SYLLABUS[1]

CHEM 2323 – ORGANIC CHEMISTRY I

FALL 2015

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COURSE PREREQUISITES: CHEM 1312 - General Chemistry II, or equivalent.

COURSE DESCRIPTION: This course provides a unified overview of fundamental organic chemistry for science majors. Students who successfully complete this course acquire an integrated understanding of molecular architecture, molecular transformations, reaction energetics and mechanisms, synthetic strategy, and structure determination.

LEARNING OUTCOMES: Upon completing this class, students will be able to:

- Predict bonding, three-dimensional structure, and chirality of organic compounds.
- Compare reactivity amongst a series of organic compounds.
- Predict reactivity of specific functional groups.
- Devise simple and efficient routes for the preparation of organic compounds.

REQUIRED TEXTBOOK: L. G. Wade, Jr. ***Organic Chemistry*. 8th. ed**. Note: Only the regular textbook is required. The package containing *MasteringChemistry* & access card package is not required.

RECOMMENDED MATERIALS

1. **Solutions Manual**

   The ***solutions manual*** contains the answers to the problems in the textbook, so it is strongly recommended. You might find it cost-effective to either buy the textbook/solutions manual bundle, or share the cost of one copy with other students, since you won't need it on a regular basis.

2. **Reference textbooks** (Current prices range about $30 - $40, depending on the vendor).

   - ***Organic Chemistry I as a Second Language*** by David R. Klein. Covers basic principles such as resonance structures, curved arrows, orbital hybridizations, etc.
   - ***Organic Chemistry II as a Second Language*** by David R. Klein. Coverage of typical concepts presented in second semester courses. Publisher's site: same as above.
   - ***Get Ready for Organic Chemistry*** by Joel Karty.

3. **Molecular model sets**. If you wish to enhance your ability to visualize 3-dimensional features and movements in organic structures, you may benefit from using a molecular model set. Some reasonably priced kits, yet adequate for student use, can be obtained from the following vendors. Expect to spend at least $20 for a good kit. If you go too cheap you will end up with junk.

   - ***Darling Models* / *Molecular Visions*.**
   - ***Indigo***. Has *Molymod* sets for organic chemistry.
   - ***Amazon.com***. Search for "molecular model sets." The recommended set is the P*rentice-Hall molecular model set for organic chemistry*.

[1] *The descriptions and timelines presented in this syllabus are subject to change at the discretion of the Professor.*

CLASS SCHEDULE – FALL 2015

TUESDAY	WEDNESDAY	THURSDAY
Aug. 25		**Aug. 27**
Ch. 1: Intro & Review		Ch. 1: Intro & Review
Sept. 1		**Sept. 3**
Ch. 2: Structure & Bonding		Ch. 2: Structure & Bonding
Sept. 8		**Sept. 10**
Ch. 3: Alkanes **QUIZ 1 (Ch. 1, 2)**		Ch. 3: Alkanes
Sept. 15		**Sept. 17**
Ch. 5: Stereochemistry		Ch. 5: Stereochemistry
Sept. 22	**Sept. 23**	**Sept. 24**
Ch. 5: Stereochemistry **QUIZ 2 (Ch. 3, 5)**	**TEST 1 (7:00 pm)**	Ch. 4: Chemical Reactions
Sept. 29		**Oct. 1**
Ch. 4: Chemical Reactions		Ch. 4: Chemical Reactions
Oct. 6		**Oct. 8**
Ch. 6: Nucleophilic Substitutions **QUIZ 3 (Ch. 4)**		Ch. 6: Nucleophilic Substitutions
Oct. 13		**Oct. 15**
Ch. 6: Nucleophilic Substitutions		Ch. 6: Elimination Reactions
Oct. 20		**Oct. 22**
Ch. 6: Elimination Reactions		Ch. 6: Elimination Reactions
Oct. 27	**Oct. 28**	**Oct. 29**
Representing Chem. Rxs. **QUIZ 4 (Ch. 6)**	**TEST 2 (Ch. 4, 6)**	Ch. 7: Alkenes
Nov. 3		**Nov. 5**
Ch. 8: Reactions of Alkenes		Ch. 8: Reactions of Alkenes
Nov. 10		**Nov. 12**
Ch. 9: Reactions of Alkynes		Ch. 9: Reactions of Alkynes
Nov. 17		**Nov. 19**
Ch. 10: Alcohols **QUIZ 5 (Ch. 8, 9)**		Ch. 10: Alcohols
FALL BREAK		
Dec. 1	**Dec. 2**	**Dec. 3**
Ch. 10: Alcohols	**TEST 3 (Ch. 7 – 10)**	Review
Dec. 8		
Review		
FINAL EXAM DATE & TIME TO BE ANNOUNCED		

