

Course	CHEM 3321: Physical Chemistry I (8/20/13 Draft)
Professor	Lev D. Gelb
Term	Fall 2013
Meetings	MWF 9:00 AM – 9:50 AM, JO 3.516

Professor's Contact Information

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Office Phone	972-883-5644
Office Location	ECS-S 4.607
Email Address	lev.gelb@utdallas.edu
Office Hours	Tues 3:00 to 4:00 pm; Wed 11:00 am to 12:00 pm
Office Hours	Feel free to stop by at other times!
ТА	Amir Nasrabadi

General Course Information

Prerequisites, Co- Requisites, and Other Restrictions	CHEM 2325 (Organic Chemistry II) and MATH 2451 (Multivariate Calculus).		
Course Description	Fundamental properties of macroscopic chemical systems are introduced and described in quantitative terms. A core of topics in thermodynamics, molecular motion, kinetics, molecular distributions and statistical thermodynamics is supplemented with topics germane to students taking physical chemistry with biophysical applications.		
	Objectives Physical Chemistry I is part of a two-course sequence designed to provide students with fundamental understanding of the principles underlying the behavior of chemical systems. The core of this course is the detailed discussion of thermodynamics (both fundamentals and chemical applications), how thermodynamic behavior arises from microscopic behavior (kinetic theory and statistical mechanics), physical and chemical equilibria, and chemical kinetics and transport.		
Learning Outcomes	 Expected Learning Outcomes Upon successful completion of this course, students will therefore: demonstrate a thorough understanding of the principles of chemical thermodynamics and their microscopic foundations. be able to use thermodynamic manipulations and tables to predict the equilibrium states of chemical and physical systems. be able to manipulate and derive thermodynamical and statistical-mechanical expressions in support of (2). demonstrate a thorough understanding of chemical kinetics and how reaction rates and equilibrium properties are related. Be able to analyze kinetic data in order to provide plausible reaction mechanisms, and to determine the consistency of proposed mechanisms with given information. Be able to manipulate integral and differential rate laws, and to apply standard approximations in the analysis of proposed mechanisms. 		
Required Texts & Materials	Physical Chemistry: A Molecular Approach, by D. A. McQuarrie and J. D. Simon		

Schedule & Academic Calendar

Class	Day	Date	Торіс	Homework
1	Mon	Aug 26	Introduction	
2	Wed	Aug 28	Gas Laws	
3	Fri	Aug 30		
	Mon	Sep 2	Labor day, no class.	
4	Wed	Sep 4	Microscopic vs macroscopic properties	
5	Fri	Sep 6	Statistical mechanics	#1 due
6	Mon	Sep 9		
7	Wed	Sep 11	Thermodynamic processes; the First Law	
8	Fri	Sep 13		#2 due
9	Mon	Sep 16	Enthalpy and thermochemistry	
10	Wed	Sep 18		
11	Fri	Sep 20		#3 due
12	Mon	Sep 23	Entropy and spontaneity	
13	Wed	Sep 25	EXAM 1 (through Friday 9/20)	
14	Fri	Sep 27		
15	Mon	Sep 30	The Second Law	
16	Wed	Oct 2]	
17	Fri	Oct 4		#4 due
18	Mon	Oct 7	The Third Law and absolute entropy	
19	Wed	Oct 9	Thermodynamic potentials	
20	Fri	Oct 11		#5 due
21	Mon	Oct 14		
22	Wed	Oct 16	Phase equilibria and transitions	
23	Fri	Oct 18		#6 due
24	Mon	Oct 21	Chemical equilibria in gases	
25	Wed	Oct 23	EXAM 2 (through Friday 10/18)	
26	Fri	Oct 25		
27	Mon	Oct 28	Solution thermodynamics and chemical equilibria	
28	Wed	Oct 30		
29	Fri	Nov 1		#7 due
30	Mon	Nov 4	Electrochemical systems	
31	Wed	Nov 6		
32	Fri	Nov 8		#8 due
33	Mon	Nov 11	Chemical kinetics: rate laws and reaction mechanisms	
34	Wed	Nov 13]	
35	Fri	Nov 15		#9 due
36	Mon	Nov 18	EXAM 3 (through Friday 11/15)	
37	Wed	Nov 20	Chemical reaction dynamics	
38	Fri	Nov 22		
			Thanksgiving week, Nov 25 – Nov 30	
39	Mon	Dec 2		
40	Wed	Dec 4	Catalysis	
41	Fri	Dec 6		#10 due
42	Mon	Dec 9	Reactions at surfaces and electrodes	
43	Wed	Dec 11		#11 due
			Reading Days	
		TBA	Cumulative Final Exam	

