Course Syllabus

CHEM 2323 – ORGANIC CHEMISTRY I
Spring 2007 – Section 001

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Course Pre-requisites

- General Chemistry I and II or equivalent

Course Description

This course provides a unified overview of fundamental organic chemistry. Students who successfully complete this course acquire an integrated understanding of molecular architecture, molecular transformations, reaction energetics and mechanisms, synthetic strategy, and structure determination. An important goal is to foster an appreciation of the subject by encouraging students to explore their own interest in it.

Student Learning Objectives/Outcomes

Upon completion of this course, students will:

- Identify and describe the rules of chemical bonding and principles of molecular architecture in organic molecules, including potential energy-stability relationships, Lewis structures, resonance theory, conformational analysis, and stereochemistry.
- Identify centers of reactivity in organic structures, including the names, structures, and basic chemical properties of the most important functional groups.
- Identify and describe the fundamental principles of reaction mechanisms, including bond breaking and bond formation in ionic and free-radical mechanisms, and the energetic implications of each as represented in potential energy diagrams.
- Demonstrate effective utilization of the curved arrow formalism for electron movement in organic reactions and mechanistic representations.
- Describe and identify the terminology, characteristics, and uses of the Bronsted-Lowry and the Lewis theories of acids and bases.
- Describe and identify the fundamental chemistry of select functional groups such as alkyl halides, carbon-carbon pi bonds, and alcohols.
- Describe and utilize the terminology of organic synthesis and the principles of organic transformations, including the design of simple and efficient routes for the preparation of simple organic molecules.

Required Textbooks and Materials

TEXTBOOK: L. G. Wade, Jr. *Organic Chemistry*. 6th. ed. The solutions manual is optional but highly recommended. Also strongly recommended are reference books such as the following.

1. ***3000 Solved Problems in Organic Chemistry*** (Schaum's Solved Problems Series). Focuses on presenting worked problems with detailed solutions rather than on theoretical concepts, which are assumed to be obtained from mainstream textbooks.
2. ***Test Yourself: Organic Chemistry*** by Drew H. Wolfe. Discussions of basic principles followed by standardized test type questions such as those in the MCAT and other admissions tests.
3. ***Organic Chemistry as a Second Language*** by David R. Klein. A more in-depth discussion of basic principles such as resonance structures, use of curved arrows, orbital hybridizations, etc.

Class schedules and important deadlines

STUDY TIP: Skim the lecture notes and textbook readings prior to their discussion in class, then go for a more in depth reading and work problems. Do this even if you don't consider yourself ready. You will not really learn the material until you've worked as many problems as possible.

CLASS SCHEDULE *This schedule is subject to revisions as needed*	
Jan. 8 – 24	Chapters 1 & 2, and class notes # 1 – 7
Jan. 26	**QUIZ # 1**
Jan. 29 – Feb. 2	Chapter 3, and class notes # 8
Feb. 5	**TEST # 1 on ch. 1 – 3 and lecture notes 1 – 8**
Feb. 7 – 21	Ch. 5 & 4 (in that order), and relevant lecture notes
Feb. 23	**QUIZ # 2**
Feb. 26 – 28	Bronsted acid-base chemistry (Chapter 1 and lecture notes)
Mar. 2	**TEST # 2 on ch. 4, 5, Bronsted acid-base chemistry, and relevant lecture notes**
Mar. 5 – 11	*SPRING BREAK*
Mar. 12 – 21	Ch. 6 and 7 and relevant lecture notes
Mar. 23	**QUIZ # 3**
Mar. 26 – 30	Ch. 8 and relevant lecture notes
Apr. 2	**TEST # 3 on ch. 6 – 8 and relevant lecture notes**
Apr. 4 - 9	Ch. 9 and relevant lecture notes
Apr. 11	**QUIZ # 4**
Apr. 13 – 20	Ch. 10 and relevant lecture notes
Apr. 23	**TEST # 4 on ch. 9, 10 and relevant lecture notes**

PLEASE NOTE: Due to tight final grade deadlines, THERE IS NO OFFICIAL FINAL EXAM AS INDICATED IN THE CLASS SCHEDULE. Test # 4 occurs on the last day of class.

TOPIC DESCRIPTIONS

Chapter 1: **Introduction & review of general chemistry**. Atomic structure & bonding, Lewis formulas, resonance, conjugation, electron mobility, polarity, and electron density distributions.

Chapter 2: **Fundamentals of molecular structure**: Basic molecular orbital theory, hybridization, sigma and pi bonding in hydrocarbons, structural and geometric isomerism, introduction to functional groups.

Chapter 3: **Alkanes and conformational analysis**. Basic rules of organic nomenclature, conformational analysis of alkanes & cycloalkanes, alkanes as basic skeletons in the makeup of complex molecules.

Chapter 5: **Stereochemistry**. Symmetry and chirality, stereoisomerism, *R*/*S* nomenclature, chiral environments and the differentiation of stereoisomers, Fischer formulas, meso forms.

Chapter 4: **Reaction mechanisms & alkane chemistry**. Introduction to molecular transformations, basic bond formation and bond breaking processes, reaction intermediates, free radical mechanisms, energetics, free radical halogenation and its importance in the functionalization of alkanes.

Ionic (polar) mechanisms: Bronsted acid-base chemistry. Sections 1-13, 1-14, and additional notes. Structure and acidity, trends in acidity and basicity, introduction to Lewis acid-base theory.

Chapter 6: Ionic mechanisms and nucleophilic substitutions. Alkyl halides as synthetic precursors, nucleophilic substitutions of tetrahedral carbon, Sn1 and Sn2 reactions.

