Lectures: 10:20-11:20 MWF (HS-107) Attendance strongly recommended (response clicker answers count for extra credit).

Labs: Attendance required (two unexcused absences = automatic F for course). All labs meet in HS-404 at various times (See LABORATORY SECTION below).

Discussions: Attendance strongly recommended (in class quizzes and activities count for grade). All discussions meet in HS-270 on Mondays at various times (See DISCUSSION SECTION below).

Instructors:

Name	Office	Phone	e-mail
Dr. J. Gutow*	HS-412	424-1326	gutow@uwosh.edu
Dr. J. Plude‡	HS-438	424-7098	plude@uwosh.edu
Dr. S. Hawi‡	HS-443	424-1029	hawi@uwosh.edu

*All administrative questions, scheduling, exam regrades, etc. should be directed to Dr. Gutow.
‡ Lab only.

Required Materials

Text: *Chemistry: the Science in Context* by Gilbert, Kirss and Davies. Try to look at each chapter before we begin discussing it in class. This will familiarize you with the vocabulary and concepts being discussed so that you can take notes more efficiently. This text was chosen because it is easier to read than most general chemistry texts and has good worked examples. However, it is a first edition, and most of you probably will get a copy of the first or second printing; thus it has a few typos. A list of all the known typos is posted in the lecture section of the class web site. It is a good idea to check this list. If you find additional typos, please let me know and I will add to the typo list.

Lab Manual: *Cooperative Chemistry*, 3rd Ed. by Cooper.

Laboratory Notebook: Must be bound and make copies of each page. The preferred carbonless notebook is sold at the University Bookstore bundled with the Lab Manual.

Safety goggles with covered vents, available at the Bookstore or from the Chemistry Club ($4 outside lab the first day).

Calculator capable of handling scientific notation, square roots, powers and logs.

eInstruction response clicker: Please register as soon as possible. The Class Key is F16807I383.

Subscription to e-mail discussion list: **All students are required to sign up for the class e-mail discussion list by Friday, February 10, 2006 to pass the course**. Instructions for subscribing in RESOURCES SECTION.

Optional Materials: *Study Guide for Chemistry: the Science in Context* and the *Student Solution Manual*. Both may be ordered through bookstores. Neither of these are likely to be necessary. Student solution manuals are generally full of errors. The text itself contains study summaries, example solved problems and practice problems. Answers to most end-of-chapter problems are in the back of the book. Worked out answers to suggested homework that do not have answers in the back will be provided on the class web site.

Course Prerequisite: Credit in or concurrent with Math 104, College Algebra

Course Objectives/Overview: 105 is the first chemistry course for science majors. It also meets the requirements for pre-chiropracty/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 matter. Chemical reactions are the main topic of 106.

As part of a good liberal arts curriculum this course has a number of goals. The primary goal, as described

above, is to introduce you to structure and composition of matter. This topic fits well into the liberal arts curriculum because it teaches skills which are generally useful and specific models that are widely applicable. Learning to use these models is extremely good practice at solving unfamiliar problems as well as thinking analytically, critically and creatively. A few of the things these models are used for are understanding the chemical reactions involved in living, the shapes of biomolecules, environmental issues such as global warming, developing new drugs, and designing solid-state electronics. A secondary, but very important goal of the course, is to help you develop effective communication skills. You will work on written communication skills primarily in lab where you will produce reports on your work.

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,take notes and try some exercises. In discussion you will use data or models and calculations to build theories and practice techniques. In the laboratory you will do experiments to discover properties of matter. You are encouraged to visit the instructors 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 (see RESOURCES SECTION).

Lecture: Lectures are Monday, Wednesday and Friday. Each 60 minute period will be devoted to several concepts, with the material corresponding to the textbook chapters listed in the schedule below. Bring your calculator and clicker so that you will be able to do practice problems. You can earn up to 25 points extra credit by answering the clicker questions correctly (there will be more than 25 clicker questions).

