Syllabus: PHYSICAL CHEMISTRY CHEM-3332
Spring 2012

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Office Hours: Monday, Wednesday and Friday Afternoons: 3:00-5:00 PM; Tuesday and Thursday Mornings: 9:00-11:00 AM.


Description: A fundamental approach to the study of physical and chemical phenomena, including chemical kinetics, quantum mechanics, spectroscopy, statistical thermodynamics and molecules in motion. Required of all chemistry majors. Prerequisites: Two semesters each of physics and calculus.

Course Objectives: Students in this class will be able to 1) understand the theories of chemical reaction rates 2) predict rate laws from mechanisms or data 3) understand the basic postulates in quantum mechanics and their application in chemical systems 4) perform quantum mechanical calculations for simple systems 5) compute molecular energies, speeds, collision rates and selected transport properties. At the successful completion of the course, you will demonstrate your mastery of the key concepts by successful completion of homework and exams.

Methodology: A website is designed for this course. Please check regularly for lecture notes, homework, announcements, etc. http://users.tamuk.edu/kfxc000/chem3332.htm

Homework problem will be discussed in class, followed by in-class quizzes. The grade is based on the quizzes (25%) and three equally weighted exams (75%). Letter grades are derived as follows: A≥90, B≥80, C≥70, D≥60.

Course Content:
I. Kinetics (1/19-2/14): Introduction to kinetics, rate equations, reaction mechanisms, 1st order, 2nd order, 3rd order and zero order reactions, half lives, pseudo order rxns, multiple reactants, temperature dependence, activation energy, pre-exponential factors.

II. Complex Reactions (2/16-3/1): Mechanism vs. rate law, consecutive first order reactions, parallel first order reactions, steady state approximation, pre-equilibrium approximation, reactive intermediates, chain reactions, acid catalysis, enzyme catalysis.

III. Quantum Mechanics (3/6-4/24): Introduction and brief history, waves/particle properties, quantization, de Broglie wavelength, Schrödinger wave eq, wave functions, Born interpretation, normalization, operators, eigenvalues, uncertainty principle, simple potential functions, particle in a box, tunneling, harmonic oscillator, rigid rotator, hydrogen atom, many-electron atoms, intro to vibration, rotation and atomic spectra.

IV. The Boltzmann distribution (4/24-5/1): the configurations and weights, the probability, the dominating configuration, the Boltzmann distribution, the thermal energy, the molecular partition function, the fraction of particles in a given energy level.
This syllabus is meant to be informational and not contractual. Changes may be made during the semester. **Students are responsible for any changes in this syllabus that are announced in class.**

Other sources of help and information include:
1. Physical Chemistry, Thomas Engel and Philip Reid
2. Physical Chemistry, I. N. Levine - QD 453.3, L48
3. Student’s Solution Manual for Atkins textbook

Policies for Attendance, Excused Absences, Make-up Exams, Late Assignments, Early Exams, Cell Phones, Recording Lectures etc. Successful performance in this class requires you to attend each class, take thorough notes and actively participate in discussions by asking and answering questions during lecture. This is especially true of the weekly portions of the lecture devoted to homework problems. There are no make-up exams. You may be able to take an exam early or late for an official University excused absence. Problem sets will not be accepted late. Students must turn off cell phones during lecture and will lose participation points for violations. No electronic recording or transmitting devices are allowed in operation during lecture without the express, written permission of the instructor.

The last day to drop with an automatic grade of Q is March 22. After March 22, you will receive either a Q or F when you drop depending upon your average. It is not possible to drop or withdraw after May 2. **Students** are responsible for observing these deadlines and must see their academic advisor or department chair in order to drop the course.

Disability Statement (see pages 2 and 11 of the Student Handbook): Students with disabilities, including learning disabilities, who wish to request accommodations in class, should register with the Services for Students with Disabilities (SSD) early in the semester so that appropriate arrangements may be made. In accordance with federal laws, a student requesting special accommodations must provide documentation for the disability to the SSD coordinator.

Academic Misconduct: You are expected to practice academic honesty in every aspect of this course. Students engaging in academic misconduct are subject to university disciplinary procedure as outlined in the Student Handbook. Forms of academic dishonesty:
1. Cheating: deception in which a student misrepresents that he/she has mastered information on an academic exercise that he/she has not mastered; giving or receiving aid unauthorized by the instructor on assignments or examination.
2. Academic misconduct: tampering with grades or taking part in obtaining or distributing any parts of a schedule test.
3. Fabrication: use of invented information or falsified research.
4. Plagiarism: unacknowledge quotation and/or paraphrase of someone else’s words, ideas, or data as one’s own submitted for credit. Failure to identify information or essays from the Internet and submitting them as one’s own work also constitutes plagiarism.

Nonacademic misconduct: Student behavior that interferes with the instructor’s ability to conduct class, or with the ability of students to gain from the class or that infringes upon the rights of others will not be tolerated. Individuals engaging in such behavior may be subject to disciplinary action such as outlined in the Student Handbook.
Sexual Misconduct: Sexual harassment of students and employees at Texas A&M-Kingsville is unacceptable and will not be tolerated. See Student Handbook.

Six-drop policy:
The following provision (new in Fall 2007) does not apply to students with Texas public college or university credits prior to Fall 2007. The Texas legislature has enacted a limit to the number of course drops allowed to a student without penalty. After a student has dropped six courses, a grade of QF will normally be recorded for each subsequent drop. If you need additional information on Senate Bill 1231 and how it affects you, please contact the Registrar’s Office in College Hall, Room 105.