Chemistry 121 *General Chemistry II* Spring 2016

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Lecture: MTR 9-9:50 a.m. KSC 130

Text: Petrucci and Harwood, *General Chemistry*, 10th Ed. (Required)

Lab: The same lab manual used in General Chemistry I (Chem 120) is used this semester. Purchase *The Official Laboratory Notebook*, lab coat, and safety goggles or glasses before your first lab.

Qualifications:
You must have earned a C- or better in both the lecture and lab of General Chemistry I to be enrolled in this course.

At-a-Glance Information

OFFICE HOURS	
Tuesday	11a-12p
Wednesday	2p-3p
Friday	9:30a-10:30a
Email: All day until 10:00pm	

TENTATIVE TEST SCHEDULE		
Subject to change with advance notice. In the event a chapter is not complete at test time, the exam will cover up to the completed material		
Test 1	Thur, Feb 4	Chap 10-11
Test 2	Thur, Feb 25	Chap 12-13
Test 3	Thur, Mar 31	Chap 14-16
Test 4	Thur, Apr 21	Chap 17,19
Final	Mon, Apr 25	7:30-10:00 a.m.

I have no special talents. I am only passionately curious.
- Albert Einstein

LEARNING OUTCOMES

The specific *Student Learning Outcome* aligned to the Chemistry *Program Learning Outcomes* is that at the successful completion of this course participants should be able to successfully solve a wide variety of multi-step problems using mathematical and descriptive algorithms that describe the behavior of atoms and molecules.

OBJECTIVES

This course is a continuation of General Chemistry I. The overall goal of this course is to provide each participant with an understanding of some of the principles, laws, and theories of chemistry such that they may continue on to higher levels of chemistry and other scientific fields in which chemical principles are exploited. Each student should gain competence in solving chemical problems of varying difficulty utilizing problem solving strategies such as dimensional analysis, application of standard formulae, and synthesis of new formulae and algorithms from prior knowledge obtained in this and other courses.

While the major foci are on the basic principles of chemistry and the analytical methods necessary to explore these principles, the specific goals are that every participant will…

- ✓ recognize that chemistry is an experimental science and, as such, cannot be completely mastered without also experiencing personally the "hands-on" aspects of science.
- ✓ recognize and appreciate that there may be multiple approaches to the solution of a problem and that there may be a "best" approach which is different from that learned in the past.
- ✓ understand that success in this course depends, in part, upon a working knowledge of the mathematics of chemistry as well as the chemical concepts underpinning the problem at hand.
- ✓ understand that success in this course also depends, in part, upon the dedication and commitment of the participant to study beyond that presented in lecture.

This course is nearly entirely introductions to and applications of topics from a largely limited body of chemistry. Because of this characteristic, **students must come to the lecture prepared with the foundational knowledge expected to have been obtained from previous courses** and augmented by reading the textbook chapter in advance. Likewise, **knowledge and experience gained in the laboratory can not be extricated from the material presented in lecture.** Theoretical and practical topics will also be discussed which will expand on areas introduced in General Chemistry lecture, lab, and textbook. While coursework beyond the lecture is not required to succeed in this course, it is essential for mastery that participants not be intimidated from pursuing background or ancillary information necessary to fully understand a topic. On the other hand, **reasonable mastery and recall of material from the first semester of this sequence course is crucial to success in this course.**

Upon successful completion of this course every course participant should be able to:

- ✓ demonstrate the skills necessary to carefully and accurately solve chemical problems, including but not limited to: unit conversions, stoichiometry, properties of gases and compounds in the condensed phase, thermochemistry and thermodynamics, chemical reactions and kinetics, quantum mechanics specifically relating to structures and bonding, chemical periodicity, and chemical equilibrium.
- ✓ show mastery of material by confidently demonstrating the solution of a variety of chemical problem-types to a colleague.
- ✓ recognize, in a list of data given for a problem, information which is required for obtaining a solution to a problem and that which is superfluous.
- ✓ understand qualitatively the microscopic nature of chemical reactions and other chemical principles.