Exams: There will be five 60 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: Discussion 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** (8 points for doing the worksheet) designed to demonstrate properties of matter or help you learn necessary skills. For example you might analyze periodic trends in melting points. The lowest worksheet score will be dropped. A **quiz** (13 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 Mondays in HS-270, each associated with the lab section of the same number:

1) 12:40-1:40	2) 1:50 - 2:50	3) 3:00 - 4:00	4) 4:10 - 5:10

Reading/Studying: Research into how successful students study shows that 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 on the class web site 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 (answers may be found in the appendix beginning on page A-45). If anything is confusing ask one of your instructors about it.

Go to the review section at the end of the chapter and see which topics, skills and equations are clear to you. Mark any that you have trouble with so you can ask more questions, study it more and do more examples of related problems.

Homework: Homework is not graded. Answer keys will be provided to allow you to study for the quizzes and exams. Answers to most end of chapter problems may be found in the appendices beginning on page A-57. Answer to problems without answers in the back of the text 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 Dr. Gutow's 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*	Mon Chap	Monday Discussion Topic	Quiz	Wed Chap	Fri Chap
Jan 30	No Lab	1	Significant Figures	no	1	1
Feb 6	Lab	2	Isotopes and Radiochemical Dating	yes	2	2
Feb 13	Lab	2	REVIEW	yes	**EXAM**	3
Feb 20	Lab	3	Atomic Structure/Photoelectron Spectroscopy	no	3	4
Feb 27	Lab	4	Limiting Reagents/Stoichiometry	yes	4	4
Mar 6	Lab	4/5	REVIEW	yes	**EXAM**	5
Mar 13			SPRING BREAK			
Mar 20	Lab	5	Molarity/Molality	no	5	5
Mar 27	Lab	5/6	Bonding	yes	6	6
Apr 3	Lab	6	REVIEW	yes	**EXAM**	7
Apr 10	Lab	7	Geometry/Hybridization	no	7	7
Apr 17	Lab	7/8	Greenhouse Gases	yes	8	8
Apr 24	Lab	8	REVIEW	yes	**EXAM**	9
May 1	Lab	9	Intermolecular Interactions	no	9	10
May 8	Lab	10	Crystals/Gems	yes	10/review	**EXAM**

*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. Most of the labs will be extended open-ended projects. 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 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 18, "The laboratory notebook" in the lab manual. List your lab partners, since their notebooks may contain data that your notes do 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 may take the copies for your reference.

You will be writing some individual reports and some group reports. 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.

Group reports will be constructed with a contribution from each group member. Each student will be assigned to write a section (Introduction, Procedure, Results, or Discussion/Conclusion) and the assignment will rotate during the semester. Each section will be graded individually. Your score will be determined using the following formula: (0.75 x points of your section) + (0.25 x average of the other sections). This means that you will receive up to 75% of the lab report points just by doing your section. In order to secure a higher score for lab reports, group members are encouraged to communicate and exchange feedback.

If one (or more) of the group members are not cooperating to compile a full report, group members should assist the person(s) who are having difficulties. If they are still unable to contribute their part, they may be excluded from the report compilation upon approval by your lab instructor. In this case, the group is still responsible for all four complete sections. People excluded from the group report must prepare FULL reports on their own.

No reports missing any sections will be graded. Assignments turned in a week or more late will get zero credit. Until that time late assignments will be marked down 10% per day.

Your lab grade will also depend on the quality of your laboratory notebook and lab work, your contribution to

your group, and the research plan presented by your group.

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 to be written. The tense (present or past) and voice (active or passive voice) should be consistent. Because you will have completed the experiment most of the report should be in past tense and the passive voice (see page 20-35 of the lab manual).
Spelling: No or few errors are found.
References: Web sites, books, articles and handouts used in preparation of the report are listed at the end of the report as a numbered list. The numbers are used in the text to show where the information from the reference was used.
Organization: The information is divided into the four standard sections, labeled with their titles. **Sections should be in the order listed below, not those in the lab manual.**

Content of the Sections (**They should appear in this order contrary to what the manual 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. References to current work of others (published literature) can be in present tense as can statements of what is known. References to the work you did should be in past tense and passive voice.

