

CHM3400 — Physical Chemistry for the Biosciences – Spring 2014

Instructor	Dr. Alexander Angerhofer
Phone	392-9489 (office, CLB 318A) or 392-2123 (lab, CLB 303)
E-mail	alex@chem.ufl.edu
Class Times	MWF 2 nd period (8:30-9:20am) in Leigh 207
Office Hours	M-3 rd period (9:35 – 10:25am) and T-8 th period (3:00 – 3:50 pm) in CLB 318A

TA	Justin Goodsell
Phone	392-0493
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Office Hours	W-3 rd period (9:35 – 10:25am) and R-9 th period (4:05-4:55pm) in CLB 318

Holidays	01/20 (MLK Day), 3/3-3/7 (spring break), 4/24+25 (reading days).
Class Text	“Physical Chemistry for the Biosciences,” by Raymond Chang, University Science Books, Sausalito, CA, 2005, ISBN #1-891389-33-5.
Homework	Homework will be assigned weekly except for exam weeks.
Points Earnable	2 progress exams @ 200 pts. each, for 400 pts. total. 1 cumulative final exam @ 400 pts., for 400 pts total. 2 online quizzes @ 50 pts. each, for 100 pts. total. 10 homeworks @ 20 pts. each, for 200 pts. total. 1 participation grade @ 100 pts., for 100 pts. total. Total earnable points are 1,200 pts.
Grading Scheme	A: $\geq 85\%$ (1020 pts) 85% (1020 pts) > A– $\geq 82.5\%$ (990 pts) 82.5% (990 pts) > B+ $\geq 80\%$ (960 pts) 80% (960 pts) > B $\geq 75\%$ (900 pts) 75% (900 pts) > B– $\geq 72.5\%$ (870 pts) 72.5% (870 pts) > C+ $\geq 70\%$ (840 pts) 70% (840 pts) > C $\geq 65\%$ (780 pts) 65% (780 pts) > C– $\geq 62.5\%$ (750 pts) 62.5% (750 pts) > D+ $\geq 60\%$ (720 pts) 60% (720 pts) > D $\geq 55\%$ (660 pts) 55% (660 pts) > E.

Course Schedule (tentative):

Date	Day	Chapter	Topic	Reading
01/06/14	M	2	Gas Laws	pp. 7-21
01/08/14	W	2	Kinetic Theory of Gases	pp. 21-31
01/10/14	F	3	The First Law of Thermodynamics	pp. 39-49
01/13/14	M	3	State Functions/Path Functions	
01/15/14	W	3	Heat Capacities	pp. 49-74
01/17/14	F	3	Gas Expansion, and Calorimetry	
01/22/14	W	4	Entropy	pp. 81-86
01/24/14	F	4	Carnot Engine, 2 nd Law of Thermodynamics	pp. 87-95
01/27/14	M	4	3 rd Law of Thermodynamics, Gibbs Energy	pp. 95-110
01/29/14	W	4	Refrigeration/Gibbs and Helmholtz Energy	
01/31/14	F		Field Trip – Microkelvin Lab	
02/03/14	M	4	Clapeyron Equation/Phase Diagrams	
02/05/14	W	5	Ideal Solutions, Chemical Potential	pp. 127-131
02/07/14	F	5	Real Solutions, Raoult's Law, Henry's Law	pp. 132-142
02/10/14	M	5	Colligative Properties	pp. 142-154
02/12/14	W		Exam Review	
02/13/14	R		1 st Mid-Term Exam (chapters 2-5)	
02/14/14	F	6	Chemical Equilibrium	pp. 193-203
02/17/14	M	6	Heterogeneous Equilibria, Ligand Binding	pp. 203-217
02/19/14	W	6	Bioenergetics	pp. 217-229
02/21/14	F	7	Electrochemistry, Nernst Equation	pp. 235-246
02/24/14	M	7	Electrochemistry, Applications	pp. 246-261
02/26/14	W	9	Chemical Kinetics, Rxn Rates, Molecularity	pp. 311-332
02/28/14	F	9	Temperature Effects and Potential Energy Surfaces	pp. 332-336
03/10/14	M	9	Rxn Rate Theories, Rxns in Solution	pp. 336-354
03/12/14	W	10	Enzyme Catalysis	pp. 363-372
03/14/14	F	10	Enzyme Inhibition, Allosterism, pH Effects	pp. 372-396
03/17/14	M	11	Quantum Mechanics – The Foundations	pp. 401-410
03/19/14	W	11	De Broglie, Heisenberg, Schrödinger Equation	pp. 410-426
03/21/14	F	11	Atomic Orbitals and the Periodic Table	pp. 426-439
03/24/14	M	12	The Chemical Bond, MO Theory	pp. 447-458
03/26/14	W		Exam Review	
03/27/14	R		2 nd Mid-Term Exam (chapters 6,7,9-11)	
03/28/14	F	12	MO Theory	pp. 458-468
03/31/14	M	12	Coordination Compounds	pp. 469-483