- ✓ solve a variety of problems dealing with physical and chemical properties of substances, stoichiometry, chemical reactions and equilibrium processes, compounds in the gas or condensed phases, energy transfer in chemical reactions, chemical analysis, basic quantum mechanics and electromagnetic radiation with emphasis on chemical structure and bonding, and periodic properties and trends.

- ✓ write in scientific format reports of the theory, experimental method, and results of an analysis.

> ***Keep away from people who try to belittle your ambitions. Small people always do that, but the really great make you feel that you, too, can become great.***
>
> **- Mark Twain**

RELATIONSHIP TO THE SEAVER COLLEGE MISSION

From The Mission of Seaver College of Pepeprdine University: *"Seaver College exists to provide a link between the knowledge and wisdom of the past and present with the challenges of the future. The college is essentially a community…[of] teachers committed to a life of instruction and scholarship [and] students preparing to assume responsible roles in contemporary society…."*

This course is designed to provide the framework on which hangs a significant portion of the body of basic chemistry knowledge, allowing the perceptive participant to glance into the richness of the microscopic world from a macroscopic point of view, and to provide the foundation for further studies in the sciences. Over the course of the semester, the successful participant will develop new and expand upon existing skills in critical thinking, mathematics, and the scientific method. Since chemistry is by its very nature an experimental science, honesty and integrity in the acquisition and analysis of data is at the very core of the scientific process. It is part of our role as practicing scientists to defend the nature of scientific discourse and to expose pseudoscience and scientific dishonesty.

ATTENDANCE

Generally, roll will not be taken. However, since the content of exams and homework problems is often covered in lecture, missing class is not advised. Chronic absenses and/or leaving during class may result in a grade penalty. Tardiness is disruptive – please try to be to class on time. If you *must* leave early, advise Dr. Green before class starts.

HOMEWORK

Homework will be assigned as we go. Homework is due on the assigned date. **Late homework will not be accepted, please do not ask.** You must keep up with the reading and homework. Getting behind usually results in intense frustration later. This instructor has found that reading the chapters a minimum of at least twice -- once quickly, once in depth -- is necessary for approaching an average understanding of the material. Sufficient homework is assigned to give a representative overview of the chapter. Some homework may be assigned which has not been covered in lecture. This is because the instructor believes you are in college to learn as much as possible -- not only material for the tests (see also **A Note On Grades**). *You must work as many of the chapter problems as possible beyond those assigned* to achieve the best results in mastery of the material, development of intuition and creativity, and personal accomplishment. DO NOT try to do the problems until you have read the chapter at least once completely.

Some students have grown accustomed to simply copying someone else's homework in the last moments before it is due – this is unacceptable, has regularly been observed by this instructor, and can result in the posting of zero for that assignment (see also *PLAGIARISM AND CHEATING*, below).

> ***Knowledge, and understanding, are wild things, to be hunted down and subdued.***
>
> ***Ignorance, stupidity and superstition are infectious, treatable conditions; but their successful treatment requires the cooperation of the patient.***
>
> ***- John N. Cooper, Professor of Chemistry***
> ***Bucknell University***

EXAMINATIONS Four tests will be given. So that one bad day on an exam will not completely ruin your course grade, your lowest test grade will count only one-half normal credit. If you score 15 points below the mean on two tests, please contact the professor concerning your status in the course. There is no mechanism built into the class to make up a missed exam. Make arrangements early if you will be missing an exam because you are a participant in a school-sponsored event. In the event of an illness – with documentation from a physician or the University Health Center – contact the course instructor as soon as is practical to make appropriate arrangements.

QUIZZES Occasional unannounced short quizzes will be given during the semester so that you can track your progress and improve on deficiencies, if necessary. If you miss a quiz for any reason, it cannot be made up.

