



Course	CHEM 1312: General Chemistry II
Professor	Dr. Amandeep Sra
Term	Fall 2016
Time	MWF 3:00 pm – 3:50 pm, SLC 1.102

Professor's Contact Information

Office Phone	972-883-4818
Office Location	SLC 3.513
Email Address	aks057000@utdallas.edu
Office Hours	Monday / Wednesday / Friday 1:00 pm – 2:00 pm. PLEASE feel free to stop by when I am in my office. I have an open door policy.
Online Office Hours	Sunday evening office hours will be held online on blackboard 9:00 -10:00 pm Go to elearning and click on Course page. Click on online office hours. You will be required to download Blackboard Collaborate Launcher.
Other Information	Best way to contact me: email listed above or stop by my office; I don't read eLearning emails
TA information	Sahila Perananthan pxs123430@utdallas.edu
TA office hours	M 4:00 -5:00 pm outside my office "Workshop" F 4:00 - 5:00 pm SLC 1.102 (NOT MANDATORY)

General Course Information

Pre-requisites, Co-requisites, & other restrictions	One year of high school chemistry is assumed.
Course Description	Introduction to elementary concepts of chemistry theory. The course emphasizes molecular structure and bonding, chemical reactions, and the mole concept and its applications.
Learning Outcomes	<u>Objectives</u> This course is the first of a two-course sequence. The goal is to provide students with a working knowledge of the basic concepts of general chemistry needed for creative problem solving, as well as a background for advance chemistry and related science courses, and for laboratory applications. The course focuses on the following: the architecture of the atom; molecular structure and bonding; chemical reactions; thermochemistry; the mole concept and its applications; and the properties of solids, liquids and gases. Basic problem solving skills and critical thinking are also emphasized. <u>Expected Learning Outcomes</u> Upon successful completion of this course, students will therefore: 1) be able to use basic concepts in quantum theory and chemical bonding theory by

	predicting both the chemical properties (e.g. periodic trends, reactivities) and the electronic and 3-dimensional structures of representative compounds 2) be able to interpret experimental data (in both tabular and graphical form) by appropriately setting up and solving scientific problems using dimensional analysis with proper attention to scientific units and significant figures 3) be able to demonstrate an understanding of the role of energy in physical changes and chemical reactions by predicting the direction and magnitude of energy changes and by performing thermochemical calculations 4) be able to demonstrate an understanding of the properties of gases by applying the gas laws and kinetic molecular theory to processes involving gases
Required Texts & Materials	1. Textbook: <i>Chemistry: Atoms First, 2nd Edition</i> (Julia Burdge, Jason Overby); McGraw-Hill 2. Course materials located on class site at eLearning: http://elearning.utdallas.edu/ 3. ALEKS online assignment system: www.aleks.com 4. Only three types of calculators are allowed during exams. TI-30 XIIS, TI-30 XIIB and TI-30 XA

