

CH 382 PHYSICAL CHEMISTRY - 2008

**OVERVIEW:**

This semester we are again studying the physics of chemistry. Last semester we derived models of macroscopic observables from First Principles. This semester employs quantum mechanical properties (non-Newtonian Mechanics) of atoms, which will be used to explain macroscopic observables.

<u>WEEK</u>	<u>Chapter(s)</u>	<u>CONTENT</u>
1/21	1 & 2	Classical Mechanics Review Vectors, Differential Equations Failures of Classical Mechanics
1/28	3 & 4	Waves & Functions Postulates of Quantum Mechanics Free and Constrained particles
2/4	5 & 6	Applications Uncertainties
2/11	7	<b>EXAM #1</b> Vibrational/Rotational Eigenfunctions
2/18	9	Center of Mass Coordinates Hydrogen Atom Radial Distribution Function
2/25	10	Many electron atoms
3/3	13 & 14	Molecular Orbitals Variation Principle Huckel Theory
3/10	7-10; 13,14	<b>EXAM #2</b>
3/17	<b>SPRING BREAK</b>	
3/24	11	Atomic Spectroscopy
	12	Diatomic
	8	Spectroscopy; Selection Rules Rotational Spectra Vibrational Spectra; Anharmonicity Spectral Broadening
	15	Electronic Transitions Lasers
3/31	11,12,15 Change Text*	<b>EXAM #3</b>
4/7	12* & 13* 14*	Probability; Boltzman Distribution Partition Function
4/14	15*	trans/rot/vib/elec contributions Stat Thermo; Heat Capacities
4/21	12* - 15* 18*	<b>EXAM #4</b> Rates/Orders of Chemical Reactions
4/28		Reversible/Parallel/Consecutive Rxns Activation Energies
5/5	19* 18*- 19*	Reaction Mechanisms <b>EXAM #5</b>
Friday, 5/16 at 9:00	<u>CH381-CH382 Inclusive</u>	<b>ACS Final Exam</b>

Chapters assigned are from assigned texts: *Quantum Chemistry & Spectroscopy*, Thomas Engel  
\**Thermodynamics, Statistical Thermodynamics & Kinetics*, Thomas Engel, Philip Reid

## EVALUATION:

100% - 90%	A		
90% - 80%	B	Exams:	46%
80% - 70%	C	Homework:	30%
70% - 60%	D	Final:	24%
60% - 0	F		

There are five chapter exams and one final exam. Each of the first three chapter exams cover a variety of material: each is 10% of your grade, for a sum of 30%. The last two chapter exams cover more limited material: they each account for 8% of your grade. You may be given a chance to improve each exam score (except the final), depending on the exam scores. Every aspect of an exam is autonomous work. The final exam is the American Chemical Society standardized physical chemistry exam. This final is a comprehensive exam covering the entire year. Despite peer advice to the contrary, you are strongly encouraged to review for this exam.

Unlike the exams, you may collaborate on your homework assignments: you may not copy work, but you may exchange ideas and work together toward solutions.

### Office Hours:

Door is always open for Physical Chemistry Students. You also may prearrange times.  
email: [stephen.angel@washburn.edu](mailto:stephen.angel@washburn.edu); telephone: 670-2266