

Chemistry 105: General Chemistry I
Dr. Jonathan Gutow

Syllabus
Spring 2002

Lectures: 9:40-11:10 Tues. Thurs. (HS-107)

Labs: Attendance required. All labs meet in HS-404 at various times (See LABORATORY SECTION below).

Class Instructor: Dr. Gutow (Office: HS-412, Phone: 424-1326, e-mail: gutow@uwosh.edu, Chemistry Department Main Office Phone: 424-1400)

Dr. Gutow's Office Hours: 1-2 PM MTTh, 10:45-11:45 AM F in HS-412.

Required Materials

Text: *Chemistry and Chemical Reactivity*, 4th Edition, by Kotz and Treichel. Try to look at each chapter before we begin discussing it in class. This will familiarize you with the vocabulary and concepts I will be discussing so that you can take notes more efficiently.

Lab Manual: *Cooperative Chemistry* by Cooper.

Laboratory Notebook: Must be bound and make copies of each page. The preferred carbonless notebook is sold as a package with the text.

Other: Safety goggles with covered vents (available at the bookstore) and a calculator capable of handling scientific notation, square roots, powers and logs.

Subscription to e-mail discussion list: **All students are required to sign up for the class e-mail discussion list by Friday, February 15, 2002 to pass the course.** Instructions for subscribing in RESOURCES SECTION.

Optional Materials: *Study Guide for Chemistry and Chemical Reactivity* and *Student Solution Manual for Chemistry and Chemical Reactivity*. Both are available in limited quantities at the bookstore. Neither of these are likely to be necessary. Many solutions are in the back of the book. Answers to suggested problems will be supplied.

Course Prerequisite: Credit in or concurrent with Math 103, Introduction to College Algebra

Course Objectives/Overview: 105 is the first chemistry course for science majors. It also meets the requirements for pre-chiropractic/dental/medical/pharmacy/physical therapy/veterinary students. It is primarily an introduction to the structure and composition of matter. We will also begin to discuss the ways that reactions can change it. Chemical reactions are the main topic of 106.

Each week you will have at least four places to learn chemistry. At home or in the library you will read the textbook, study the vocabulary, and do problems to test your understanding. In lecture you will listen to descriptions of the most important and/or confusing concepts and take notes. In discussion you will use data or models and calculations to build theories. In the laboratory you will do experiments to discover properties of matter. You are encouraged to visit the instructor during office hours to clear up points of confusion. An optional weekly workshop organized by Dr. Sandra Neuendorf provides practice problems to do with a group, assisted by advanced chemistry students.

Lecture: Lectures are Tuesday and Thursday. Each 90 minute period will be devoted to several concepts, with the material corresponding to the textbook chapters listed in the schedule on page 2. Bring your calculator so that you will be able to do practice problems. Up to four unannounced extra credit quizzes (5 points each) will also be given during lecture.

Exams: There will be four 90 minute exams administered in class. Although the exams are not cumulative you will need to know material from the earlier chapters to understand things covered on the later exams.

Discussion: Discussions is a chance for you to work on chemistry in small groups and with more direct interaction with the instructor. Most discussions will consist of small group exercises directed by **worksheets** (5 points each) designed to demonstrate properties of matter or help you learn necessary skills. For example you might

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analyze periodic trends in melting points. A **quiz** (10 points each) based on the homework will also be given at the beginning of each discussion. The lowest quiz score will be dropped. The discussion immediately preceding each exam will be used for review.

There are four discussion sections meeting on Wednesdays each associated with the lab section of the same number:

1) 10:20-11:20 in HS-237	2) 11:30-12:30 in HS-237	3) 1:50-2:50 in HS-367	4) 3:00-4:00 HS-367
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Reading/Studying: Devotion of time each day to chemistry homework is the most efficient way to study for the class. College students are very busy; try this method to save time!

Reading assignments will be included on the homework sheet distributed for each chapter. Skim the text before the first lecture on the material. Look at the introduction, the subtitles for sections, the pictures and their captions, and the chapter highlights listed at the end.

After each lecture review your notes and read the appropriate textbook sections. Work through the in-chapter examples and exercises as you go along. If anything is confusing ask the professor about it.

Go to the review questions at the end of the chapter and see which ones you know how to do. You can check your work since answers are in the back of the book for many of the problems. Mark any that you have trouble with so you can do more examples of that type of problem.

Homework: Homework is not graded. Answer keys will be provided to allow you to study for the quizzes and exams. Answers to many Study Questions may be found in appendix O. Answers to the in-chapter exercises may be found in appendix N. Complete answer keys will be available a few days after the problems are assigned. Answer keys will be posted on the Chemistry 105 web site, accessible through links on your instructors home page (http://www.uwosh.edu/faculty_staff/gutow). You should do the homework in a timely manner since it will prepare you for the tests and quizzes.