Schedule & Academic Calendar

Class Period	Day	Date	Topic	Chapter	
1	Mon	Aug 22	Introduction		
2	Wed	Aug 24	Physical Properties of Liquids and Solids: properties of liquids and solids; phase changes; phase diagrams	12	
3	Fri	Aug 26			
4	Mon	Aug 29	Physical Properties of Solutions: heats of solutions; concentration units; temperature and pressure effects on solubility;	13	
5	Wed	Aug 31			
6	Fri	Sept 2			
	Mon	Sept 5	Labor Day (no classes)		
7	Wed	Sept 7	colligative properties: boiling pt. elevation / freezing pt. depression, osmosis; colloids		
8	Fri	Sept 9	Kinetics: collision theory; reaction rates; concentration vs. rate; concentration vs. time; dependence of rate on temperature; reaction mechanisms;	19	
9	Mon	Sept 12			
10	Wed	Sept 14			
11	Fri	Sept 16			
12	Mon	Sept 19			
	Tues	Sept 20	Exam 1 (Chapters 12, 13 and part 19)		
13	Wed	Sept 21	catalysis		
14	Fri	Sept 23	Equilibrium: the concept and the equilibrium constant; equilibrium expressions; using equilibrium to solve problems; factors that affect equilibrium	15	
15	Mon	Sept 26			
16	Wed	Sept 28			
17	Fri	Sept 30			
18	Mon	Oct 3			
19	Wed	Oct 5	Acids and Bases: Bronsted acids/bases; molecular structure and acid strength; acid/base properties of water; pH scale; strong acids and bases; weak acids and K_a ; weak bases and K_b ; conjugate acid/base pairs; polyprotic acids; acidic/basic salts; acid/ base properties of oxides and hydroxides; Lewis acids and bases	16	
20	Fri	Oct 7			
21	Mon	Oct 10			
22	Wed	Oct 12			
23	Fri	Oct 14			
24	Mon	Oct 17			
	Tues	Oct 18	Exam 2 (Chapters 19, 15 and 16)		
25	Wed	Oct 19	Acid/base equilibria and Solubility equilibria: common ion effect; buffer solutions; acid/base titrations; solubility equilibria; factors affecting solubility; separation of ions using differences in solubility	17	
26	Fri	Oct 21			
27	Mon	Oct 24			
28	Wed	Oct 26			
29	Fri	Oct 28			
30	Mon	Oct 31			
31	Wed	Nov 2			
32	Fri	Nov 4	Entropy, Free energy and Equilibrium: Spontaneous processes; entropy and entropy changes;	14, 15.4	
33	Mon	Nov 7			
	Tues	Nov 8	Exam 3 (Chapters 17 and 18)		
34	Wed	Nov 9	second and third laws of thermodynamics; predicting spontaneity and Gibb's free energy; free energy and equilibrium		
35	Fri	Nov 11			
36	Mon	Nov 14			
37	Wed	Nov 16	Electrochemistry: balancing redox reactions; galvanic cells;	18	
38	Fri	Nov 18			
	Mon-Wed	Nov 21-23	Fall Break (no classes)		
	Thurs	Nov 24	Thanksgiving (no classes)		
	Fri	Nov 25	Thanksgiving (no classes)		
39	Mon	Nov 28	cell potentials and reduction potentials; spontaneity of redox reactions; batteries; electrolysis	20/23	
40	Wed	Nov 30			
41	Fri	Dec 2			
42	Mon	Dec 5	Nuclear chemistry:		
	Tues	Dec 6	Exam 4 (Chapters 14, 15.4, 18 and part 20)		
43	Wed	Dec 7	nuclei and nuclear reactions; nuclear stability; fission and fusion / organic chemistry		
	Thurs	Dec 8	Reading Day		

Exam Schedule:

Tue	Sept 20	Exam 1	7.00 pm to 8.30 pm	SLC 2.303/1.102
Tue	Oct 18	Exam 2	7.00 pm to 8.30 pm	SLC 2.303/1.102
Tue	Nov. 8	Exam 3	7.00 pm to 8.30 pm	SLC 2.303/1.102
Tue	Dec. 6	Exam 4	7.00 pm to 8.30 pm	SLC 2.303/1.102

