy, critical thinking, problem solving, and idea integration skills necessary for students pursuing careers in technological disciplines to master. Reading, problem solving, performing experiments, writing reports, participating in discussions facilitated by the instructor, small-group activities, and lectures will be employed to accomplish these goals.

The course objectives are to introduce basic concepts of chemistry including chemical bonding; deduction of and ramifications of molecular structures; properties of gases, liquids, and solids; rates of chemical reactions; qualitative and quantitative aspects of chemical equilibrium; and qualitative and quantitative understanding of the properties of solutions. This course helps provide students with the skills necessary to reach their career objectives. Students should consider the time devoted to this course an investment in their future.

Requirements

Students are required to conduct themselves in a professional manner during class. Cell phones, pagers and other electronic devices must be turned off during lecture. Late arrivals, side-discussions and other unprofessional behavior will be addressed at the instructor's discretion. Attendance will be recorded. Students returning from absences are advised to copy lecture notes from students in their study group.

Students are required to take quizzes and examinations designed to measure each individual's understanding of the course objectives cited above, which will include both problem solving and essay responses. Weekly quizzes will be administered during recitation. Students are required to take two midterms and a final examination. Make-up exams will not be available for midterm exams, and will only be made available for the final exam at the discretion of the instructor for medical emergencies or other extreme situations verified in writing by a third party. For example, in case of medical emergency, the student must provide a signed physician's note to the instructor before a make-up exam will be scheduled.

Students must be concurrently enrolled in Chemistry 102 recitation and laboratory sections to take this course. Students will perform experiments that demonstrate the basic concepts of chemistry and microscopic properties, and prepare written reports describing the principles, techniques, results, conclusions, and sources of experimental error in these experiments. This is a very important component of this course worth 22% of your grade. ***A student who does not pass the lab will not pass the course!***

Study Suggestions

- Study illustrations and diagrams and read the text before attending lectures.
- Form a small (3 or 4 person) study group.
- Do as many problems possible in addition to the assigned homework and do them without relying on solution keys.
- Work additional problems and review for the exams with study group members.
- Get help from the University Tutorial Services staff and your instructors in a timely manner. The office hours of all Chemistry 102 instructors are posted in the Department office (PS 616).

For more study tips, read the Preface of your text.

Grading

The grade in this course is assigned largely on the basis of points accumulated through activities in the following categories:

Section	Activities (points)	Total Points Possible
Lecture	e-graded homework	100
Lecture	Two 150-points midterms	300
Lecture	Final Examination	240
Recitation	Logarithm Exercises (15), eight best 10-point recitation quizzes (80), hand-graded homework (45)	140
Laboratory	Laboratory Reports (200) and technique (20)	220
	TOTAL	1000

The instructor may make minor changes to the total number of points as necessary. Additional quizzes given during lecture may be used to assign extra credit. The final grade will be based largely on the total number of points accumulated. The instructor will provide details of the requirements for specific letter grades as the quarter progresses. Plus and minus grades will be issued in this course. ***However, if you fail the laboratory/recitation, you will not pass the class!***

Dropping, Incompletes and Withdrawals

It is this Department's and the University's hope that nobody withdraws from this course. However, before you consider withdrawing from the course you should be aware of the University Policy on withdrawal.

You are not allowed to drop a course because:

- you have found the workload to be too heavy,
- or you are getting a poor grade.

It is your responsibility to be aware of these policies. Also, you should be aware that there are specific policies on the incomplete grade, IN. It is not automatically given—you must request it from your instructor who is not allowed to give an IN grade unless certain conditions are met. Consult the schedule of classes and your University catalog for details.

Schedule of Topics and Laboratories

The scheduled list of topics and laboratory exercises is tabulated below. The homework solutions will be posted on the bulletin board outside Physical Sciences 155 and in a library limited loan folder after the due date.

Week	Topics (Chapters)	Goldwhite & Tikkanen Lab Experiments (Points)	Hand-graded Homework Problems (Week Due)
1	Molecular Structures (9)	Check-in; review	Chap. 9: 77, 80, 83, 87, 92 (2)
2	Molecular Structures (9)	#9 Molecular Models (25)	Chap. 9: 94, 96, 98, 101, 102 (3)
3	Gases and the Atmosphere (10)	#6 PV relationship for a gas and determination of R (25)	Chap. 10: 93, 99, 108, 111, 113 (4)
4*	Gases and the Atmosphere (10); Liquids, solids etc. (11)	#7 Molar mass by vapor density (25)	Chap. 10: 115, 118, 119, 121, 122 (5)
5	Liquids, solids and materials (11)	#11 Synthesis of benzoic acid (20)	Chap. 11: 93, 97, 98, 100, 101, 102 (6)
6	Chemical Kinetics (13)	#12 Paper chromatography (25)	Chap. 11: 104, 108 Chap. 13: 95, 96, 98 (7)
7	Chemical Kinetics (13) Chemical Equilibrium (14)	#23 Chemical kinetics (30)	Chap. 13: 100, 101, 115, 116, 123 (8)
8*	Chemical Equilibrium (14)	#25 Formula and formation constant of a complex ion (25)	Chap. 14: 69, 71, 90, 95, 98 (9)
9	Solutes and Solutions (15)	#18 Solubility product of potassium hydrogen tartrate (25)	Chap. 15: 88, 92, 95, 99, 101 (10)
10	Solutes and Solutions (15)	Check- out; review for final	Chap. 15: 106, 109, 111, 114, 118 (never- solutions to be posted last day of classes)