Class Schedule

Week of	Lab*	Tues Chapter	Wednesday Topic	Quiz	Thursday Chapter
February 4	No Lab	1	1.7-1.8 (Significant Digits/Problem Solving)	no	2
Feb 11	Lab	3	Atomic Structure I	yes	3/4
Feb 18	Lab	4	Limiting Reagents/Balancing Equations	yes	4
Feb 25	Lab	7	REVIEW	no	Exam (1-4)
Mar 4	Lab	7/8	Atomic Structure II	yes	8/9
Mar 11	Lab	9 (skip 9.3)	Bonding	yes	9
Mar 18			SPRING BREAK		
Mar 25	Lab	9	REVIEW	no	Exam (7-9)
April 1	Lab	10	Orbitals/Hybridization	yes	10/11
April 8	Lab	11	Organic Molecules	yes	11
April 15	Lab	6	Enthalpy	yes	6 (+ 9.3)
April 22	Lab	12	REVIEW	no	Exam (6,10, 11)
April 29	Lab	12/13	Gases	yes	13
May 6	Lab	13/14	Intermolecular Forces	yes	14
May 13	Lab	14/review	REVIEW	no	Exam (12, 13, 14)

*See Lab Schedule on page 4 for exact experiments and when assignments are due.

Laboratory: In the laboratory you will learn to design experiments, use scientific instruments, make careful observations, and communicate your results to other scientists.

Safety is crucial in the laboratory. The dress code for chemistry laboratory includes safety goggles, long pants, and closed shoes. Safety rules will be reviewed during the first lab.

This laboratory is probably different from most that you have taken. There will not be a new lab project each week, but five extended open-ended projects in this lab. Before each new project begins, read the description of the project and consult the relevant sections of the lab manual (equipment, techniques, instruments, appendices). In the lab you will work with your group to plan an approach to answering the question or solving the problem. The instructor and the "SuperChemLab" computer program will be available for assistance. A written plan must be approved by your instructor before the group begins the experiment.

All procedures actually performed, observations and other data should be written in your laboratory notebook *in ink*. Refer to page 10, "The laboratory notebook" in the text. List your lab partners, since their notebooks may contain data that yours does not. Your notes must be complete before you leave each week. The notebooks may not leave the lab until the end of the semester; you will keep the copies for your reference.

A report will be written by each student for each lab. The reports will be graded on the basis of style, grammar and spelling as well as data analysis and interpretation. For most of the labs you will have a chance to review a draft with your group members and the instructor before turning in the report and will get points for producing such a draft.

Your lab grade will also depend on the quality of your laboratory notebook and lab work, your contribution to your group as judged by your peers, and the research plan presented by your group.

Reports, plans or drafts turned in a week or more late will get zero credit. Until that time late assignments will be marked down 10% per day.

You must receive **at least 50% in lab to pass the course**. Attendance in lab is mandatory. **Two unexcused absences from lab will result in a failing grade for the course**. To have an absence excused you must bring a written excuse to your instructor. There will be no make up labs, unless you can attend another laboratory section while the experiment is still in progress.

What is expected in an outstanding laboratory report?

Grammar: Complete sentences are written. The tense (present or past) and voice (active voice in first person singular or plural, or passive voice) are consistent. Because you will have completed the experiment most of the report should be in past tense and the passive voice (see page 28 of the lab text).

Spelling: No or few errors are found.

References: Books or articles used in preparation of the report are listed.

Organization: The information is divided into the four standard sections, labeled with their titles.

Content of the Sections (They should appear in this order contrary to what the text says)

Introduction: tells the reader why the report is worth reading. What may be learned from the experiment? What hypothesis is being tested? Does the experiment build on existing knowledge that has been presented in the text or lecture? If chemical reactions were performed, a balanced equation should be included.

Experimental: All reagents and equipment are described using correct terminology, including brand and model names for instruments. Names of chemicals are used rather than chemical formulas. Quantities of reagents and concentrations of solutions are given either here or in a table in the results section. The description of the procedures followed is complete enough that the experiment may be reproduced without consulting the lab manual or lab notebook. Standard methods (use of an analytical balance, preparation of a solution in a volumetric flask) are mentioned but not described. Diagrams are given for unusual apparatus.

Results: All qualitative and quantitative observations are described. Both directly measured and calculated quantities are included. Tables and graphs are used to display data whenever possible. Titles or captions describe the contents of the table or graph. For any calculations, an algebraic equation and sample calculation including units are given. The rules for significant digits are followed.

Discussion: The significance of the experiment is discussed. What was learned? Did the results confirm or disprove the hypothesis? Can an alternative hypothesis be suggested from the data? Comparison should be made to results of previous experiments found in the chemical literature. Any known or suspected sources of error should be mentioned and their possible impact on the results described. Suggestions may be made for improvement of the procedures for the benefit of people who may decide to reproduce the experiment. Scientific reports do not include whether the scientists enjoyed doing an experiment.