Course Policies

	Course Evalua	ation:	
	1.	Homework	20%
	2.	Midterm Exams (3 x 20%)	60%
	3.	Final Exam	20%
	The course gra total), and a fin grade on the fir	ide will be based on three in al exam (20%). The lowest ir ial, if higher.	class exams (20% each), homework (20% -class exam score will be replaced by your
	Homework as	signments_	
Grading (credit) Criteria	These will cons by several ques due on Friday r the receptacle of credit. Answer on your best 10	ist of a series of "warm-up" questions that must be completed nornings at the end of class. Dutside my office door. Homew keys will be posted on eLearn 0 (ten) assignments.	uestions assigned from <i>McQuarrie</i> , followed and turned in. Homework will (usually) be You may turn in homework in advance at work turned in late will not receive any hing. Overall homework score will be based
	Midterm exam	<u>s</u>	
	All midterm exa an <i>acceptable</i> , you will be allow you will receive and will be inclu	ams must be taken. There will documented reason for mis wed to replace the missed exa a "zero" for that exam, and the uded in the calculation of your	be no makeup exams given. If you have using an exam (e.g., documented illness), am with your score on the final. Otherwise, nat zero will not be replaced by the final, final class grade.
	<u>Final exam</u>		
	The final exam No makeup fin	must be taken and cannot be al will be given. Note the da	e replaced by any other grade. Don't miss it! y and time of the final.
Make-up Exams	There are no m	nake-up exams (see above).	
Extra Credit	There is no ext	ra credit.	
Class Attendance	Regular attend	lance is critical to your suc	cess in this class.
Regrade Policy	Requests to ha week of receivin unaltered , alor Unsubstantiate any way the ex integrity and tre	ve one or more questions of a ng the graded exam back. Yo ng with a clear explanation of d requests for additional partia cam prior to returning it, it will eated accordingly.	a exam regraded must be made within one u must provide the original exam, now the problem was graded incorrectly. al credit will not be accepted. If you alter in be considered a violation of academic
Classroom decorum	Students should setting. Any be disciplinary acti class for the pu otherwise not b	d conduct themselves in a ma havior that is disruptive, incon on. Phones should be silence rposes of notetaking or other e used.	nner appropriate to a University classroom siderate, or offensive is subject to d during class. Computers may be used in class-related activities, but should
Student Conduct and Discipline	The University regulations for of each student regulations whi conduct and dis provided to all r	of Texas System and The Unit the orderly and efficient condu- t and each student organization ch govern student conduct an scipline is contained in the UT registered students each acac	versity of Texas at Dallas have rules and loct of their business. It is the responsibility on to be knowledgeable about the rules and d activities. General information on student D publication, <i>A to Z Guide</i> , which is lemic year.
	The University recognized and <i>Rules and Reg</i>	of Texas at Dallas administers l established due process. Pro <i>ulations, Series 50000, Board</i>	s student discipline within the procedures of ocedures are defined and described in the of Regents, The University of Texas