* Midterm Exams will be administered during these weeks or the week immediately following.

Exam Schedules

Mid-term exams will be given during near the 4th and 8th weeks of the term—the exact dates for each exam will be announced in class at least one week prior to the exam. However, you should be studying for the exams starting the first day of class. The final exam for Section 01 (Santillian) will be given on Monday March 16th, 4:30PM – 7:00PM. The final exam for Section 02 (Foster) will be given on Wednesday March 18th, 8:00AM – 10:30AM.

Laboratory and Recitation

The recitation is devoted to reviewing the topics related to the homework and the theoretical aspects of the laboratory exercise. Students will have a weekly quiz in their recitation, and written homework is due when their recitation meets. Recitation instructors will provide details during the first class meeting.

In all experiments you are required to wear safety glasses that meet the Z-87 standards at all times during the laboratory period. ***If you do not have appropriate eye protection, you will have to leave the laboratory and lose the points for that experiment.***

During the experiment students will enter data into bound laboratory notebooks. In experiments where students work with a partner, both need to enter the data into their respective notebooks before leaving the laboratory. After completing the experiment, the instructor will initial the page on which the student entered the data in their laboratory notebook.

The instructor will tell students when final written reports are due. Final reports submitted for grading will be either **neatly** written in each student's notebook following the data pages or prepared with a word processor with a photocopy of the original raw data attached. **All** laboratory reports will contain the sections described below:

- I. **Prelab:** A detailed description of how the student plans to perform the experiment. **This section must be completed before coming to lab.** The instructor has the discretion to grade the prelab assignment and use that grade for that week's quiz grade.
- II. **Raw Data:** The initialed data (or photocopy) that the student collected in the lab period. Neatness is not imperative here, but it must be readable, with the data clearly labeled and the units of measurement listed. If this section is missing, the student may receive **ZERO** credit for that experiment.

Formal Report. (graded)

- I. The student's **name** (and lab partner's name (if applicable)), **date**, and experiment **title**.
- II. **Purpose:** A brief description of the experiment and what the student intends to accomplish
- III. **Data:** A table containing the data the student collected in the experiment complete with units. In some cases the student may also want to include results in this table.
- IV. **Theory/Principles:** A summary of the concepts explored in the experiment. If there are mathematical equations used in your calculations, they are derived and explained here. This section is one of the most valuable sections in the reports in terms of the number of points. Just writing equations is not enough!
- V. **Experimental:** A section that may refer to the laboratory manual, but also describe deviations from or improvements to the procedure.
- VI. **Calculations:** A sample calculation showing how the student obtained their results.
- VII. **Results:** The results of each student's experiment in a table.
- VIII. **Conclusions/Discussion:** This section also carries a large share of points. In this section you compare your results to the accepted literature values whenever possible. Make sure to reference literature values; a good source is the **CRC Handbook of Chemistry and Physics**, which is in the reference section of the library. The student should also identify

the most critical measurement (that which has the greatest uncertainty) and point out approximations that may affect the accuracy of your answer.

IX. Questions: Answer the questions at the end of the experiment. Note that some of these questions are based on *your* experimental results.

Laboratory Safety

Safety must be a primary consideration for all persons entering and working in a chemistry laboratory. The experiments have been chosen for their relation to lecture topics and to teach basic techniques. However, students have the responsibility to preview the experiment, learn and understand the appropriate safety precautions for each experiment and to consult with the instructor when safety procedures are not clear. Finally, the following general rules must be observed:

- Safety glasses must be worn at all times when *anyone* is doing experimental work in the lab.
- Smoking, **eating or drinking** are **NOT** permitted at anytime in the lab.
- Before beginning the first experiment, familiarize yourself with the location of safety equipment in the lab. These include the fire extinguishers, safety shower, fire blanket and eye wash. Your instructor will describe their appropriate use.
- Read your experiment and note any specific safety precautions.
- Work is not permitted in the labs except during regular class hours in the presence of an instructor. If you miss an experiment you *may* make it up by arranging to attend another instructor's session with **prior** permission from that instructor. Performance of unauthorized experiments is not allowed.