The four laboratory sections each associated with the discussion of the same number are (all meet in HS-404):

Section # and When	Instructor	Instructor e-mail	instructor phone
1) 8:00-11:20 Mondays	Dr. J. Gutow	gutow@uwosh.edu	424-1326
2) 9:10-12:30 Fridays	Dr. J. Paulson	paulson@uwosh.edu	424-7100
3) 1:50-5:10 Mondays	Dr. J. Paulson	paulson@uwosh.edu	424-7100
4) 1:20-4:30 Thursdays	Dr. J. Mihalick	mihalick@uwosh.edu	424-7095

Lab Schedule:

Week of	In Lab Activities*	Due in Lab** (plans, report drafts, reports, peer evals.)
Feb 4	No Lab	
Feb 11	Check-In/Safety/Density Experiment before lab read pp. 1-21, 24-29, 47-52, 59, 60, 66, 120	Plan for Density lab made and approved; peer evaluation.
Feb 18	Concrete planning and sample preparation. read pp. 31-33, 117	Density experimental and results only; concrete plan.
Feb 25	Concrete continued (sample testing)	
Mar 4	Contest; discussion of reports; planning for next experiment	Draft concrete report; peer evaluation; plan for Volume vs. Temperature of Gases.
Mar 11	Volume vs. Temperature of Gases read pp. 31-36, 53-55, 118-119	Concrete experimental and results only.
Spring Break		
Mar 25	Discussion of reports; planning for next experiment	Draft gas report; peer evaluation; plan for Analysis of Colas.
April 1	Analysis of Colas read pp. 67-69, 87, 93-96, 109-111	Gas report (all sections).
April 8	Colas continued	
April 15	Colas continued	
April 22	Discussion of reports, planning for next experiment	Draft cola report; peer evaluation; plan for Properties of Matter and Separations.
April 29	Properties of Matter and Separations read pp. 74-86, 140-141	Cola report (all sections).
May 6	Separations continued	
May 13	Check-out of lab	Separations report; peer evaluation.

*Reading assignments refer to the *Cooperative Chemistry Laboratory Manual*. Reading assignments must be completed before lab.

**Notebooks must remain in the lab in the drawer assigned to your section. Take the duplicate pages with you so that you may complete write-ups.

Resources:

Chem 105 Web Site: Contains lots of useful information: copies of this syllabus, links to interesting and useful sites related to this course, a regularly updated announcement page, information on tutors, homework assignments and answer keys. This site is constantly being revised so your suggestions of things to include would be appreciated. Most of the site is publicly accessible, however if you try to access homework information, answer keys and the regularly updated announcement page you will be asked for a username and your password. The username is "chem10502". The password will be provided the first day of class.

E-mail Discussion Group: **You are required to subscribe to this to pass the course**. This is a moderated discussion. All submissions must be sent to Dr. Gutow (gutow@uwosh.edu). Questions of general interest will be posted (without the name of the person submitting it, if requested). You are encouraged to send in your answers to questions. The instructor will attempt to answer any questions that are not answered by your fellow students within 48 hours. To subscribe send e-mail to: gutow@uwosh.edu with the "Subject:" line containing exactly "subscribe 105" without the quotations. In the body include your full name and your student ID#. You should check your e-mail daily to get the maximum benefit from this discussion group. The instructor will also send announcements and reminders to this discussion group.

Grading

<u>Exams:</u>	4 @ 100 points each	400 (59.7 %)
<u>Discussion Worksheets</u>	9 @ 5 points each	45 (6.7 %)
<u>Quizzes:</u>	best 8 @ 10 points each	80 (12.0 %)
<u>Laboratory:</u> Two or more unexcused absences from lab will result in a failing grade for the course.	Lab work and Notebook (9 @ 5 points = 45) Plans (2 @ 2.5 points and 3 @ 5 points = 20) Drafts (1 @ 2 points and 2 @ 3 points = 8) Peer Evaluations (2 @ 2 points and 3 @ 4 points = 16) Reports (2 @ 7 points and 3 @ 14 points = 56)	145 (21.6 %)*
<u>Total:</u>		670 (100.0 %)

*You must receive at least 50% (73 points) in lab to pass the course.

The total points necessary to receive a particular grade are listed below. The instructor reserves the right to change the point total downward.

A: 603 (>90%)	AB: 577 (>86%)	B: 536 (>80%)	BC: 503 (>75%)	C: 456 (>68%)	CD: 416 (>62%)	D: 336 (>50%)
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Course Policies:

Absences: The reason for any excused absences must be reported to your instructor (before the absence, if possible), and substantiated in writing by the appropriate person (i.e. doctor, parent, etc.). Assignments and tests missed because of an excused absence will not count against your record, but you will be held responsible for material covered during your absence.

Grading Errors: To be considered for possible regrading any mistakes must be brought to the attention of your instructor within one week of the time the exam, quiz or project is returned to you.

Final Grade Check: You are responsible for checking that your final score is correct. Save all papers, exams and quizzes until the final course grade has been determined.

Last day to drop without a late add/drop form is March 1, 2002, the day after the first exam.

A WORD TO THE WISE: The most common reason for a poor grade in this course is the failure to keep up with the work on a daily and weekly basis. In general, if you attend all parts of the course, read the text, complete and understand the problem assignments and lab experiments, you will pass the course. If you study in addition to that, you should do better. If you experience difficulty with any part of the course, seek help immediately. If you let it slide, it becomes more difficult to catch up because the subject matter tends to be cumulative.