	System, and in Title V, Rules on Student Services and Activities of the university's Handbook of Operating Procedures. Copies of these rules and regulations are available to students in the Office of the Dean of Students, where staff members are available to assist students in interpreting the rules and regulations (SU 1.602, 972/883-6391) and online at: <u>http://www.utdallas.edu/judicialaffairs/UTDJudicialAffairs-HOPV.html</u> A student at the university neither loses the rights nor escapes the responsibilities of citizenship. He or she is expected to obey federal state, and local laws as well as the
	Regents' Rules, university regulations, and administrative rules. Students are subject to discipline for violating the standards of conduct whether such conduct takes place on or off campus, or whether civil or criminal penalties are also imposed for such conduct.
	The faculty expects you to display a high level of responsibility and academic honesty. Because the value of an academic degree depends upon the absolute integrity of the work done by the student for that degree, it is imperative that a student demonstrate a high standard of individual honor in his or her scholastic work.
Academic Integrity	Any student who commits an act of scholastic dishonesty is subject to discipline. Scholastic dishonesty includes, but is not limited to, cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts.
	Plagiarism, especially from the web, from portions of papers for other classes, and from any other source is unacceptable and will be dealt with under the university's policy on plagiarism (see general catalog for details).
Email Use	The University of Texas at Dallas recognizes the value and efficiency of communication between faculty/staff and students through electronic mail. At the same time, email raises some issues concerning security and the identity of each individual in an email exchange. The university encourages all official student email correspondence be sent only to a student's UTD email address and that faculty and staff consider email from students official only if it originates from a UTD student account. This allows the university to maintain a high degree of confidence in the identity of all individual corresponding and the security of the transmitted information. UTD furnishes each student with a free email account that is to be used in all communication with university personnel.
	Our policy is to not communicate any details regarding your grade through email. We will only discuss grades and grading in person.
Withdrawal	The administration of this institution has set deadlines for withdrawal of any college-level courses. These dates and times are published in that semester's course catalog. Administration procedures must be followed. It is the student's responsibility to handle withdrawal requirements from any class. In other words, I cannot drop or withdraw any student. You must do the proper paperwork to ensure that you will not receive a final grade of "F" in a course if you choose not to attend the class once you are enrolled.
	Undergraduate last day to withdraw with WP/WF: Thursday Oct. 31
Student Grievance	Procedures for student grievances are found in Title V, Rules on Student Services and Activities, of the university's <i>Handbook of Operating Procedures</i> .
Procedures	In attempting to resolve any student grievance regarding grades, evaluations, or other fulfillments of academic responsibility, it is the obligation of the student first to make a serious effort to resolve the matter with the instructor, supervisor, administrator, or committee with whom the grievance originates (hereafter called "the respondent"). Individual faculty members retain primary responsibility for assigning grades and evaluations. If the matter cannot be resolved at that level, the grievance must be submitted in writing to the respondent with a copy of the respondent's School Dean. If the matter is not resolved by the written response provided by the respondent, the

	student may submit a written appeal to the School Dean. If the grievance is not resolved by the School Dean's decision, the student may make a written appeal to the Dean of Graduate or Undergraduate Education, and the dean will appoint and convene an Academic Appeals Panel. The decision of the Academic Appeals Panel is final. The results of the academic appeals process will be distributed to all involved parties. Copies of these rules and regulations are available to students in the Office of the Dean of Students, where staff members are available to assist students in interpreting the rules and regulations.	
Incomplete Grades	As per university policy, incomplete grades will be granted only for work unavoidably missed at the semester's end and only if 70% of the course work has been completed. An incomplete grade must be resolved within eight (8) weeks from the first day of the subsequent long semester. If the required work to complete the course and to remove the incomplete grade is not submitted by the specified deadline, the incomplete grade is changed automatically to a grade of F .	
AccessAbility Services	The goal of Student AccessAbility is to provide students with disabilities educational opportunities equal to those of their non-disabled peers. Office are at: Office of Student AccessAbility Student Services Building 3.200 Phone: 972-883-2098 Fax: 972-883-6561 disabilityservice@utdallas.edu If you anticipate issues related to the format or requirements of this course, please meet with the AccessAbility Coordinator. If formal, disability-related accommodations are necessary, it is very important that you be registered with AccessAbility Services. They can then plan how best to coordinate your accommodations. It is the student's responsibility to notify his or her professors of the need for such an accommodation. AccessAbility Services provides students with letters to present to faculty members to verify that the student has a disability and needs accommodations. Individuals requiring special accommodation should contact the professor ASAP after class or during office hours.	
Religious Holy Days	The University of Texas at Dallas will excuse a student from class or other required activities for the travel to and observance of a religious holy day for a religion whose places of worship are exempt from property tax under Section 11.20, Tax Code, Texas Code Annotated. The student is encouraged to notify the instructor or activity sponsor as soon as possible regarding the absence, in advance of the assignment. The student, so excused, will be allowed to take the exam or complete the assignment within a reasonable time after the absence: a period equal to the length of the absence, up to a maximum of one week. A student who notifies the instructor and completes any missed exam or assignment may not be penalized for the absence. A student who fails to complete the exam or assignment. If a student or an instructor disagrees about the nature of the absence [i.e., for the purpose of observing a religious holy day] or if there is similar disagreement about whether the student has been given a reasonable time to complete any missed assignments or examinations, either the student or the instructor may request a ruling from the chief executive officer of the institution, or his or her designee. The chief executive officer or designee must take into account the legislative intent of TEC 51.911(b), and the student and instructor will abide by the decision of the chief executive officer or designee.	

These descriptions and schedules are subject to change at the discretion of the Professor.