CHM 4411: Physical Chemistry - Thermodynamics and Kinetics

Fall Semester 2014 (4 credits)

Instructor:	David Wei, 311D Chemistry Lab Building (CLB), wei@chem.ufl.edu, 352-392-2050
Office hours:	T, R (10:30-11:20 AM) or by appointment, 311D CLB
Lectures:	T, R 2-3 period (8:30-10:25 AM) 50 FLI
TA:	Jingjing Qiu, qiujingjing@ufl.edu Shuai He, shuaihe@ufl.edu Office Hours: Mon. (5:00-6:00 PM), Wed. (4:00-5:00 PM), and Thur. (4:00-5:00 PM) 313 CLB
Aims:	To provide students with a solid understanding of the concepts of physical chemistry and their application to chemical systems.
Textbook:	Peter Atkins and Julio De Paula, Physical Chemistry 9th Ed. W. H. Freeman and Co., New York, ISBN #1-4292-1812-6.
Homework:	Problem sets will be made available throughout the semester, which will be graded. Assignments should be hand-written or printed and turned in before class on the due date. Please write your name and UFID clearly on each page.
Exams:	The course consists of three in-class exams during the semester as well as a comprehensive final. The exams will cover homework problems and emphasize understanding of the lecture materials and problem solving. All exams will be closed book. **Only for the final exam**: you can bring one hand-written letter-size sheet with your own

notes with formula etc. that aid understanding of the course.
Exam I: Tue. SEP. 23 in class
Exam II: Thur. OCT. 23 in class
Exam III: Thur. NOV. 20 in class
Final comprehensive exam: Wed. DEC 17 10:00-12:00 pm, 50 FLI.

Grading:

The in-class exams are worth 90 points. **You are allowed to choose two higher scores to be counted in your final grade**. The final comprehensive exam is worth 200 pts. The total points for homework are 90 pts: each one is worth maximum point if turned in on time, and late submission will incur a 2 pts deduction per day. The assignments will also be graded for content. In addition, there will be 30 pts for in-class quizzes. The total number of the in-class quiz are 12 and 10 will be counted for your final grade (you are allowed to miss 2).

Total = 180 + 200 + 90+ 30 = 500 points

Proposed Grade Levels:

A: 450 – 500
A-: 420 - 449
B+: 390 - 419
B: 360 – 389
B-: 340 - 359
C+: 320 - 339
C: 300 - 319
C-: 280 - 299
D+: 265 - 279
D: 250 - 264
E: 249 and below

Course policies:

Attendance will not be recorded, but participation in lectures and demonstration periods is important in assimilating the course material and there will be in-class quiz that counts 30 points for your final score. Since exams are during normal class hours, make-

up exams are granted **solely** at the discretion of the instructor. Any request for make-up exams should have a legitimate excuse, and be made to Dr. Wei as far in advance as possible. Students should also familiarize themselves with the UF Student Honor Code posted on the web at www.chem.ufl.edu/~itl/honor.html. Students with disabilities must first register with the Dean of Students Office; the Dean of the Students Office will provide documentation to the student who must then provide this documentation to the instructor when requesting accommodation.

Tentative Lecture Schedule CHM 4411

Date	Topic	Textbook	HW
T 08/25	Introduction		
R 08/28	Ideal and real gases	**Chapter 1**	**H1**
T 09/02	Kinetic gas theory, Maxwell distribution laws and molecular collisions	**Chapter 20**	
R 09/04	First Law of Thermodynamics: work and heat	**Chapter 2**	**H2**
T 09/09	Heat capacity and gas expansions, Calorimetry	**Chapter 2**	
R 09/11	Second Law of Thermodynamics: Entropy	**Chapter 3**	**H3**
T 09/16	Second Law of Thermodynamics: Carnot engine, entropy change	**Chapter 3**	
R 09/18	Third Law of Thermodynamics, Gibbs free energy	**Chapter 3**	
T 09/23	**EXAM I (in-class)**		
R 09/25	Phase diagram	**Chapter 4**	**H4**
T 09/30	Phase equilibrium, ideal solutions, chemical potential	**Chapter 5**	
R 10/02	Thermodynamics of mixing, real solutions	**Chapter 5**	**H5**
T 10/07	Colligative properties, electrolyte solutions	**Chapter 5**	
R 10/09	Colligative properties of electrolyte	**Chapter 5**	

	solutions, biological membranes		
T 10/14	Chemical equilibrium	**Chapter 6**	**H6**
R 10/16	Chemical equilibrium	**Chapter 6**	
T 10/21	Electrochemistry	**Chapter 6**	
R 10/23	**Exam II (in-class)**		
T 10/28	Chemical kinetics	**Chapter 21**	**H7**
R 10/30	Effect of temperature and PES	**Chapter 21**	
T 11/04	Reaction rate theories, reactions in solution	**Chapter 21**	
R 11/06	Reaction mechanisms	**Chapter 21**	
T 11/11	***No class (UF Holiday)***		
R 11/13	Reaction dynamics	**Chapter 22**	**H8**
T 11/18	Reaction dynamics	**Chapter 22**	
R 11/20	**Exam III (in-class)**		
T 11/25	Catalysis	**Chapter 23**	**H9**
R 11/27	***No class (UF Holiday)***		
T 12/02	Catalysis		
R 12/04	Physical chemistry for nanoscience and nanotechnology	From Literatures	
T 12/09	Review		
WED 12/17	**10:00-12:00 pm final exam FLI 50**		