

CHM3400 — Physical Chemistry for the Biosciences – Summer A 2017

Instructor	Dr. Alexander Angerhofer
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E-mail	alex@chem.ufl.edu
Class Times	M–F 3 rd period (11:00am – 12:15pm) in Hernandez Hall 221
Office Hours	Periods M–6, W–7, R–7 in CLB318A, and by appointment

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Office Hours	T-5, W-2, R-6, CLB318	M-5, W-5, R-5, Lei 442

Holidays	05/29 (Memorial Day).
Course 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 twice each week, usually on T and F and be due at 9:30am (beginning of class) the next F or T, whichever comes first.
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
05/07/17	M	2	Gas Laws	pp. 7-21
05/08/17	T	2	Kinetic Theory of Gases	pp. 21-31
05/09/17	W	3	The First Law of Thermodynamics	pp. 39-49
05/10/17	R	3	Heat Capacities, Gas Expansion, and Calorimetry	pp. 49-74
05/11/17	F*	4	Entropy	pp. 81-86
05/15/17	M	4	Carnot Engine, 2 nd Law of Thermodynamics	pp. 87-95
05/16/17	T*	4	3 rd Law of Thermodynamics, Gibbs Energy	pp. 95-110
05/17/17	W	5	Ideal Solutions, chemical potential	pp. 127-131
05/18/17	R	5	Thermodynamics of Mixing, Real Solutions	pp. 132-142
05/19/17	F*	5	Colligative Properties	pp. 142-154
05/22/17	M		Field Trip I, Micro-Kelvin Lab	
05/23/17	T*	6	Chemical Equilibrium	pp. 193-203
05/24/17	W	6	Heterogeneous Equilibria, Ligand Binding	pp. 203-217
05/24/17	W	2-5	Mid-Term Exam I (evening exam during E1 and E2, FLI-121)	
05/25/17	R	6	Bioenergetics	pp. 217-229
05/26/17	F*	7	Electrochemistry, Nernst Equation and Applications	pp. 235-261
05/30/17	T	9	Chemical Kinetics, Rxn Rates, Molecularity	pp. 311-332
05/31/17	W*	9	Temperature Effects and Potential Energy Surfaces	pp. 332-336
06/01/17	R	9	Rxn Rate Theories, Rxns in Solution	pp. 336-354
06/02/17	F*	10	Enzyme Catalysis	pp. 363-372
06/05/17	M	10	Enzyme Inhibition, Allosterism, pH Effects	pp. 372-396
06/06/17	T*	11	Quantum Mechanics – The Foundations	pp. 401-410
06/07/17	W	11	De Broglie, Heisenberg, Schrödinger Equation	pp. 410-417
06/07/17	W	6, 9, 10	Mid-term Exam II (evening exam during E1 and E2, FLI-121)	
06/08/17	R	11	Particle in a Box Problems	pp. 418-426
06/09/17	F*	11	Atomic Orbitals and the Periodic Table	pp. 426-439
06/12/17	M	12	The Chemical Bond, MO Theory	pp. 447-468
06/13/17	T*	12	Coordination Compounds	pp. 469-483
06/14/17	W	14	Spectroscopy, μ W, IR, and UVVIS	pp. 513-539
06/15/17	R	14	NMR Spectroscopy	pp. 539-554
06/15/17	R		Final Exam (evening exam during E1 and E2, FLI-121)	
06/16/17	F		Field Trip II, NMR Lab	

* Days homework will be due.

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 (see schedule above). Making up a missed exam is a serious and exceptionally burdensome problem. Consequently, a makeup exam 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 before missing an exam. If you have an emergency that prevents you from letting the instructor know ahead of time, 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 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 instructor or 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 instructor (or TA) in person. 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 elearning interface (canvas) to the class. Quiz durations will be 60 minutes. 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.
5. **E-learning:** This course uses the canvas e-learning site. Please log on at <http://elearning.ufl.edu/> to get access to your course page.
6. **Homework:** Homework will be assigned twice every week. The homework will come from problems in the book as well as other problem sets that the instructor may assign and computer-assisted projects. Homework will typically be assigned on Tuesdays and Fridays and will be due the next Friday or Tuesday, whichever comes first at the beginning of lecture (11:00am). Policies for late submission: Each work day that homework is late, 25% of the achievable points are subtracted. Homework is considered a day late if it is turned in after 11:00am the day it is due.
7. **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.
8. **Participation Grade:** The participation points (up to 100) will be earned through active participation in class. This is primarily done by using the learning catalytics app on your digital device (smartphone, tablet, notebook PC, *etc.*) to respond to questions asked by the instructor throughout the lectures (see further explanation below under #10).