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. This section should be in past tense passive voice. Do not use command voice.

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. Within the text references to tables and figures that the reader is looking at may be in present tense. The rest of the description in this section should be in past tense passive voice.

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. References to tables and figures that the reader is looking at may be in present tense. Except for suggested future experiments the rest of the discussion in this section should be in past tense passive voice.

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

Section # and When	Instructor	Section # and When	Instructor
1) 8:00 -11:20 Tuesdays	Dr. J. Plude	3) 1:20-4:30 Tuesdays	Dr. S. Hawi
2) 8:00 -11:20 Thursdays	Dr. J. Plude	4) 1:20 - 4:30 Thursdays	Dr. J. Gutow

Lab Schedule:

Week of	In Lab Activities*	Due in Lab** (plans, report drafts, reports)
Jan 30	No Lab	
Feb 6	Check-In/Safety/Density experiment before lab read pp. 7-19, 45-54, 57-58, 68 (reading a meniscus), 95. As you write results and experimental refer to pp. 20-41.	Density plan made and approved.
Feb 13	Discussion of reports; Begin pigment synthesis lab. Read handout from web site (print out, so you can fill out data sheets), pp. 70,74-75 (gravimetric analysis)	draft of Density experimental and results sections; prelab questions for pigment lab.
Feb 20	Complete pigment lab; discuss contents of introduction and conclusions; planning for next experiment. Read pp. 38-41, 64-69, 87-90,129-133	Density lab report (experimental and results only); Analysis of Colas plan A
Feb 27	Analysis of Colas	Pigment Data Sheets plus introduction and conclusions; Analysis of Colas plan B.
Mar 6	colas continued	Analysis of Colas plan C
	Spring Break	
Mar 20	colas continued	
Mar 27	Discussion of reports, planning for next experiment. Read pp. 38-41, 53-54, 101-102	Draft cola report (each group member assigned a section); plan for Volume vs. Temperature of Gases.
April 3	Volume vs. Temperature of Gases	Cola report (group report)
April 10	Discussion of reports, planning for next experiment. Read pp. 58-63, 67-69, 70, 74-75	Draft gas report (each group member assigned a section); Unknown Compound Plan A
April 17	Unknown Compound	Gas report (group report); Unknown Compound Plan B
April 24	Unknown Compound	Unknown Compound Plan C
May 1	Unknown Compound	Assignment of report sections.
May 8	Check-out of lab	Unknown Compound Report (group report)

*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, interactive tutorials, 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 or answer keys you will be asked for a username and your password. The username is "chem10506". 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). Please include [Chem 105] in the subject line. 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 instructors 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.

Optional Workshop: In workshop you will do practice problems in a group, assisted by advanced chemistry students. If you believe your math skills or chemistry background are weak you are strongly encouraged to attend this weekly workshop. This workshop meets 5-7 P on Tuesdays in HS-202 beginning the second week of classes. Enrollment is limited. Contact Dr. Sandra Neuendorf (neuendor@uwosh.edu) to sign up.

Grading

Exams:	5 @ 100 points each	500 (58.8 %)
Discussion Worksheets	9 @ 8 points each (1 dropped for absence)	72 (8.5 %)
Quizzes:	best 8 @ 13 points each	104 (12.2 %)
Laboratory: Two or more unexcused absences from lab will result in a failing grade for the course.	Lab work and Notebook (9 @ 7 points = 63) Plans (8 @ 3 points = 24) Drafts (3 @ 5 =15) Reports (1 @ 8 points & 4 @ 16 points = 72)	174 (20.5 %)*
Total:		850 (100.0 %)

*You must receive at least 50% (87 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: 765	AB: 723	B: 663	BC: 604	C: 544	CD: 485	D: 425
(>90%)	(>85%)	(>78%)	(>71%)	(>64%)	(>57%)	(>50%)

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 20, 2006, after the second 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.