DEADLINES Homework and assignment due-dates are not negotiable. It is the responsibility of every student to meet due date deadlines. Quizzes and exams must be turned in when called for. Competency, mastery and success in any course (or career choice) is defined not only by the correct answer but by a person's alacrity, facility, and finesse at completing timed tasks.

OFFICE HOURS Office hours are posted. The instructor obviously prefers you to come to posted office hours, **but if you cannot make it please make an appointment or even try just dropping by**. Those who need and avail themselves of in and out of office help usually do better in the course. If you are doing unassigned problems to gain proficiency, I will gladly go over the problem with you, if you wish. **You may use and are encouraged to e-mail to get non-immediate help as well.**The maximum time for reply is typically 3-6 hours during the day and 6-12 hours past 9:00 p.m. However, situations vary so these times are merely approximates. Interactive on-line office hours are available as well.

> ***If you think education is expensive, try ignorance.***
>
> **- Derek Bok, President, Harvard University**

GRADING **It is important to remember that grades are not wages.** You will not be graded on how hard you work – you will be graded on mastery of the assigned material. Your course grade is broken down as follows:

3 tests	=	300 pts	18.5% each
1 test counted half	=	50 pts	9.25%
Final exam	=	125 pts	23%
Homework/Quizzes	=	50 pts	9.25%
Discretionary	=	15 pts	3%

Total	=	540 pts	100%

CURVING You may be accustomed to being "graded on a curve." What this is usually assumed to mean is that if an average test score is not at an arbitrarily determined level, the teacher will adjust the scores or grade range-breaks so that the average does meet this numerical criterion. It

makes little statistical sense (on which a *curve* depends) to curve a class of less than 100 students. A curve also tends to promote unhealthy competition which interferes with an atmosphere of cooperativity and friendly competition. In addition, a properly applied curve requires numerical adjustments in both directions on all graded work.

In this course your grade will be based on your final course average and determined by a fixed scale:

Course Average	Grade
100-94%	A
90-93%	A-
87-89%	B+
84-86%	B
80-83%	B-
etc.	

Scores on the borderline will be handled individually by the instructor.

A Word On *DEAD WEEK*

Contrary to common belief, the last week of classes is not reserved for review, partying, etc. There will be lecture on new material and homework will be due. An exam is scheduled for the final week of class, as well.

There is a theory which states that if ever anybody discovers exactly what the universe is for and why it is here, it will instantly disappear and be replaced by something even more bizarre and inexplicable. There is another theory which states that this has already happened.

- Douglas Adams, "The Hitchhiker's Guide to the Galaxy"

A Word On Sorority, Fraternity, Sports, SongFest, etc.

Extracurricular activities such as sororities, fraternities, athletics, drama and other artistic endeavors, etc. are important parts of your total education at Pepperdine. However, these activities require a very significant time commitment. **It is your responsibility to keep up in class while involved in extracurricular activities.** This professor encourages you to make a decision now whether academics or co-curricular activities will take priority if your mastery of the material in this or other courses begins to suffer. Making this decision sooner is unquestionably better than later.

PLAGIARISM AND CHEATING

Fortunately, in all likelihood, no one in this class will be subject this paragraph. Plagiarism and cheating are professionally and ethically wrong. There exists a fundamental difference between working cooperatively (*e.g.* working together with friends or in a study group on homework problems which this instructor not only approves of but also encourages) and simply copying someone else's work. Cheating on an exam or plagiarizing the work of others is an offense of considerable magnitude. Careers have been brought to a close over a single incident. Students suspected of cheating or plagiarism will be referred to the University Academic Ethics Committee. *It's not worth it – trust me on this – I've been through it and it isn't pleasant!*

(See also http://seaver.pepperdine.edu/academicintegrity/policies/violations.htm)