Final Exam
(Comprehensive) NOT YET ANNOUNCED

Course Policies

Grading (credit) Criteria	Course Evaluation: <table style="margin-left: 40px;"> <tr> <td>(i) In-class assignments</td><td style="text-align: right;">10%</td></tr> <tr> <td>(ii) ALEKS Assignments</td><td style="text-align: right;">10%</td></tr> <tr> <td>(iii) Midterm Exams (4 x 15%)</td><td style="text-align: right;">60%</td></tr> <tr> <td>(iv) Final Exam</td><td style="text-align: right;">20%</td></tr> </table> Our goal in this class is to help you develop an understanding (and appreciation) of how chemistry impacts your everyday lives. Our main focus will be on CONCEPTS and not just FACTS, and our teaching and testing will reflect this. We have designed this course to empower you to succeed in learning chemical concepts. We have a number of “resources” that we are putting at your disposal to enable you to succeed. While students will differ in the type of resources they prefer to utilize, in our experience we have identified a subset that are critical. Thus for those, we give credit in the class to strongly encourage students to use them. Resources are described below and in the following sections: <u>0. Homework assignments (end of chapter problems):</u> • a principle method for assessing whether you understand a concept and how to use it • one of the most critical resources for preparing for exams • assigned for each chapter from end-of-chapter exercises in your textbook • large number of problems selected to cover the majority of important concepts • mixture of conceptual and quantitative problems • these will not be collected or graded • all homework assignments are posted on eLearning <u>1. In-class assignments:</u> • In Class assignments are for attendance and they will be worth 10% of your grade. • these will be unannounced, and can occur anytime during any lecture • any student leaving the lecture after the assignment will automatically get a “zero” for that day’s assignment. • obvious message: attending class each and every day is arguably the MOST important thing a successful general chemistry student does <u>2. ALEKS:</u> • helps a student gauge their fundamental knowledge and identify what they don’t understand • details for ALEKS provided in separate document • each student will get a unique set of questions tailored by the system to suit the student’s preparation and understanding of the material • ALEKS will constitute 10% of your course score, broken down as follows: -- Completion Goals, 14 of 15 objectives (Objectives 1 – 15), 6% -- Overall course mastery – 128 topics mastery, 4% <u>3. Midterm exams (scantron-based multiple choice exams):</u> • each exam is 80 minutes long • ALL 4 MIDTERM EXAMS MUST BE TAKEN, at the scheduled time and on the scheduled day	(i) In-class assignments	10%	(ii) ALEKS Assignments	10%	(iii) Midterm Exams (4 x 15%)	60%	(iv) Final Exam	20%
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	• <i>There will be no makeup exams given</i> • The lowest of the 4 exam scores will be automatically replaced by a higher final exam score. If you have an <i>acceptable, documented reason</i> for missing an exam (examples include: documented illness, auto accident, participation in UTD-sponsored event, observance of religious holiday), 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 • You may arrive late for an exam <i>until the time when the first student finishes and leaves</i> (only penalty being that you will have proportionally less time to finish the exam). After this grace period you will not be allowed to take the exam and will receive a score of "zero" • questions will focus on concepts and material covered in class, homework, in-class assignments and ALEKS. <u>4. Final exam (scantron-based multiple choice exam):</u> • comprehensive exam • the final exam is 2 hours and 30 minutes long • The final exam must be taken and cannot be replaced by any other grade • <i>No makeup final will be given. NOTE THE DAY AND TIME OF THE FINAL!</i>
Exam/Final Exam Details	• you will need your valid UTD ID to take the exam; in the absence of this, a valid, current photo ID such as your driver's license can be used • during exams, students are not allowed to have the following items with them: food or drink, scratch paper (unless provided by the instructor), course materials, textbooks, notes (including formula sheets), or electronic devices, including iPads, iPhones or any other type of smart phone or cellular phone, iPods, MP3 players, earphones, radios, cameras, google glasses, multi-functional timepieces, or computers. • when possible, students will sit in alternating seats, face forward at all times, and remove any clothing which might conceal eye movements, reflect images of another's work, or hide course materials for copying. • exam proctors will monitor any communication or signaling between students by talking, whispering or making sounds, or by using your hands, feet, or other body movements, the test paper itself or your writing implement. • Specific calculators (listed below) required for use on all exams (you will provide your own calculator for exams). - TI-30X IIS (solar) or TI-30X IIB (battery) or TI-30XA - same calculator required for SAT and ACT exams - inexpensive sources (\$10 to \$20): Walmart, Amazon.com • <u>Non-approved calculators will be confiscated by the instructor.</u> <i>Use of a non-approved calculator will be considered an act of scholastic dishonesty and will be dealt with appropriately (see Section "Academic Integrity" below).</i> • ALL calculators will be checked before/during the exam. Non-approved calculators will be removed immediately from the student, to be returned at some point after the exam period (possibly in class) • If your calculator is removed, you will be required to finish the exam WITHOUT a calculator (i.e., we do not have calculators to provide, and another student cannot provide you with a calculator once the exam has started)

**ALEKS
deadlines**

Objectives are **due 6:00 am on the days listed below (typically a Tuesday)** — at the deadline time, these objectives will close — you will no longer be able to work on them for a grade. There are going to be a total of 4 scheduled assessments on ALEKS. These will be triggered upon completion of certain objectives (these are highlighted below).

