Chem 102H Syllabus
Text: *Chemical Principles, The Quest for Insight,* Atkins & Jones, 3rd ed.

Instructor: Timothy Hughbanks
Office: 330 Chemistry
Office Hours: W, 2:30 - 4:00 pm; F, 3:00 - 4:30 pm
Plus other times as available

Chapter		Text Pages	Classes (40 total)
Fundamentals (D, G, I, J, K)		(36)	(Review)
6	Thermodynamics – 1st Law	46	4
7	Thermodynamics – 2nd Law	38	4
8	Physical Equilibria	46	4
9	Chemical Equilibria	37	4
10	Acids and Bases	43	4
11	Aqueous Equilibria	36	4
12	Electrochemistry	39	5
13	Chemical Kinetics	48	4
*14,15	The Elements: The First Four Main Groups	76	4
*16	The *d*-Block: Metals in Transition	42	4
		451	(11.3 pages/class)

* This material was covered to some extent in Chem 101H. I will offer coverage of this material that takes better advantage of the material covered the first part of this course. Students who were in 101H may (or may not) appreciate an overview of the "high points" of what they saw at the end of 101H. Coverage will be less complete than in previous chapters.

Further information concerning the course, including examination details, homework assignments, grading policies, and calendar of events is posted on the class web site:

http://www.chem.tamu.edu/class/majors/chem102h/index.html

Course Description
(Adapted from a nearly identical description of 101H by Dr. M P. Rosynek)

The Chemistry 101H/102H sequence is intended to provide a rigorous introduction to important theories and concepts in the broad area of general chemistry. Chemistry 101H emphasizes atomic and molecular structure, chemical bonding, the gas laws, properties of liquids and solids, thermodynamics, and an introduction to chemical equilibrium. Chemistry 102H deals with physical equilibria, solution equilibria, the energetics and kinetics of chemical reactions, nuclear chemistry, and descriptive inorganic and applied chemistry. Successful completion of these courses will provide you with an excellent foundation for further study in more specialized areas of chemistry, as well as in related disciplines such as biology, biochemistry, and engineering.

Because this is an honors course, it will be conducted at a more conceptually (and mathematically) rigorous level. Students enrolled in the course should have had at least one year of high school chemistry (and preferably one year of high school physics), and should already be knowledgeable about many elementary chemical concepts. I will assume, for example, that you are already familiar from your high school course(s) with essentially all of the concepts in the introductory "Fundamentals" sections of the textbook, and these topics will, therefore, not be formally covered in class. However, you should review this material, and for Chem 102H sections D, G, H, I, J, K, and L are particularly relevant (the other sections were prerequisite to Chem 101H). Perform the assigned homework exercises from it during the first week of class to ensure that you are "up to speed." You should also review the material in Sections A, B, and C of Appendix A in your textbook (pp. A1 to A7) to ensure that you are adequately familiar with the concepts of scientific notation, SI units, and conversions that are presented there. Proficiency in algebra and simple trigonometry and knowledge of the elementary principles of differential and integral calculus will also be assumed. Sections C–F of Appendix A (pp. A6 to A10) briefly review some of the mathematical techniques and concepts that will be used during the course. If you have any concerns that you may not be adequately prepared to succeed in this course, please consult with me during the first week of class, so that we may discuss your individual situation.

Examinations and Grading

As summarized on the first page of the syllabus, your grade in the course will be based on two one-hour examinations (each worth 100 points), a final examination (150 points), graded homework assignments (worth a total of 150 points), and a term paper (100 points), and laboratory work (165 points). The length of the term paper will be strictly limited to six double-spaced typed or printed pages of text, not including references, Tables or Figures, with one-inch margins on all sides and using a font no smaller than 10 pt. Each student should consult individually with me no later than February 24 about the selection of a suitable topic for the paper. A detailed one-page outline of the paper (worth 10% of the paper's total grade) must be submitted to me for evaluation by March 31, and the final paper is due on April 19.

Homework and Class Exercises

Chemistry is a quantitative discipline that can only be properly learned by solving problems. The assigned even-numbered homework problems and their due dates for each chapter are summarized elsewhere. Each chapter of the textbook ends with a section entitled "Skills You Should Have Mastered," which summarizes the principal topics of the chapter. The topics from each chapter for which you will be responsible are also given on the "Homework Assignments" page. The textbook's accompanying "Student Solutions Manual" contains solutions to all of the odd-numbered problems in the text, and should be used as a learning tool, in order to study solutions of the unassigned problems.