Against logic there is no armor like ignorance

- Laurence J. Peter

CELLULAR TELEPHONES AND INTERNET MESSAGING

If you bring a cell phone with you to class, please turn it off or silence it (merely setting the cell phone to vibrate mode is insufficient) before class starts. The vibrate function not silent – it sounds vaguely like a quiet cow – please turn it off. It is very distracting (and colossally inconsiderate) to have incoming calls during class time. Some people like to use their computer to take notes in class – a practice which your professor does not discourage. There is a strong temptation to accept internet messaging requests during class – a practice which your professor strongly discourages. ***Your course grade will be affected if your phone audibly rings or if you are found to be text or internet messaging during class.*** *Please read that previous sentence again.*

OTHER PET PEEVES

There are really very few things that bother this professor during class time. An open and friendly classroom that allows for discussion and dialog is desired and, even, expected. However, there are a few behaviors that can elicit a strong and negative response. The chances of getting along with this and other professors are greatly increased if you avoid…

…chronically leaving and returning to the classroom during lectures.
…continued chatter past the scheduled start of class time.
…talking when the instructor is talking or another student is asking a question or speaking.
…habitually arriving late to class.
…making any noise while chewing gum.
…eating loud food or slurping through a straw during lectures.
…failing to laugh at your professor's jokes regardless of their (or lack of) humorous quality.

The most exciting phrase to hear in science, the one that heralds new discoveries, is not 'Eureka!' (I've found it!), but 'That's funny...'
-- Isaac Asimov

SAVING GRADED MATERIAL

It is your responsibility to save all graded materials (exams, homework, etc.) for this class. As per university policies, all grade disputes must be settled by the midpoint of the next non-summer semester which immediately follows this course.

COUNSELING CENTER and DISABILITY SERVICES

Students who feel that they may suffer from "test anxiety" or other academic obstacles despite exercising reasonable study and social habits may benefit by speaking to one of the staff in the Counseling Center.

Any student with a documented disability (physical, learning, or psychological) needing academic accommodations should contact the Disability Services Office (TCC264, x6500) as early in the semester as possible. All discussions will remain confidential. Visit www.pepperdine.edu/disabilityservices for additional information.

LABORATORY

The laboratory has an independent grade. You cannot rely on the laboratory to improve your lecture grade. Since the laboratory is often coupled to lecture, you will be responsible for some laboratory material in lecture.

INTELLECTUAL PROPERTY STATEMENT

Course materials prepared by the instructor, together with the content of all lectures and review sessions presented by the instructor, are the property of the instructor. Video and audio recording of lectures and review sessions without the consent of the instructor is prohibited. Unless explicit permission is obtained from the instructor, recordings of lectures and review sessions may not be modified and must not be transferred or transmitted to any other person. Electronic devices other than calculators (e.g., laptops, cell phones, PDAs, calculators, and recording devices) are not to be used during lectures or exams without prior permission of the instructor.

SOME GENTLE ADVICE

What and how you write in all media forms reflects on you and your professionalism. There exists different liguistic cultures in different "worlds". Text messaging a friend on a cell phone or in internet messaging is a different world than emailing a professor requesting help and letters of recommendation or a prospective employer about a job. The rules of etiquette are

different in different arenas. For example, “chatspeak” (when used correctly) is a fast and phonetic way to transfer information back and forth on a cell phone. Chatspeak, however, has no place in professional communication and simply appears as laziness. As a member of a community of professionals, let your communication style reflect on your professionalism. In professional communications, take the time to use good grammar and punctuation. Use proper honorifics and salutations. All of your faculty will appreciate it and will usually respond to you more quickly and respectfully.

IMPORTANT INFORMATION THAT DOESN’T FIT ELSEWHERE

The incomplete grade (I) will be assigned only in cases of an extreme emergencies and only in the last 3 weeks of class (after Exam 3 but prior to the final exam). According to university policies, the grade of incomplete will not be assigned to allow extra time for a student improve their grade but, rather, only in the case where an emergency prevents a student from completing a course’s culminating assignments and exams. Supporting documentation is required. Should the need arise for non-emergency situations, there are 3 opportunities during the semester to withdraw from this course.

