CHEM 3610
Physical Chemistry I

Fall, 2011
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INTRODUCTION	
Tues Sept 13	Introduction to Thermodynamics, Calculus review
Thurs Sept 15	Real and ideal gases (Chapter 1)
THERMODYNAMICS - THE FIRST LAW	
Tues Sept 20	Work, heat and the first law of thermodynamics (Chapter 2.1-2.4)
Thurs Sept 22	Enthalpy & heat capacities (Chapter 2.5 – 2.6), impact on biochemistry and materials science
Tues Sept 27	Understanding thermochemistry & enthalpies (Chapter 2.7-2.9), impact on biology and biochemistry
Thurs Sept 29	State functions and exact differentials, changes internal energy & the Joule-Thomson effect, applications (2.10 – 2.12)
Tues Oct 4	**Discussion and review**
Thurs Oct 6	**Exam #1**
THERMODYNAMICS - THE SECOND LAW	
Tues Oct 11	The direction of spontaneous change, entropy, & the second law of thermodynamics (Chapter 3.1 & 3.2)
Thurs Oct 13	ΔS for processes involving gases, phase transitions, and chemical reactions, entropy & probability, the third law of thermodynamics (Chapter 3.3 & 3.4)
Tues Oct 18	Concentrating on the system, predicting spontaneous processes: Gibbs & Helmholtz energies - (Chapter 3.5 & 3.6, Thermodynamics in a Nutshell)
Thurs Oct 20	Combining the 1^{st} and 2^{nd} Laws, Properties of the internal energy, properties of the Gibbs energy, applications (biology, environmental science) (Chapter 3.7 - 3.9)
APPLICATIONS OF THERMODYNAMICS	
Tues Oct 25	Phase diagrams for pure substances, applications to biology and biochemistry (Chapter 4.1-4.7)
Thurs Oct 27	Thermodynamic description of mixtures, chemical potentials, ideal solutions, impact on biology and polymer science (Chapter 5.1-5.3)
Tues Nov 1	**Discussion and review**
Thurs Nov 3	**Exam #2**
Tues Nov 8	Properties of solutions, activities, applications to biology (Chapter 5.4-5.9)

Thurs Nov 10	Phase diagrams for two component systems, impact on materials science and biology (Chapter 6.1-6.6)
Tues Nov 15	Chemical equilibrium & spontaneous reactions; Effect of pressure, temperature, pH, and catalysts on K_{eq} (Chapter 7.1 & 7.4)
Thurs Nov 17	Equilibrium electrochemistry, (Chapter 7.5-7.9) impact on biochemistry
Tues Nov 22	**Final Exam**

Homework

Homework is very important since confidence in the subject can only be gained by working problems. Although the approach to and solutions of each problem should be your own, you may discuss the problems with your classmates.

Reading Assignments

The reading assignments are designed to prepare you for lectures and worksheets. Please bring questions on the reading to class. I will spend some time during the lecture portion of each class answering questions about the reading. Furthermore, it will be exceedingly difficult to complete the worksheets if you don't do the reading.

Attendance

Attendance is not mandatory; however, to get full credit for group work you must attend. For unexcused absences, your group grade will be adjusted to reflect the percentage of classes missed. For example, if 3 of 15 classes are missed, then you group grade will be reduced 20%.

Peer Review

During the quarter, you will fill out an evaluation sheet for each member of your group and they will in turn evaluate you.

Grading Scheme

<u>Individual Work</u>
Homework – 10%
Exam I – 25%
Exam II – 25%
Exam III – 25%

<u>Group Work/In class assignments</u>
Worksheets – 15%