

CHM 3400: Physical Chemistry (for the Biosciences)

Fall Semester 2015 (3 credits)

- Instructor:** David Wei, 311D Chemistry Lab Building (CLB), wei@chem.ufl.edu, 352-392-2050
- Office hours:** W(10:45-11:35 AM), F(12:45-1:35 PM) or by appointment, 311D CLB
- Lectures:** M,W,F 5th period (11:45 AM-12:35 PM) 207 LEI
- TA:** He,Shuai, shuaihe@chem.ufl.edu
Wenxiao Guo, sggwx2012@gmail.com
Yunlu Zhang, ylzhang@ufl.edu
Office Hours: W (4:00-6:00 PM) and F (3:00-4:00 PM) 313 CLB
- Aims:** To provide students with a solid understanding of the concepts of physical chemistry and their application to chemical and biological systems.
- Textbook:** Physical Chemistry for the Biosciences, by Raymond Chang; University Science Books, Sausalito, CA. ISBN #1-891389-33-5.
- 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 will 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: Fri. Sep. 25 in class

Exam II: Wed. Oct. 21 in class

Exam III: Fri. Nov. 20 in class

Final comprehensive exam: Friday Dec 18
12:30-2:30 PM, 207 LEI.

Grading:

The in-class exams are worth 100 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 80 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 20 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 = 200 + 200 + 80 + 20 = 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 20 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 3400

Date	Topic	Textbook	HW
M 08/24	Introduction	1	
W 08/26	Ideal and real gases	2 (7-21)	
F 08/28	Kinetic gas theory	2 (21-25)	
M 08/31	Maxwell distribution laws and molecular collisions	2 (25-31)	
W 09/02	First Law of Thermodynamics	3 (39-49)	
F 09/04	Heat capacity and gas expansions	3 (49-59)	
M 09/07	<i>No class (UF Holiday)</i>		
W 09/09	Calorimetry	3 (59-74)	
F 09/11	Second Law of Thermodynamics: Entropy	4 (81-86)	H1
M 09/14	Second Law of Thermodynamics: Entropy	4 (81-86)	
W 09/16	Second Law of Thermodynamics: Carnot engine, entropy change	4 (87-95)	
F 09/18	Third Law of Thermodynamics, Gibbs free energy	4 (95-110)	
M 09/21	Phase equilibria	4 (110-117)	
W 09/23	Ideal solutions, chem. potential	5 (127-131)	H2
F 09/25	EXAM I (in-class)		
M 09/28	Colligative properties	5 (142-154)	
W 09/30	Thermodynamics of mixing, real solutions	5 (131-142)	

F 10/02	Electrolyte solutions	5 (154-170)	
M 10/05	Colligative properties of electrolyte solutions, biological membranes	5 (170-181)	
W 10/07	Chemical equilibrium	6 (193-203)	H3
F 10/09	Ligand binding to macromolecules	6 (209-217)	
M 10/12	Bioenergetics	6 (217-229)	
W 10/14	Electrochemistry	7 (sel. p.)	
F 10/16	Chemical kinetics	9 (311-324)	H4
M 10/19	Molecularity of reaction	9 (324-332)	
W 10/21	Exam II (in-class)		
F 10/23	Effect of temperature and PES	9 (332-336)	
M 10/26	Reaction rate theories, reactions in solution	9 (336-342, 346-349)	
W 10/28	Enzyme catalysis	10 (363-372)	H5
F 10/30	Enzyme catalysis II	10 (382-396)	
M 11/02	allosteric interactions and PH	10 (382-396)	
W 11/04	Foundation of quantum mechanics	11 (401-414)	
F 11/06	<i>No class (UF Holiday)</i>		
M 11/09	Heisenberg uncertainty principle, Schrödinger equation	11 (414-426)	
W 11/11	<i>No class (UF Holiday)</i>		
F 11/13	Atomic orbitals and periodic table	11 (426-439)	
M 11/16	The chemical bond	12 (447-458)	H6
W 11/18	Molecular orbital theory	12 (458-468)	
F 11/20	Exam III (in-class)		
M 11/23	Coordination compounds	12 (469-483)	
W 11/25	<i>No class (UF Holiday)</i>		
F 11/27	<i>No class (UF Holiday)</i>		
M 11/30	Spectroscopy: fundamentals and micro-wave	14 (513-526)	H7
W 12/02	Infrared and electronic spectroscopy	14 (527-539)	
F 12/04	Magnetic resonance	14 (539-554)	
M 12/07	Luminescence, lasers, optical activity	14 (554-568)	
W 12/09	Review		H8
F 12/18	12:30-2:30 PM final exam LEI 207		