There is no “extra credit” beyond that which is available to every student in class. No exceptions; please, don’t ask. Consider the rationale: If someone hasn’t yet earned the available credit, how then can they be eligible for “extra credit”?

PARTING NOTE

If you are having any problems in the class, do not hesitate to come see me (this applies equally to out-of-class problems). No question is too dumb and I will attempt to accommodate the best I can if you need help outside of office hours.

A professor is one who talks in someone else's sleep.
(unknown)

Disclosure Statement Required by the State of California

REGULATORY NOTICE: Natural Science's laboratories contain and certain class experiments or procedures will expose you to chemicals known to the state of California to cause cancer, birth defects, and other reproductive harm at levels which require a warning. For more information, contact your instructor or the Office of Regulatory Affairs at extension 4702.

So… there.

A Note On Grades

Most students believe their course grade is important, and rightly so. However, many will try to "earn" an 'A' with a minimum amount of work, or with procrastination, cramming, etc., and perhaps even cheating. One goal of this instructor is to help you make the attainment of knowledge (not just chemistry) and its wise use your ambition. When you make learning *personal* and not simply a short-term goal to get you to the next class, job, etc. then the grade will have a new significance and be a by-product of (rather than) the goal. If you have recently graduated from high school, this "university" perspective of grades may be somewhat alien to your way of thinking. With this in mind, the guidelines for the definition of the course grade is outlined below. They will be the criteria used to determine your course grade:

A is the highest academic grade possible. This honor is **not** automatically given to a student who ranks highest in the course, but is reserved for accomplishment that is truly distinctive and demonstrably outstanding. It represents a superior mastery of course material and is a grade that demands a very high degree of understanding, originality, and/or creativity. Further, the student is characterized as one who takes initiative in seeking new knowledge outside the formal confines of the course.

B is a grade that denotes achievement considerably above acceptable standards. Good mastery of course material is evident and student performance demonstrates a high degree of originality, creativity, or both. Student works well independently and often shows initiative. Oral and written analysis, synthesis, and critical expression is considerably above average.

C indicates a satisfactory degree of attainment and is the acceptable standard for proceeding to more advanced work in the field. It is the grade that may be expected of a student of average ability who gives to the work a reasonable amount of time and effort. This grade implies familiarity with the content of the course and acceptable mastery of the material. Student displays some evidence of originality, creativity, or both. Student works independently at an acceptable level and **completes all requirements in the course**, including attendance and participation.

D denotes a limited understanding of the subject, meeting only the minimum requirements for passing the course. It signifies work which in quality and/or quantity falls below the average acceptable standard for the course. Performance is deficient in analysis, synthesis, and critical expression and lacks in originality and creativity. This grade is insufficient to proceed to higher level courses in the discipline. For most students this grade is the result of insufficient devotion of time to the course.

F indicates inadequate or unsatisfactory attainment and a serious deficiency in understanding of material. This grade also indicates the student cannot work independently and/or fails to complete assignments. This grade is usually earned by students who do not attend class or devote sufficient time to study. This grade, like the 'D', is inadequate for proceeding to higher level courses in the field.

Generally Observed Student Characteristics

(Adapted from John H. Williams, *The Teaching Professor*, 1993, pp 1-2)

	The "A" Students…
Attendance	…have nearly perfect attendance.
Preparation	…are prepared for class. Their attention to detail is superb and they usually read the material prior to class.
Curiosity	…show a high level of interest in the subject matter whether they actually like the subject or not. They look up or search out answers to topics that they don't understand. They often ask interesting questions or make insightful comments.
Retention	…are able to retain new material and consciously connect past learning to the present.
Attitude	…have an attitude that displays both the determination and self-discipline required for success. They also show initiative and do things without being told.
Talent	…possess a special talent. It may be exceptional intelligence and insight or it may be unusual creativity, organizational skills, commitment and perseverance - or a combination thereof. These gifts are evident to the professor and usually to the other students as well.
Results	…make the highest grades on tests and their work is generally a pleasure to grade.

