



<b>Course</b>	<b>CHEM 3322: Physical Chemistry 2</b>
<b>Professor</b>	<b>Lev D. Gelb</b>
<b>Term</b>	<b>Spring 2013</b>
<b>Meetings</b>	<b>MWF 9:00 AM – 9:50 AM, GR 3.302</b>

### Professor's Contact Information

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 Feel free to stop by at other times!
TA	Amir Nasrabadi

### General Course Information

Prerequisites, Co-requisites, & other restrictions	CHEM 3321 (Physical Chemistry I) and MATH 2451 (Multivariate Calculus).
Course Description	Fundamental microscopic properties of matter and radiation are discussed. A core of topics including quantum chemistry, atomic and molecular structure and spectroscopy, non-bonded interactions, and computational chemistry is supplemented with topics germane to students taking physical chemistry with biophysical applications.
Learning Outcomes	<p><b>Objectives</b> Physical Chemistry II is part of a two-course sequence designed to provide students with fundamental understanding of the principles underlying the behavior of chemical systems. understanding of chemical structures and processes at the microscopic level. In Physical Chemistry II the microscopic properties of matter and radiation are discussed. The essentially quantum-mechanical nature of chemical phenomena is stressed, and familiar chemical concepts (orbitals, valence, bonding, etc.) and spectroscopic tools are explained using these principles.</p> <p><b>Outcomes</b> Students will be able to:</p> <ol style="list-style-type: none"><li>1. Explain and apply principles of quantum mechanics pertinent to chemical problems,</li><li>2. Explain atomic and molecular structure and spectroscopy in terms of quantum mechanics,</li><li>3. Deduce molecular structure from spectroscopic data and predict spectroscopic properties from molecular structure, and</li><li>4. Relate macroscopic properties of matter to microscopic behavior of atoms and molecules through statistical mechanics.</li></ol>
Required Texts & Materials	Physical Chemistry, 3 <sup>rd</sup> edition, by T. Engel and P. Reid, ISBN-10: 0-321-81200-X Student's Solution Manual to Physical Chemistry; Engel and Reid (Recommended.)

### Schedule & Academic Calendar

Class	Day	Date	Topic	Homework
1	Mon	1/14	Introduction and motivation: particles, waves, and wave equations; Schrödinger equation	
2	Wed	1/16		
3	Fri	1/18		
	Mon	1/21	<i>MLK day, no class.</i>	
4	Wed	1/23	Simple problems: particle in a box	#1 due
5	Fri	1/25		
6	Mon	1/28	Postulates of QM and their consequences	#2 due
7	Wed	1/30		
8	Fri	2/1		
9	Mon	2/4	Vibrational and Rotational motion and spectroscopy	#3 due
10	Wed	2/6		
11	Fri	2/8		
12	Mon	2/11		
13	Wed	2/13	EXAM 1 (through Fri 2/8)	
14	Fri	2/15		
15	Mon	2/18	Vibrational and Rotational motion and spectroscopy (continued)	#4 due
16	Wed	2/20		
17	Fri	2/22		
18	Mon	2/25	The hydrogen atom	#5 due
19	Wed	2/27		
20	Fri	3/1		
21	Mon	3/4	Multi-electron atoms and atomic states	#6 due
22	Wed	3/6		
23	Fri	3/8		
			<i>Spring Break, 3/10-3/16</i>	
24	Mon	3/18		
25	Wed	3/20		
26	Fri	3/22	EXAM 2 (through Fri 3/8)	
27	Mon	3/25	Molecules and chemical bonds	#7 due
28	Wed	3/27		
29	Fri	3/29		
30	Mon	4/1	Molecular and hybrid orbitals, VSEPR, etc.	#8 due
31	Wed	4/3		
32	Fri	4/5		
33	Mon	4/8	Hückel theory and computational chemistry	#9 due
34	Wed	4/10		
35	Fri	4/12		
36	Mon	4/15		
37	Wed	4/17	EXAM 3 (through Fri 4/12)	
38	Fri	4/19		
39	Mon	4/22	Molecular spectroscopy, intro statistical mechanics	#10 due
40	Wed	4/24		
41	Fri	4/26		
42	Mon	4/29	The Boltzmann distribution and its consequences	#11 due
43	Wed	5/1		
44	Fri	5/3		
		5/6	Reading Days	
	Wed	5/8	Cumulative Final Exam 8:00-10:45 AM, GR 2.530	

