

CHM 3400 – Physical Chemistry for the Biosciences (Su18)

Instructor: Prof. Daniel Savin, 318 Leigh Hall (LEI), savin@chem.ufl.edu, 352-392-9150

Office Hours: MR 12:30 – 2:00 PM, or by appointment
I am generally available to answer questions via email

Lecture: MTWRF Period 3 (11:00 am – 12:15pm), LEI 207

TAs: Anthony Pastore, atpastore09@ufl.edu
Tommy Zhao, zhaoyunpu@chem.ufl.edu
Office Hours: M 2:00 – 4:00 PM (CLB 318), TR 2:00 – 4:00 PM (CLB 112)

Course Website: This course has a Canvas page for notes, answer keys and announcements

Textbook: “Physical Chemistry for the Biosciences,” by Raymond Chang, University Science Books, Sausalito, CA, 2005, ISBN #1-891389-33-5.

Midterm Exams: There will be 2 midterm exams. The tentative dates for the midterms are 5/29/18 and 6/12/18. Doing well on midterm exams requires mastery of qualitative, conceptual material. *Each midterm exam will count 100 points towards your final grade.*

Final Exam: The *in class* final exam is scheduled for Friday 6/22/18. The final exam is cumulative. *The final exam will count 200 points towards your final grade.*

Homework: There will be 11 homework assignments throughout the semester, handed out on T or F and due the next F or T, respectively (even if there is an exam!) *Homework assignments will be worth 25 points each, and the top 10 scores will count towards your final grade.* The assignments should be presented in a **professional** manner, with the work, any assumptions and explanations presented **clearly**. When preparing graphs, you **must** use Excel or a comparable graphing program. If you are doing a curve-fit, you must justify the choice of fitting function. While you are strongly advised to work in groups, **you must turn in your own work to receive any credit!** You must also reference the other members of your study group. Failure to adhere to these requirements will result in zero credit for the assignment.

Grading: Your final grade will be determined from the following:

Homework = 38%

Exams = 62%

Approximate Grade Ranges:			
> 90	A	69 - 72.99	C+
86 - 89.9	A-	64 - 68.9	C
82 - 85.9	B+	60 - 63.9	C-
77 - 81.9	B	56 - 59.9	D+
73 - 76.9	B-	50 - 55.9	D
		< 50	E

Makeups: There will be no makeup exams unless prior arrangements are made. If an exam is missed for an excused reason, the final exam score will be used in the exam calculation. Homework assignments that are turned in late will not be accepted unless prior arrangements have been made.

- Philosophy:** Physical chemistry is concerned with the **quantitative** description of natural phenomena. The homework is designed to have you interpret experimental data – if you were going to go into the laboratory, what would you measure and how would you treat the data? The midterm exams are intended to gauge mastery of basic concepts and elementary calculations or derivations. It is not a good idea to leave studying until the night before the exam. It takes time to grasp some of the concepts of physical chemistry and to work through the problems. ‘Cramming’ is not the way to be successful in this course. Working in groups is strongly encouraged, but copying another student’s work will not be tolerated.
- Attendance:** Lecture attendance is essential for your success in this class. Repeated absence in class will make it very difficult to earn full participation points.
- Disabilities:** Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, www.dso.ufl.edu/drc/) by providing appropriate documentation. Once registered, students will receive an accommodation letter, which must be presented to the instructor when requesting accommodations. Students with disabilities should follow this procedure as early as possible in the semester.
- Counseling:** 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 on weekends call the Alachua County Crisis Center (264-6789). Students may also call the clinician on-call at Student Mental Health for phone callback and consultation at (352) 392-1171.
- Cell Phones:** Please put all cell phones and other digital devices on “silent mode” during all class periods. During exams, your cell phone must be placed on the table in front of you, face down, for the entire test period.
- Honor 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.*
- Objectives:** 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.

Tentative Lecture Schedule:

Date	Day	Chapter	Topic	Reading	HW Out	HW Due
5/14/18	M	2	Intro / Gas Laws	pp. 7-21		
5/15/18	T	2	Kinetic Theory of Gases	pp. 21-31	1	
5/16/18	W	3	The First Law of Thermodynamics	pp. 39-49		
5/17/18	R	3	Heat Capacities, Gas Expansion, and Calorimetry	pp. 49-74		
5/18/18	F	4	Entropy	pp. 81-86	2	1
5/21/18	M	4	Carnot Engine, 2nd Law of Thermodynamics	pp. 87-95		
5/22/18	T	4	3rd Law of Thermodynamics, Gibbs Energy	pp. 95-110	3	2
5/23/18	W	5	Ideal Solutions, chemical potential	pp. 127-131		
5/24/18	R	5	Thermodynamics of Mixing, Real Solutions	pp. 132-142		
5/25/18	F	5	Colligative Properties	pp. 142-154	4	3
5/28/18	M		Memorial Day - No Class			
5/29/18	T	EXAM	Mid-Term Exam I (during class)	Ch. 2-5	5	4
5/30/18	W	6	Chemical Equilibrium	pp. 193-203		
5/31/18	R	6	Heterogeneous Equilibria, Ligand Binding	pp. 203-217		
6/1/18	F	6	Bioenergetics	pp. 217-229	6	5
6/4/18	M	9	Chemical Kinetics, Rxn Rates, Molecularity	pp. 311-332		
6/5/18	T	9	Temperature Effects and Potential Energy Surfaces	pp. 332-336	7	6
6/6/18	W	9	Rxn Rate Theories, Rxns in Solution	pp. 336-354		
6/7/18	R	10	Enzyme Catalysis	pp. 363-372		
6/8/18	F	10	Enzyme Inhibition, Allosterism, pH Effects	pp. 372-396	8	7
6/11/18	M	11	Quantum Mechanics – The Foundations	pp. 401-410		
6/12/18	T	EXAM	Mid-term Exam II (during class)	Ch. 6, 9, 10	9	8
6/13/18	W	11	De Broglie, Heisenberg, Schrödinger Equation	pp. 410-426		
6/14/18	R	11	Atomic Orbitals and the Periodic Table	pp. 426-439		
6/15/18	F	12	The Chemical Bond, MO Theory	pp. 447-468	10	9
6/18/18	M	12	Coordination Compounds	pp. 469-483		
6/19/18	T	14	Experimental Techniques IR, CD, and UV/VIS	pp. 513-539	11	10
6/20/18	W	14	Experimental Techniques: EPR, NMR	pp. 540-554		
6/21/18	R	14	Experimental Techniques: ITC, Fluorescence	pp. 554-566		
6/22/18	F	EXAM	Final Exam (during class time)	cumulative		11