The "C" Students…

Attendance … put other priorities ahead of academic work and may miss class frequently.

Preparation …prepare their assignments consistently, but in a perfunctory manner. Their work may be sloppy or careless and at times is incomplete or late.

Attitude …are not visibly committed to the class. They participate, if at all, without enthusiasm and their body language often expresses boredom.

Talent …vary enormously in talent. Some have exceptional ability, but show undeniable signs of poor self-management or bad attitude. Other are committed and diligent, but are simply average in academic ability.

Results …obtain mediocre or inconsistent results on tests. They have some concept of and familiarity with the material, but clearly do not show mastery of the subject matter while insisting otherwise.

> ***I cannot teach anybody anything, I can only make them think.***
>
> **-Socrates**

Guide to Learning

The following taxonomy[1] summarizes the 6 levels of learning. Generally, it may be said that a student who wishes to master the material of a class will strive to reach level 6.

Notice that to move up in the learning hierarchy, a student will have, for example, mastered the language of the field and possess a knowledge-base of basic facts before they can select the correct formula to solve a problem given a list of data. A level 6 “thinker” will necessarily have mastered the lower levels to such an extent that they can call upon those tools as necessary to solve the problem at hand. It is suggested that one cannot effectively move to higher levels until lower levels have been adequately addressed.

1. **Knowledge** Language of chemistry, nomenclature, facts, memorization
2. **Comprehension** Qualitatively predict outcome of a reaction or process, summarize results, estimate a result
3. **Application** Use formulas to solve a problem (d=m/v, PV=nRT, etc.), apply and calculate, algebraic manipulation, explain and demonstrate
4. **Analysis** Gather and use experimental data to solve an assigned problem, present results in written or oral format
5. **Synthesis** Use prior knowledge to derive new knowledge, derive from known equations new and useful equations, utilize prior material learned in prior courses in current course, read the primary and secondary literature to obtain necessary tools for performing an experiment, independently design a new experiment or analysis, gather and use experimental data to solve a problem, write and speak clearly and accurately in the scientific style
6. **Evaluation** Examine data and results to distinguish quality from “noise”, read the primary literature and rationally and critically discuss the results presented, predict the outcome of similar experiments

> ***Education is too important to be left solely to the educators.***
>
> **- Francis Keppel**

[1]This hierarchy is based on Bloom’s Taxonomy of Cognitive Learning

Some Important Dates

1/15/2016	Last day of add/drop period
1/18/2016	Martin Luther King Day
1/25/2016	Last day to change CR/NC status
2/29/2016	Spring Break
3/14/2016	Last day to withdraw with a grade of W

We will have had 2 exams by March 14. If you have scored 15 points below the mean on these exams, this is a good chance to withdraw with no penalty to your GPA. If you are having problems in the course, please see Dr. Green before withdrawing from the course.

4/15/2016	Last day to withdraw with a grade of WP/WF
4/25/2016	Final exam: Monday, Apr 25 7:30-10:00am

Frequently Asked Questions

I got a C- in Chemistry 120. Am I at a disadvantage? Can I still get a good grade?

You are at a little disadvantage but, of course, you can get a good grade. Statistically, students who score a C- in the first semester of General Chemistry have to work harder than others. If you are serious about this class and your desire to learn, you will do all right. We have discovered that a good math background is more essential for success in General Chemistry than historic grades. In any case, with diligent study almost everyone can succeed in this course (or in any course, for that matter).

What is the key to success in General Chemistry?

Practice, practice, practice. This means putting in quality study time every day. Chemistry is like a foreign language or a musical instrument. If you don't practice, don't expect to get really good at it.

How should I "practice" chemistry?

Every day spend at least one and one-half to two hours reading the chapter and taking notes, rewriting your lecture notes neatly and more completely, and *working as many problems as possible*. Even redoing problems you have already completed - even in prior chapters.