04/02/13	W	13	IMF	pp. 489-510
04/04/13	F	14	Spectroscopy, μ W, IR, and UVVIS	pp. 513-539
04/07/13	M	14	Magnetic Resonance	pp. 539-554
04/09/13	W	14	Luminescence, Lasers, Optical Activity	pp. 554-568
04/11/13	F	15	Photochemistry – Fundamentals and Photosynthesis	pp. 575-586
04/14/13	M	15	Photochemistry – Vision, Radiation Effects	pp. 586-594
04/16/13	W	16	Macromolecules – Analytical Methods	pp. 599-613
04/18/13	F	16	Macromolecules – Structure	pp. 613-633
04/21/13	M		Field Trip	
04/23/13	W		Final Exam Review	
04/30/13	W		Final Exam (Leigh 207, 5:30-7:30pm, cumulative)	

Further Important Information:

1. **Overview and Goals:** CHM 3400 is a one-semester overview of physical chemistry with emphasis on biological systems. It covers the whole range of physical chemistry, *i.e.*, thermodynamics, electrochemistry, chemical kinetics, molecular structure and bonding, and spectroscopy. The goal of this course is to familiarize students who major in biochemistry or other bio-related majors with the techniques and tools of physical chemistry.
2. **Prerequisites:** MAC 2312, CHM 2200 or CHM 2210, and two semesters of college physics.
3. **Exam Policies:** Two mid-term exams will be given on R-2/13 and R-3/27 evening, periods E2-E3 (approx. 8:15-10:15pm, see schedule above). Making up a missed exam is a serious and exceptionally burdensome problem. Consequently, a makeup exam will be granted solely at the discretion of the instructor. This will require that you have a legitimate excuse, and that you have brought this to the attention of the instructor before the missed exam. Legitimate excuses include sickness or a conflict with another exam for a higher numbered class. If you are not sure whether your excuse is valid, talk to the instructor well before missing an exam. If you have an emergency that prevents you from letting the instructor know ahead of time that you are missing an exam, an excused absence and rescheduled make-up exam will be granted after official documentation about your emergency (doctor's notes, *etc.*) deemed appropriate by your instructor has been presented. Since the final exam is cumulative, the instructor reserves the right to consider assigning a letter grade above that which the student would receive based strictly on total points earned (as listed above). Of course this will only take effect if the performance on the final exam is significantly above the student's overall performance for the semester, and if the student shows clear improvement in his/her grades over the course of the semester. This qualification cannot lower your grade and will depend on the instructor's evaluation of the student's performance on the final exam. A student contending that an exam or quiz has been mis-graded or mis-scored must report this to the TA responsible for grading within one week of receiving the original grade or score. Failure to follow this policy results in no reconsideration of the contended grade or score. For all questions on grades or grading, please consult with the TA first in person. If this does not resolve the issue you may talk to the instructor about it. Except for problems with on-line quizzes (see below), emailed questions on grades or grading will not be answered.
4. **On-line Quizzes:** There will be two on-line quizzes on elearning (1 quiz = 50 points max.). The on-line quizzes will be administered through the sakai interface to the class. Quiz durations will be between 30 and 60 minutes depending on the level of difficulty and the number of questions. For your convenience the web format will allow for an extended period of time (typically a 4-

day period) during which you can take the quiz. Once a quiz has been started the clock starts running and you have to finish it in the allotted time. Typically, students will get two chances at a quiz and the better of the two scores will count toward their grade.