Because one of the best ways to truly learn a subject is to explain or teach it to others, students are encouraged to work together on homework assignments if they find that to be helpful. I ask that you limit the size of such groups to four or fewer individuals; the only restriction on such collaboration is that every participant in any such group must make a significant contribution to solving the problems. I would advise you not to divide up the problem sets and assign a subset of problems to individual group members if only because such an approach will leave you more poorly prepared for exams. If any group of four or fewer students does hand in identical papers, please put all the participants in the group on each paper to save us the trouble of grading identical papers more than once. You are "on your honor" concerning adherence to these rules.

Reading Assignments

At this point in your education, role an instructors role is not so much to "teach" you chemistry, but to assist you in teaching yourselves and in "discovering" chemical principles through self-study. Consequently, the lectures, discussions, and in-class exercises in this course are not intended to provide comprehensive coverage of each topic, but to highlight and strengthen the most important and difficult concepts, in order to assist and guide you in your study. On another page of this syllabus are listed the text sections for which you will be responsible, whether or not they are all covered in class. As described above, the "Skills You Should Have Mastered" section at the end of each text chapter concisely summarizes the topics which you should have mastered from that chapter. The syllabus also gives a tentative schedule of lecture/discussion topics for the entire semester. To derive the greatest benefit from the classes, I urge you to develop the habit of reading and studying each chapter before the class(es) on that topic. This practice of prior study will not only enable you to better understand the material presented in the lectures, but will also allow for discussion in class about those topics with which you are having difficulty. Although I'll usually bring more than enough lecture material prepared for each class meeting, I hope to conduct as many classes as possible in a "interactive" style, with formal lecture material being interruptible with questions and answers.

Approaches to the Study of Chemistry

In his book, The Chemistry Classroom: Formulas for Successful Teaching, J. Dudley Herron refers to studies by Carolyn Carter, in which she describes two contrasting approaches by students to the study of chemistry:

> Some students see chemistry as abstract and alien. Their job is to absorb and reproduce knowledge presented by the teacher, who is an authority from another world. Problems are tasks that require calculations and an answer, but not a question, and the only purpose of solving problems is to get an answer that "they" want. The way to do problems is to reproduce algorithms and recognize problem types; creativity has no role in chemistry. The way to succeed is to work the same problems over and over until they are memorized. Students such as these are estranged from chemistry as a discipline. Chemistry is "out there" and the people who do it are some undefined "they" who want students to perform in mysterious ways that do not make much sense. The student's job is to figure out what "they" want done, to recall how "they" say a problem should be solved, and to apply "their" procedure to generate an answer "they" expect. There is little consideration of whether the answer to a problem or the problem itself makes sense. It is not supposed to.
>
> Other (more enlightened) students hold quite different beliefs. To them, chemistry is a creative way of understanding concepts and problems. They see themselves as the source of knowledge, and they see their role as putting concepts together and applying them to solve problems. The teacher is there to motivate, answer questions, and explain when necessary. Problems are tasks in which one must think creatively and synthesize ideas; problems are not algorithmic. The goal of problem solving is to understand ideas and apply them to new contexts, and the way to get good at it is to work problems, think about the concepts involved, and relate ideas to previous knowledge.

Clearly, it is the second of these two attitudes that you should cultivate in your study of chemistry (and many other disciplines). I will do all that I can to assist you in developing such an approach.

Legalities

Course Materials and Copyright Issues

All documents used in this course are copyrighted. Here, "documents" means all materials generated for this class, including, but not limited to, syllabi, quizzes, exams, lab materials, problem sets, and all materials appearing on the class web site. Because these materials are copyrighted, you do not have the right to copy any of them for any purpose other than your own personal academic use unless I expressly grant permission. In particular, course materials are not to be given or sold to any profit-seeking enterprise.

Americans with Disabilities Act (ADA) Policy Statement:

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact the Department of Student Life, Services for Students with Disabilities, in Room 126 of the Koldus Building or call 845-1637.

Academic Integrity Statement:

An Aggie does not lie, cheat, or steal or tolerate those who do.

Upon accepting admission to Texas A&M University, a student immediately assumes a commitment to uphold the Honor Code, to accept responsibility for learning, and to follow the philosophy and rules of the Honor System. Students will be required to state their commitment on examinations, research papers, and other academic work. Ignorance of the rules does not exclude any member of the TAMU community from the requirements or the processes of the Honor System.

Honor Council Rules and Procedures on the web: http://www.tamu.edu/aggiehonor

Plagiarism

As commonly defined, plagiarism consists of passing off as one's own the ideas, words, writings, etc., which belong to another. In accordance with this definition, you are committing plagiarism if you copy the work of another person and turn it in as your own, even if you should have the permission of that person. If you have any questions regarding plagiarism, please consult the latest issue of the Texas A&M University Student Rules, under the section "Scholastic Dishonesty."