You might try alternating study activities day-to-day... one day read and take notes, rewrite lecture notes, and work example problems. The next day work end-of-chapter problems. The day after reread and work problems, etc. Take Saturday *or* Sunday off from chemistry if you have put in 2 or more quality hours per day during the week. **4 hours on Tuesday does not cover the 2 hours you didn't do on Monday!** The point is... KEEP UP with the material so you don't have to cram the couple of nights before the exam.

It sounds like you want us all to be chemistry majors.

Not at all. This is the minimum amount of time you must put in. Chemistry majors will probably put in more (naturally). A good foundation in chemistry will serve you well in your other science courses (kind of like math).

> ***A little nonsense now and then, is cherished by the wisest men.***
>
> **- Willy Wonka in**
> **"Charlie and the Chocolate Factory"**

Do I have to take notes?

Consider the possibilities:

a. You have a photographic memory and have total recall of anything you see; then there is no need to take notes.
b. What the instructor does in class is done to dazzle and impress you and is not designed in any way to contribute to your understanding of the material; then, sit back, relax, be dazzled and impressed, but don't bother taking notes.
c. The premises of 'a' and 'b' are false; then, take careful, detailed notes that allow you to reconstruct and study what has been covered in lecture.

See also *How to Survive Chemistry*.

Do you collect homework?

Yes... but read on. The purpose of homework is to practice and master the course material. You would not expect to master tennis solely by watching someone else play without yourself practicing. The instructor of this course really does not need to see your practice work; however, to insure that you are indeed practicing, homework is assigned, collected, and graded. Be aware that homework may not be returned before an exam. Thus, it is important that you make a copy of your work or do extra problems and be sure that you are doing them correctly. Office hours are useful for checking your work on unassigned problems.

"Is this going to be on the exam?"

Fortunately, I haven't heard this question in a long time, but let's understand the rules of the game anyway. It is the job of a course instructor to coerce you into studying all the material they think is important. This normally includes reading material, handouts, and lecture topics. It is the task of the course instructor to determine if you have learned the material. This is normally done by giving exams in which questions representative of the material are asked. There is insufficient time to ask every possible question. If you have learned the important material, you should be able to answer the representative questions. If I tell you in advance which questions are on the exam, it

a. spoils the surprise (just like spoiling Christmas).
b. tempts you to study only the material on the exam. (As hard as it is to believe, given the opportunity, some less motivated individuals will actually do this.)
c. decreases the content of the course to only those topics tested.

I was not in class. Did you do anything important?

Yes.

OK, then it sounds like we are going to work hard.

Yes. You may work harder in this course than you have worked in any other course. Maybe not. But I (we in the Natural Science Division) want you to extend yourself intellectually farther than you think you can. You are capable or you wouldn't be here.

But I work to pay the school.

I know. If you work or join a club or play a sport, you **must** organize your time to include study when you are awake, fresh, well-fed, sober, not high, undisturbed, unruffled, and, well...you-get-the-point. Every activity you do must be weighed against how it will affect your success in your course work.

Do you flunk anyone?

I don't take credit for any good grades earned; I won't take credit for poor grades. See also the instructor's feeling on grades below.

So... do you give 'F's

Yes.

You're kidding about all this - I mean the "time" stuff, the "organization," "keeping up" and all that.

No.

No, really. This is just to scare us.

No.

But this doesn't give me time for my other classes.

You will have plenty of time for your other classes... if you budget your time carefully.

Why are you so unreasonable?

Just am.

What is your feeling on grades?

Please don't fret and worry about your course grade - let me, I'm better at it. Please fret and worry (well, be concerned with) learning chemistry. If you learn the subject the grade will follow (sort of the *Field of Dreams* approach). Part of the grade is not only how well you learned a topic but also how fast you can use the information in a new setting (see **A Note on Grades**).

General Chemistry 121
Approximate Chapter Calendar

This calendar gives the content we will cover in each chapter. We will proceed at a brisk pace but may get ahead or behind at some point. These are the concepts that you must master. Refer to this occasionally to check on your progress.