Date	Objectives
08/16/2016 12:01 AM - 08/30/2016 06:00 AM	1. Objective #1-solutions 1 (10 topics)
08/30/2016 06:00 AM - 09/06/2016 06:00 AM	2. Objective #2-solutions 2 (5 topics)
09/06/2016 06:00 AM - 09/13/2016 06:00 AM	3. Objective # 3 Solutions (4 topics)
09/13/2016 06:00 AM - 09/20/2016 06:00 AM	4. Objective #4 Kinetics 1 (13 topics)
09/20/2016 06:00 AM - 09/27/2016 06:00 AM	5. Objective # 5 Kinetics 2 (12 topics)
09/27/2016 06:00 AM - 10/04/2016 06:00 AM	6. Objective # 6 equilibrium (14 topics)
10/04/2016 06:00 AM - 10/11/2016 06:00 AM	7. Objective # 7-acid/base 1 (11 topics)
10/11/2016 06:00 AM - 10/18/2016 06:00 AM	8. Objective #8 -acid/base 2 (11 topics)
10/18/2016 06:00 AM - 10/25/2016 06:00 AM	9. Objective # 9 -buffers (4 topics)
10/25/2016 06:00 AM - 11/01/2016 06:00 AM	10. Objective # 10-titrations (3 topics)
11/01/2016 06:00 AM - 11/08/2016 06:00 AM	11. Objective #11-solb/therm1 (9 topics)
11/08/2016 06:00 AM - 11/15/2016 06:00 AM	12. Objective #12 -thermo 2 (8 topics)
11/15/2016 06:00 AM - 11/22/2016 06:00 AM	13. Objective #13-echem 1 (7 topics)
11/22/2016 06:00 AM - 11/28/2016 06:00 AM	14. Open Pie (0 topics)
11/28/2016 06:00 AM - 12/06/2016 06:00 AM	15. Objective #14-echem 2 (9 topics)
12/06/2016 06:00 AM - 12/08/2016 06:00 AM	16. Objective #15-nuclear (8 topics)
12/08/2016 06:00 AM - 12/09/2016 06:00 AM	17. Open Pie (0 topics)

Make-up Exams	There are no make-up exams (see above).
Extra Credit	There is no extra credit .
Class Attendance	<i>Your attendance is CRITICAL for your ultimate performance in this class.</i> Results from Fall 2006 support this statement: students that missed just 4 of the first 21 lectures ended up with D's, F's or withdrew from the course. <i>Bottom line: DO NOT SKIP CLASS.</i> We will be doing several in-class assignments and these will be collected and completion points will count as attendance points.
Regrade Policy	Requests to have 1 or more questions of an exam regraded have to be made within 1 week of receiving the graded assignment. The request should be in the form of an email from your UTD email account to the instructor; the subject line should read "exam X regrade", where X is the assignment number; the body of the email should contain your full name, the problem number and an explanation of how the problem was graded incorrectly.
Other Assistance	We have many other resources available to you in this class: Instructor / TA run workshop -- Every Friday from 4:00 to 5:00 pm in SLC 2.302 Chemistry TA office hours -- hours will be set in near future and posted online at elearning website -- available for walk-in assistance Chemistry Tutors provided by Student Success Center -- hours will be set in near future and posted online at Success Center website http://www.utdallas.edu/studentssuccess/leader/tutors.html -- available for walk-in assistance
Comet Creed	<i>This creed was voted on by the UT Dallas student body in 2014. It is a standard that Comets choose to live by and encourage others to do the same:</i> "As a Comet, I pledge honesty, integrity, and service in all that I do."
UT Dallas Syllabus Policies and Procedures	<i>The information contained in the following link constitutes the University's policies and procedures segment of the course syllabus.</i> Please go to http://go.utdallas.edu/syllabus-policies for these policies.

These descriptions and timelines contained in this syllabus are subject to change at the discretion of the Professor.