

**Chemistry 4392**  
**Problem-Solving Techniques in Chemistry**  
**Winter Session 2011-2012**  
**Syllabus**

**Instructor:**

Dr. Jimmy R. Rogers  
104 Chemistry Research Building  
817-272-5442  
[jimrogers@uta.edu](mailto:jimrogers@uta.edu)  
[www.uta.edu/faculty/jimrogers](http://www.uta.edu/faculty/jimrogers)

**Course Description:** This course will focus on techniques useful in solving a wide range of chemistry problems, including stoichiometry, thermodynamics, kinetics, chemical equilibria, and electrochemistry. Attention will also be given to organic reactions, mechanisms, and synthesis. The goal of the course will be to provide students with good chemistry problem-solving skills. This course will review many concepts learned in General Chemistry and Organic Chemistry, and it will be especially appropriate for students preparing for advanced courses in chemistry and biochemistry, and for students preparing for chemistry-based exams such as the MCAT, DAT, OAT, and GRE.

**Course Prerequisites:** Each student should have completed General Chemistry I, General Chemistry II, and Organic Chemistry I. *Students are not required to have finished Organic Chemistry II, but they should be aware that some review topics will be taken from that course.*

**Required Materials:**

A General Chemistry textbook  
An Organic Chemistry textbook  
Chem 4392 Class Notes (available at the UTA Bookstore)  
CPS Clicker by eInstruction

**Class Schedule:**

Dates: Monday, December 19 – Thursday, December 22, 2011  
Monday, January 2 – Friday, January 6, 2012  
Monday, January 9 – Wednesday, January 11, 2012  
Time: 8:00 AM – 11:45 AM

**Topics to be covered:**

**General Chemistry**

1. Atomic Structure
2. Nomenclature
3. Stoichiometry
4. Bonding
5. Gases
6. Liquids and Solids
7. Solutions
8. Kinetics
9. Nuclear Chemistry
10. Chemical Equilibrium
11. Acid/Base Equilibria
12. Oxidation and Reduction
13. Electrochemistry
14. Thermochemistry
15. Chemical Thermodynamics

**Organic Chemistry**

1. Stereochemistry
2. Spectroscopy
3. Properties and Reactions of Hydrocarbons
4. Benzene and Aromatic Compounds
5. S<sub>N</sub>1, S<sub>N</sub>2, E1, E2
6. Aldehydes and Ketones
7. Carboxylic Acids and Their Derivatives
8. Amines
9. Carbohydrates
10. Amino Acids, Peptides and Proteins
11. Free-Radical Reactions
12. Review of Reactions
13. Review of Mechanisms
14. Synthesis problems

**Dropping the Course:** The last day to drop a Winter Session class is January 4, 2012. If you wish to drop or withdraw from any course at UT-Arlington, you must see your academic advisor in your major department.

**Attendance:** The teaching methodology for this course will focus on solving chemistry problems in the classroom setting. Attendance and classroom participation are therefore required in order for the student to receive the greatest benefit from the course. *If a student is absent or tardy more than once, his/her grade will drop one letter grade each time the student is absent or tardy.*

**Grading:** Because Chemistry 4392 emphasizes problem-solving skills, homework, tests, and quizzes will be used throughout the course. Grading will be based upon the following scale:

<u>Total Numerical Grade</u>	<u>Letter Grade</u>
90 and above	A
80-89	B
70-79	C
60-69	D
Below 60	F

**Course Goals:**

Upon completing the course, the student should be able to solve problems over a wide variety of chemistry topics, including stoichiometry, thermodynamics, kinetics, chemical equilibria, and electrochemistry. The student should also be familiar with important organic reactions and mechanisms, and should be able to provide a synthetic pathway for synthesizing various types of organic compounds. The student should be able to use several techniques of molecular spectroscopy to identify unknown compounds.

**Academic Dishonesty:**

All students are expected to pursue their scholastic careers with honesty and integrity, and the Department of Chemistry and Biochemistry will not tolerate academic dishonesty in any form. "Scholastic dishonesty includes but is not limited to cheating, 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." (Regents' Rules and Regulations, Part One, Chapter VI, Section 3, subsection 3.2, Subdivision 3.22)

Examples of academic dishonesty include:

- exchanging answers or information during a test or quiz
- looking at another student's paper during a test or quiz
- bringing notes in any form into the test or quiz, including written notes (crib sheets), digitally stored information (including formulas, constants, alpha-numeric material or text), or notes stored in any other medium
- looking at a book or other source during the quiz or test

During tests or quizzes, students are not allowed to use any hand-held calculators or computers which possess the capability of storing alpha-numeric or textual material. If the instructor allows the use of calculators on a particular test, then students may only use scientific calculators which are non-programmable. In addition, students are not allowed to have access to digital pagers during any test or quiz. Students who violate University rules on scholastic dishonesty are subject to disciplinary penalties, including the possibility of failure in the course and dismissal from the University. Since dishonesty harms the individual, all students, and the integrity of the University, policies on scholastic dishonesty will be strictly enforced.

**Americans with Disabilities Act**

The University of Texas at Arlington is committed to the spirit and letter of federal equal opportunity legislation. The Americans with Disabilities Act (ADA) provides those with disabilities with the same opportunities as all citizens.

If you require an accommodation based on disability, I would like to meet with you in the privacy of my office, during the first week of the semester, to make sure you are appropriately accommodated.

**Bomb Threats:**

In the event of a bomb threat to a specific facility, University Police will evaluate the threat. If required, exams may be moved to an alternate location, but **exams will not be postponed**. UT-Arlington will prosecute those phoning in bomb threats to the fullest extent of the law.