Chapter		
10	**Chemical Bonding I** Lewis symbolism Covalent bonding Bond polarity Lewis structures and the *Octet Rule* Exceptions to the *Octet Rule* Electronic geometry and Molecular shape	
11	**Chemical Bonding II** Valence Bond Theory Hybridization Delocalization Introduction to MO theory	
	EXAM 1	
12	**The Condensed Phases: Liquids and Solids** Intermolecular forces Vaporization and vapor pressure Properties of solids Phase diagrams Crystal structure	
13	**Solutions** Terminology Concentration Solution formation Gases Colligative properties	
	EXAM 2	
14	**Chemical Kinetics** Rate of a chemical reaction Measuring rate Rate law 0,1,2-order reactions	
15	**Introduction to Chemical Equilibrium** Dynamic equilibrium *Keq* Le Chatelier's Principle Calculations	
16	**Acids and Bases** Arrhenius Theory Brønsted-Lowry Theory Autoionization of water and pH Acid/base strength Polyprotic acids Ions acting as acids and bases Correlation of structure and acid/base strength Lewis acids and bases	
	EXAM 3	
17	**Acid/base Equilibrium** Common-ion effect (Le Chatelier's principle revisited) Buffers Titration curves Polyprotic acids revisited	
19	**Thermodynamics and Energy** *First Law of Thermodynamics* Entropy *Second Law of Thermodynamics* ΔH, ΔS, ΔG, and K	
	Time permitting we will additionally cover chapter 20 or 25	
	EXAM 4	

Tips to Better Scores on Homework, Quizzes, Exams, and Laboratory Reports

Excellence in presentation and attention to details are some evidences of mastery and comfort in a field of study. When working class and laboratory assignments, please attempt to conform to the following guidelines to receive the maximum possible credit:

- All work must be legible.
- All numerical values that are not pure counting numbers must have units (*e.g.*, 1.23 m, 4.5 g)
- Do not improvise units. (*e.g.*, 1.23 m is 1.23 meters. The 'm' means meters, not moles, molecules, miles, etc. Kilograms are kg, not Kg, kG, etc.)
- Avoid assigning units as variables. (*e.g.*, the equation $d = \frac{m}{V}$ should generally not be written with the units assigned as the variables: $d = \frac{g}{mL}$)
- A solution to a problem should be logically presented and algebraically consistent. For example, a two step problem might be presented as follows:

  Calculate the mass, in milligrams, of 2.5 mL of water (density = 1.00 g/mL)

  $$m = 2.5\ \text{mL} \times 1.00\ \tfrac{\text{g}}{\text{mL}} = 2.5\ \text{g}\ H_2O$$

  $$m = 2.5\ \text{g}\ H_2O \times \frac{1000\ \text{mg}}{\text{g}} = 2{,}500\ \text{mg}\ H_2O$$

  or

  $$m = 2.5\ \text{mL} \times 1.00\ \tfrac{\text{g}}{\text{mL}} \times \frac{1000\ \text{mg}}{\text{g}} = 2{,}500\ \text{mg}\ H_2O$$

  but not

  $$m = 2.5\ \text{mL} \times 1.00\ \tfrac{\text{g}}{\text{mL}} = 2.5\ \text{g}\ H_2O \times \frac{1000\ \text{mg}}{\text{g}} = 2{,}500\ \text{mg}\ H_2O$$

- Avoid round-off errors in intermediate calculations.
- Use a leading zero in fractional decimal figures less than 1. Often the decimal point is not seen by the grader (*e.g.*, 0.123 g not .123 g)
- When graphing, use a graphing program or spreadsheet program for best presentation.
- Use the proper form in writing chemical symbols. (*e.g.*, sodium is Na not NA; platinum is Pt not PT.)
- The names of chemical compounds are not proper nouns unless they are trade names. (*e.g.*, sodium chloride, not Sodium Chloride; potassium sulfate, not Potassium Sulfate; etc.)