5. **Elearning:** This course uses the sakai elearning site. Please log on at <https://lss.at.ufl.edu/> to get access to your course page.
6. **Study Habits:** This course demands on average 8 – 10 hours/week of work outside of class. Regular lecture attendance is essential. While the class will loosely follow the book it will not be taught “by the book.” It is expected that you read the assigned pages from the textbook in advance of coming to class. Please note that the course scheduled printed above is tentative and may change depending on our pace of progress. Make sure to stay ahead of the material with your reading assignments. The instructor will build on this material and you are expected to be able to follow in-class discussion. The course demands a regular sustained effort throughout the term. Most importantly, do not allow yourself to fall behind! The material builds up and you need to stay on the game. If you find that you are not grasping essential material by reading the textbook and following in-class discussion, seek help! Visit your instructor's and/or TA's office hours (see above), talk to other students in your class, compare notes, form a study group, *etc.*
7. **Homework:** Weekly homework will be assigned. The homework will come from both problems in the book as well as other problem sets that the instructor may assign. Homework will typically be assigned on a Friday and announced during the Friday lecture, and will be due a week later on Friday at the beginning of lecture (8:30am). Policies for late submission: Each work day that homework is late, 20% of the achievable points are subtracted. Homework is considered a day late if it is turned in after 8:30am on Fridays (or any subsequent work day).
8. **Calculators:** You must have your own scientific calculator. Calculators may be used on quizzes and exams but may not be shared. You may not use graphing calculators or any calculators that are capable of information storage or communication on any exam. Simple inexpensive scientific calculators such as the TI-30 series or the Casio fx-260 are acceptable and sufficient for any problem encountered on exams.
9. **Participation Grade:** The participation points (up to 100) will be earned through active participation in class.
10. **Class Attendance:** Class attendance is essential for your success in this class. However, we will not have roll-calls. Repeated absence in class will make it very difficult to earn full participation points.
11. **Students with Disabilities:** Students requiring special accommodations should register with the Dean of Students Office and present documentation from that office to the instructor.
12. **Counseling Services:** The University of Florida provides counseling services for students, staff, and faculty. See <http://www.counsel.ufl.edu/> or call (352) 392-1575 during regular service hours (8am – 5pm). For other hours or weekends call the Alachua County Crisis Center, (352) 264-6789. Students may also call the clinician on-call at Student Mental Health for phone callback and consultation at (352) 392-1161.
13. **Emergency Numbers and Web Sites:**
UFPD (UF Police Department): In case of emergency dial 911. The UF campus police non-emergency number is (352) 392-1111. Their web site: <http://www.police.ufl.edu/>
Infirmary (student health center): (352) 392-1161, <http://shcc.ufl.edu/>
EH&S (Environmental Health & Safety): (352) 392-1591, <http://www.ehs.ufl.edu/>
14. **Cell Phones:** Please put all cell phones or pagers on “silent mode” during all class periods! Thank you.
15. **Classroom Behavior:** Please conduct yourself professionally and responsibly during classroom times. If you want to contribute to the class discussion or ask a question, indicate so by lifting your hand and wait until you are called upon. Arriving late or leaving class early can be very disrupting to the lecture and other students and should be kept to a minimum. If you have to

arrive late for a class period, please enter quietly. If you have to leave the class early you may do so quietly but you should not come back during the same class period. You are permitted to use your notebook computer for note-taking during lecture as long as it does not disturb your fellow students (*i.e.*, sound has to be off, very quiet keys or use of pen-enabled tablet).

16. **Honors Code:** This class will operate under the policies of the student honor code which can be found at: <http://www.registrar.ufl.edu/catalog/policies/students.html> The students, instructor, and TAs are honor-bound to comply with the Honors Pledge: **We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.**

If you have further questions, please contact me. Have a great semester!

Sincerely, Alexander Angerhofer.