## Course Policies

<p><b>Grading (credit) Criteria</b></p>	<p><b>Course Evaluation:</b></p> <table border="0"> <tr> <td>1. Homework</td> <td>20%</td> </tr> <tr> <td>2. Midterm Exams (3 x 20%)</td> <td>60%</td> </tr> <tr> <td>3. Final Exam</td> <td>20%</td> </tr> </table> <p>The course grade will be based on three in-class exams (20% each), homework (20% total), and a final exam (20%). The lowest in-class exam score can be replaced by your grade on the final, if higher.</p> <p><b>Homework assignments</b></p> <p>These will consist of “warm-up” questions assigned from your textbook, followed by several questions that should be completed and turned in. Homework will (normally) be due on Friday mornings at the end of class. You may turn in homework in advance at the receptacle outside my office door. Homework turned in late will not receive any credit. Answer keys will be posted on eLearning. Overall homework score will be based on your best 10 (ten) assignments.</p> <p><b>Midterm exams</b></p> <p>All midterm exams <b>must</b> be taken. There will be <b>no</b> makeup exams given. If you have an <b>acceptable, documented reason</b> for missing an exam (e.g., documented illness), you will be allowed to replace the missed exam with your score on the final. Otherwise, you will receive a "zero" for that exam, that zero will not be replaced by the final, and will be included in the calculation of your final class grade.</p> <p><b>Final exam</b></p> <p>The final exam <b>must</b> be taken and cannot be replaced by any other grade. Don't miss it! <b>No makeup final will be given.</b> Note the day and time of the final.</p>	1. Homework	20%	2. Midterm Exams (3 x 20%)	60%	3. Final Exam	20%
1. Homework	20%						
2. Midterm Exams (3 x 20%)	60%						
3. Final Exam	20%						
<p><b>Make-up Exams</b></p>	<p>There are <b>no make-up exams</b> (see above).</p>						
<p><b>Extra Credit</b></p>	<p>There is <b>no extra credit</b>.</p>						
<p><b>Class Attendance</b></p>	<p><b>Regular attendance is critical to your success in this class.</b></p>						
<p><b>Regrade Policy</b></p>	<p>Requests to have one or more questions of a exam regraded must be made within one week of receiving the graded exam back. You must provide the original exam, <b>unaltered</b>, along with a clear explanation of how the problem was graded incorrectly. Unsubstantiated requests for additional partial credit will not be accepted. If you alter <b>in any way</b> the exam prior to returning it, it will be considered a violation of academic integrity and treated accordingly.</p>						
<p><b>Classroom decorum</b></p>	<p>Students should conduct themselves in a manner appropriate to a University classroom setting. Any behavior that is disruptive, inconsiderate, or offensive is subject to disciplinary action. Cellular telephones should be silenced during class. Computers may be used in class for the purposes of notetaking or other class-related activities, but should otherwise not be used.</p>						
<p><b>Student Conduct and Discipline</b></p>	<p>The University of Texas System and The University of Texas at Dallas have rules and regulations for the orderly and efficient conduct of their business. It is the responsibility of each student and each student organization to be knowledgeable about the rules and regulations which govern student conduct and activities. General information on student conduct and discipline is contained in the UTD publication, <i>A to Z Guide</i>, which is provided to all registered students each academic year.</p> <p>The University of Texas at Dallas administers student discipline within the procedures of recognized and established due process. Procedures are defined and described in the <i>Rules and Regulations, Series 50000, Board of Regents, The University of Texas System</i>, and in Title V, Rules on Student Services and Activities of the university's</p>						

	<p><i>Handbook of Operating Procedures</i>. 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:</p> <p style="text-align: center;"><a href="http://www.utdallas.edu/judicialaffairs/UTDJudicialAffairs-HOPV.html">http://www.utdallas.edu/judicialaffairs/UTDJudicialAffairs-HOPV.html</a></p> <p>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.</p>
<p><b>Academic Integrity</b></p>	<p>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.</p> <p>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.</p> <p>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).</p>
<p><b>Copyright Notice</b></p>	<p>The copyright law of the United States (Title 17, United States Code) governs the making of photocopies or other reproductions of copyrighted materials, including music and software. Copying, displaying, reproducing, or distributing copyrighted works may infringe the copyright owner's rights and such infringement is subject to appropriate disciplinary action as well as criminal penalties provide by federal law. Usage of such material is only appropriate when that usage constitutes "fair use" under the Copyright Act. As a UTD student, you are required to follow the institution's copyright policy (Policy Memorandum 84-1.3-46). For more information see:</p> <p style="text-align: center;"><a href="http://www.utsystem.edu/ogc/intellectualproperty/copypol2.htm">http://www.utsystem.edu/ogc/intellectualproperty/copypol2.htm</a></p>
<p><b>Email Use</b></p>	<p>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.</p> <p>Our policy is to not communicate any details regarding your grade through email. We will only discuss grades and grading in person.</p>
<p><b>Withdrawal</b></p>	<p>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.</p> <p style="text-align: center;"><b>Undergraduate last day to withdraw with WP/WF: Mon, April 1</b></p>

<p><b>Student Grievance Procedures</b></p>	<p>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>.</p> <p>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.</p> <p>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.</p>
<p><b>Incomplete Grades</b></p>	<p>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 <b>F</b>.</p>
<p><b>AccessAbility Services</b></p>	<p>The goal of Student AccessAbility is to provide students with disabilities educational opportunities equal to those of their non-disabled peers. Office are at:</p> <p style="text-align: center;">Office of Student AccessAbility Student Services Building 3.200 Phone: 972-883-2098 Fax: 972-883-6561 <a href="mailto:disabilityservice@utdallas.edu">disabilityservice@utdallas.edu</a></p> <p>If you anticipate issues related to the format or requirements of this course, please meet with the AccessAbility Coordinator. The Coordinator is available to discuss ways to ensure your full participation in the course. 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.</p> <p><b><i>It is the student's responsibility to notify his or her professors of the need for such an accommodation.</i></b> AccessAbility Services provides students with letters to present to faculty members to verify that the student has a disability and needs accommodations. <b><i>Individuals requiring special accommodation should contact the professor ASAP after class or during office hours.</i></b></p>
<p><b>Religious Holy Days</b></p>	<p>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.</p> <p><b><i>The student is encouraged to notify the instructor or activity sponsor as soon as possible regarding the absence, in advance of the assignment.</i></b> 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 within the prescribed period may receive a failing</p>

	<p>grade for that exam or assignment.</p> <p>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.</p>
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***These descriptions and schedules are subject to change at the discretion of the Professor.***