9. **Learning Catalytics:** In this course, we will use LC on your digital device for you to respond to the instructor's questions and earn valuable points toward your grade. You will need to purchase access and create a student account on <https://learningcatalytics.com/>. Follow instructions on the web site, or in the registration document on your Canvas account (click on Files → LC → Get Started Flyer Learning Catalytics.pdf) to activate your account and link it to our course, CHM3400. The cost is \$12 for the term. You are required to bring at least one wifi-enabled digital device to class to use for this activity. If you don't have access to a digital device, please contact the instructor.
10. **Class Attendance:** Regular class attendance is essential for your success in this class. However, we will not do roll-calls. Repeated absence in class will make it very difficult to earn full participation points. For further information on UF's attendance policies which are in effect for this course, see: <https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>.
11. **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 or similar chapters in alternative textbooks in advance of coming to class. Please note that the course schedule 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 immediately! 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.*
12. **Study Groups:** It is highly encouraged to form student study groups and meet with them on a weekly basis or more frequently to discuss course material and to prepare for exams. In this course it is permissible that you work on HW assignments together with your study partners. However, you are responsible to fully understand your own worked-out HW submissions and may not just copy someone else's.
13. **Office Hours:** The instructor and TAs have listed a total of nine office hours (see above). However, we are also available by appointment (please request by email at least one day in advance), particularly if your schedule prevents you from coming to scheduled office hours.
14. **Email Policy:** For all course-related business, use your official @ufl.edu gatorlink email address or the e-learning messaging system. The instructors will not respond to emails from other sources (*e.g.*, your gmail or yahoo address).
15. **Cell Phone Etiquette:** Please put all cell phones or other electronic devices on “**silent mode**” during all class and discussion periods. Please do not leave the classroom during lecture to make a phone call. Use your cellphone only for ‘learning catalytics’ activities while class is in session. Thank you!
16. **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).
17. **Online Course Evaluation:** Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at <https://evaluations.ufl.edu>. Evaluations are typically open during the last two or three weeks of the semester.

Announcements will be made to students about the specific times when they are open.

Summary results of these assessments are available to students at

<https://evaluations.ufl.edu/results/>.

18. **Students with Disabilities:** Students requiring special accommodations should register with the Dean of Students Office (<http://www.dso.ufl.edu/>, 352-392-1261) and the Disability Resource Center (DRC, <https://www.dso.ufl.edu/drc>, 352-392-8565), and present documentation from that office to the instructor.
19. **Counseling Services:** The University of Florida provides counseling services for students, staff, and faculty. See <http://www.counseling.ufl.edu/cwc/>. If you or a friend are in distress, call (352) 392-1575 (available 24/7), email umatter@ufl.edu, or walk in for an emergency consultation during regular service hours (8:00am – 5:00pm) at the Radio Road Site, 3190 Radio Rd., or the Peabody Hall Site, on the 4th floor of Peabody Hall, adjacent to Criser Hall. For other hours or weekends, call the Alachua County Crisis Center, (352) 264-6789. For sexual assault recovery services call the Student Health Care Center at (352) 392-1161. For life-threatening emergencies always call 911.
20. **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/>,
UF Emergency management: (352) 273-2100. <https://emergency.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/>.
21. **Other Academic Resources:** UF provides several other resources for students, such as
Library Support can be obtained here: <http://cms.uflib.ufl.edu/ask>, where you can find various ways to receive assistance with respect to using the libraries or finding resources.
The Career Resource Center is located on level One in the Reitz Union, (352) 392-1601, and provides career assistance and counseling. Refer to <http://www.crc.ufl.edu/> for further info.
The Teaching Center is located in Broward Hall, call (352) 392-2010 or (352) 392-6420 and provides students with tutoring services and counseling regarding general study skills. Refer to <http://teachingcenter.ufl.edu/> for further info. It may also provide employment opportunities as tutors for well qualified students.
The Writing Studio is located at 302, Tigert Hall, (352) 846-1138, and provides help with brainstorming, formatting, and writing papers, see: <https://writing.ufl.edu/writing-studio/>.
The Ombuds Office is located at 31 Tigert Hall, (352) 392-1308, and provides students assistance in resolving problems and conflicts that arise in the course of interacting with the University of Florida. By considering problems in an unbiased way, the Ombuds works to achieve a fair resolution and works to protect the rights of all parties involved. For further information go to <http://www.ombuds.ufl.edu/> or refer to the official complaints policy here: https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf.
22. **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 summer A term!

Sincerely, Alexander Angerhofer.