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Required Texts

Physical Chemistry, A Molecular Approach, McQuarrie & Simon, University Science Books; *Physical Chemistry: A Guided Inquiry - Atoms, Molecules and Spectroscopy*, Spencer, Moog and Farrell, Houghton-Mifflin.

Recommended Texts

Quantum Mechanics in Chemistry, Hanna; *Applied Mathematics for Physical Chemistry*, Barrante.

Disability Statement

Students with documented disabilities who may need accommodations, who have any emergency medical information the instructor should know of, or who need special arrangements in the event of evacuation, should make an appointment with the instructor as early as possible, no later than the first week of the term.

Academic dishonesty

Read the section in the catalog on "Academic Dishonesty". I will assume that work you present is your own, unless it is clearly designated otherwise. Students who engage in cheating, plagiarism, fabricating or falsifying information, or facilitating academic dishonesty will be subject to disciplinary action.

Course Description

Physical Chemistry is the study of the physical and chemical properties of matter. Much of the subject is familiar to you from your studies in General Chemistry: chemical kinetics, atomic and molecular electronic structure, and spectroscopy. If it seems that the subject matter of "pchem" is fairly fundamental, then you are correct; the fundamental laws that govern the physical and chemical properties of matter are the main focus of Physical Chemistry.

Physical Chemistry can be divided into four subdisciplines: thermodynamics, kinetics, quantum mechanics and statistical mechanics. During this semester, the primary focus will be on kinetics and quantum mechanics, which provide the laws, theories and mathematical models that are used to describe the observed rates of chemical reactions, atomic electronic structure, and molecular structure. It is assumed that you have passed CHE 211, and MAT 190.

How this Course is Taught

The teaching method employed in this course is based on substantive research that shows student learning is increased when they construct their own knowldege, students who work in an interactive community are more likely to be successful and enjoy themselves more, and that students who construct their own understanding develop an ownership of the material. In this course, you will work through guided activities that help you discover the key concepts and applications of the course material - you will learn how to "think like a chemist". Rather than simply obtaining a "right answer", you will learn how to think logically and work in a team. During the course of the semester, you will be given ample opportunity to interactively refine your understanding of the course material and develop the skills necessary for success in the course, with the help of constant feedback from the instructor.

Group Work

You will be assigned to groups during the course of the semester with specific roles to perform in each group. Groups can and will be changed at any point during the semester. If a member of a group does not contribute, other members of the group may "fire" the offender. If no other groups wish to hire such a student, the student will be responsible for completing course material on their own. There will be no formal out of class group work, however you are encouraged to work on homework and study in groups (see the bonus on exams for high group averages below).

Course Components and Grading

Course grades will be based on three exams, homework, class preparation,class participation, and the ACS Thermodynamics final. The weight of each component and the ranges for final letter grades are given in the table below:

Item	Weight (%)	Grade	Range (%)
Exams (4 total)	50	A	90 - 100
ACS final	25	B	80 - 89
Homework	15	C	70 - 79
Class participation	10	D	60 - 69
		F	< 60

- *Exams.* Cumulative in-class hour exams will be based on material covered up to a week prior to the exam date. Exam questions will borrow heavily from in-class discussions and homework problems. You should be able to define important terms, apply problem-solving skills, and write about topics from the course. Tentative dates for the exams are listed on the course webpage. Because good teamwork is important in this course, you will be rewarded a 5 percentage point bonus on each exam for which your group averages at least an 80%.

- *Final Exam.* The final exam is an ACS standardized Thermodynamics exam, and will be given in the Fishbowl on **Friday, Dec. 19 2008 at 8:00 am**.

- *Homework.* Weekly homework will be assignments will be posted on the course webpage and collected each Thursday. Late homework will not be accepted and will be given a grade of zero. Assignments will typically have 5-10 problems from your textbook[1] and *Spencer*. You should try other problems as you study and especially as you review for the exams.

- *Participation.* Class participation will be graded based on your attendance, preparation and participation in the in-class group activities.

Grades and Course Proficiency

D Only modest proficiency in working problems or describing chemical concepts that have been illustrated in detail in class and course materials. Independence of learning is not evident and little ability to work well in team environments.

C Proficiency in working problems, using terms or describing chemical concepts that have been illustrated before in course materials or in class in detail. Low level of independence in learning chemistry is evident. Some ability to work well in groups.

B In addition to criteria of C, ability to deal with new problems or integrative problems with some proficiency. Independence in learning is evident part of the time. Usually works well in team environments, but can't always carry out each of the roles.

[1] Yes, I know the solutions manual exists and may be purchased. If you just copy out of it, you don't gain anything. There won't be a solutions manual available during the exams either. So there. If you want to look at my copy of the solutions manual, please just ask

A Significant independence in ability to learn and use chemistry. Proficiency in dealing with new and integrative problems. Ability to adapt to many different roles in group environments.

Plus and minus grades will be assigned at the discretion of the instructor.

Classroom & Attendance

Almost all of the meetings for this class will involve group work. Part of your responsibility for this course is to assist the other members of your group (and the entire class) in understanding the material. For this reason, attendance in class is required. It is assumed that you are a *motivated* upper level student majoring in natural science, and that the topics covered in this class are vital to achieving the goals you have set for yourself in your chosen field. If you are a chemistry major, *this and CHE 371 are the most important classes you are taking this semester.*

Valid reasons for missing exams include illness accompanied by a note from a physician), and school-sponsored travel (sports, music, field-trips). Other instances will be determined on a case-by-case basis. If you have any questions, contact me in advance.

Email & web materials

Course announcements and assignments will be communicated via email, so it is important that you regularly check it. Supplementary material, including copies of the course syllabus, exam dates, and links to useful websites for the course may be found at the CHE 362 section of the Chemistry Department website.

Goals

Physical Chemistry is a demanding subject, but it can be enjoyable, enlightening and rewarding. We will discus many topics that are familiar to you from general chemistry, but in greater detail and sophistication, as is appropriate for an upper level chemistry course. The best way for you to have a good experience in the course is by full participation in class discussions and the laboratory. By doing so, you will:

1. acquire basic physical chemistry knowledge and skills;
2. develop mathematical and analytical skills;
3. integrate mathematical and scientific skills;
4. improve communication and group problem solving skills;
5. acquire the ability to determine "what you need to know";
6. develop a sense of the enjoyment of doing science.

At the same time, you will develop process skills (such as critical thinking and communication) that will serve you well in your other classes, and more importantly when you graduate. You will learn how to apply software to the solution of physical chemical problems.

Advice

The following points will help you do your best in this course.

1. Don't get behind! Reading and homework will be assigned each week and could easily "snowball" into an impossible amount of work. Read assignments right away, and again after the material is covered in class. Look at other texts if yours is confusing. Don't be afraid to look at a general chemistry text either ("pchem is just gen. chem. on steroids..."). Start working on homework problems early.
2. Seek help when you need it. If you don't understand something, come talk to me. Be specific about what you don't understand.

3. Keep a good set of notes and revise them throughout the semester as your understanding of the material evolves. Take time after each class to work on your notes.
4. Keep a "homework notebook". Write out each of your solutions so that others can understand what you did. Include your reasoning where appropriate. Use care in reporting significant digits (no more than are justified by a problem). Include units throughout all of your calculations.
5. Learn how to use software that will help you tackle difficult problems (like Excel, Quattro and Mathematica).
6. Work together, but be sure that you understand the work that has been done (you will be individually accountable for it, after all).
7. Review for exams by re-reading the text, revising notes, and reviewing problems.
8. Ask lots of questions. Have fun. Schedule times to relax.