Chapters 6 and 7: **Elimination reactions and alkene synthesis**. E1 and E2 reactions, competing processes in Lewis acid-base chemistry, alkene synthesis and properties.

Chapters 8 and 9: Chemistry of Carbon-Carbon pi-bonds (Alkenes and Alkynes). Electrophilic and other addition reactions, oxidative cleavage, alkenes in organic synthesis, functional group equivalents, alkynes as acids, alkynide ions as nucleophiles and bases, use of carbon nucleophiles in organic synthesis.

Chapter 10: **Alcohols: Structure and Synthesis.** Structural characteristics and physical properties of alcohols, use of Grignard reagents as carbon nucleophiles in alcohol synthesis, reductions of carbonyl compounds, thiols.

Grading Policy

There are 4 exams and 4 quizzes. Students can **drop one of the first three exams and one quiz**, however **exam 4 is mandatory and cannot be dropped**.

- 3 EXAMS at 20% each 60%
- 3 QUIZZES at 10% each 30%
- ATTENDANCE 10%

95 - 100 = **A+**	80 – 84 = **B+**	65 – 69 = **C+**	50 – 54 = **D+**
90 – 94 = **A**	75 – 79 = **B**	60 – 64 = **C**	45 – 49 = **D**
85 – 89 = **A-**	70 – 74 = **B-**	55 – 59 = **C-**	40 – 44 = **D-**

THERE ARE NO EXCEPTIONS MADE FOR ANYONE

Tests are based on **lecture notes, assigned readings, quizzes, exercises, AND previous tests**. Therefore, in addition to studying the newest material to prepare for exams, students should review previous tests because some questions will reappear in different form. The format of all tests and quizzes is multiple choice and true/false.

Attendance will start to count on the third week of classes and will be recorded randomly at unspecified dates. **Your attendance grade will be strictly based on records and not on verbal accounts**.

THERE IS NO TEST RESCHEDULING, EXTRA CREDIT, OR EXCEPTIONS MADE FOR ANYONE.

THE INSTRUCTOR DOES NOT HAND OUT GRADES. YOU EARN YOUR OWN.

ADDITIONAL INFORMATION

CLASSROOM ETIQUETTE. You are taking this class by your own decision in order to further goals that are important TO YOU. The instructor and fellow students expect mature behavior from you at all times. Any behavior that is disruptive to class, inconsiderate, or offensive reflects poorly on the offender and is subject to disciplinary action. Examples of disruptive behavior are talking during a lecture, giggling, loud speech, and use of cellular telephones.

Please silence your telephone before entering the classroom. If you must take a call during class time, please leave the classroom. Likewise, **communication of any kind during tests is prohibited**. If you have an emergency during a test, you must surrender your test and resolve the issue with your instructor at a later time. However, this does not carry any obligation on the part of the instructor to reissue the test or change the grading policy.

Student Conduct & Discipline

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, *A to Z Guide*, which is provided to all registered students each academic year.

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 *Rules and Regulations, Board of Regents, The University of Texas System, Part 1, Chapter VI, Section 3*, 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).

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.

CHEATING IS THE FEEBLEST APPROACH TO THE CHALLENGES THAT YOU WILL FACE IN COLLEGE AND AFTERWARDS.

Academic Integrity

The faculty expects from its students 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.

Scholastic dishonesty includes, but is not limited to, statements, acts or omissions related to applications for enrollment or the award of a degree, and/or the submission as one's own work or material that is not one's own. As a general rule, scholastic dishonesty involves one of the following acts: cheating, plagiarism, collusion and/or falsifying academic records. Students suspected of academic dishonesty are subject to disciplinary proceedings.

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). This course will use the resources of turnitin.com, which searches the web for possible plagiarism and is over 90% effective.

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 U.T. Dallas 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. The Department of Information Resources at U.T. Dallas provides a method for students to have their U.T. Dallas mail forwarded to other accounts.

Withdrawal from Class

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.

Student Grievance Procedures

Procedures for student grievances are found in Title V, Rules on Student Services and Activities, of the university's *Handbook of Operating 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 deal 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 Grade Policy

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**.

Disability Services

The goal of Disability Services is to provide students with disabilities educational opportunities equal to those of their non-disabled peers. Disability Services is located in room 1.610 in the Student Union. Office hours are Monday and Thursday, 8:30 a.m. to 6:30 p.m.; Tuesday and Wednesday, 8:30 a.m. to 7:30 p.m.; and Friday, 8:30 a.m. to 5:30 p.m.

The contact information for the Office of Disability Services is:
The University of Texas at Dallas, SU 22
PO Box 830688
Richardson, Texas 75083-0688
(972) 883-2098 (voice or TTY)

Essentially, the law requires that colleges and universities make those reasonable adjustments necessary to eliminate discrimination on the basis of disability. For example, it may be necessary to remove classroom prohibitions against tape recorders or animals (in the case of dog guides) for students who are blind. Occasionally an assignment requirement may be substituted (for example, a research paper versus an oral presentation for a student who is hearing impaired). Classes enrolled students with mobility impairments may have to be rescheduled in accessible facilities. The college or university may need to provide special services such as registration, note-taking, or mobility assistance.

It is the student's responsibility to notify his or her professors of the need for such an accommodation. Disability 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 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, preferably 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 within the prescribed period may receive a failing grade for that 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.

Off-Campus Instruction and Course Activities

Off-campus, out-of-state, and foreign instruction and activities are subject to state law and University policies and procedures regarding travel and risk-related activities. Information regarding these rules and regulations may be found at the website address given below. Additional information is available from the office of the school dean. (http://www.utdallas.edu/Business Affairs/Travel_Risk_Activities.htm)

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