TOPIC DESCRIPTIONS

Chapter 1: **Introduction & review of general chemistry**. Atomic structure & bonding, Lewis formulas, resonance, conjugation, electron delocalization, polarity, and electron density distributions. Review of the Bronsted-Lowry & Lewis acid-base theories.

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

Chapter 3: **Alkanes and conformational analysis**. Organic nomenclature, structure, and conformational analysis of alkanes & cycloalkanes.

Chapter 5: **Stereochemistry**. Symmetry and chirality, stereoisomerism, *R/S* nomenclature system, 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, transition states and reaction intermediates, free radical mechanisms, energetics, free radical halogenation and its importance in the functionalization of alkanes.

Polar mechanisms: Bronsted acid-base chemistry. Structure & acidity relationships, trends in acidity and basicity.

Chapter 6: Polar mechanisms and nucleophilic substitutions. Alkyl halides as synthetic precursors, introduction to Lewis acid-base theory, 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. Structure and physical properties of alcohols, use of Grignard reagents as carbon nucleophiles in alcohol synthesis, reductions of carbonyl compounds, thiols.

GRADING

Grades will be determined from a combination of test, quizzes, and final exam grades as follows:

2 out of 3 Tests	2 x 250 = 500 pts
4 out of 5 Quizzes	4 x 50 = 200 pts
Final Exam	300 pts
TOTAL	**1000 pts**

900 – 1000 = **A+**	700 – 769 = **B+**	550 – 599 = **C+**	400 – 449 = **D+**
800 – 899 = **A**	650 – 699 = **B**	500 – 549 = **C**	350 – 399 = **D**
770 – 799 = **A-**	600 – 649 = **B-**	450 – 499 = **C-**	0 – 350 = **F**

MAKE-UP EXAMS – **There are no make-up exams or quizzes**. If a student misses either an exam or a quiz that grade will be counted as a drop.

EXEMPTIONS GRANTED BY UNIVERSITY POLICY & STATE LAW – Students can make special requests (e.g. rescheduling an exam) IF and WHEN the reasons are covered by either university policy or state law, AND IF they can be properly documented. Examples are:

- **military duty**
- **jury duty**
- **major illness**
- **medical procedures**
- **participation in university-sponsored events**

Examples of reasons **NOT COVERED** under this policy are:

- **personal engagements such as travel and social events**
- **common emergencies such as accidents and minor illness**
- **any reasons that cannot be properly documented**.

SERVICES PROVIDED BY THE STUDENT SUCCESS CENTER – The **UTD Student Success Center** provides a number of services designed to help students achieve their academic goals and succeed in certain courses, including Organic Chemistry. Some of the services offered are listed below. For additional information, including schedules, please visit the website.

PEER LED TEAM LEARNING (PLTL) - This program provides an active learning experience in which students can gain the skills and confidence to succeed in certain challenging courses. PLTL sessions meet weekly for 90 min. Small groups of students work problems written by UTD chemistry faculty under the guidance of an undergraduate leader who has training in group dynamics and mastery of course content.

This is an optional component to the course. However, **if you choose to participate, you are required to stay in the program throughout the semester**; the integrity of the group depends on it. PLTL groups meet on a Friday-Wednesday weekly schedule. To participate, you need to complete an application. More details will be announced in class.

SUPPLEMENTAL INSTRUCTION (SI) / TUTORING – SI is offered for this course. Sessions are free group study opportunities, scheduled three times per week. **Attendance is voluntary**. For tutoring, the center has drop in times during the week for one-on-one tutoring.

UNIVERSITY POLICIES

Please refer to the **UTD Syllabus Policies website** for information on matters such as:

- Academic integrity
- Student conduct
- Student grievance procedures
- AccessAbility services
- Incomplete grades
- Religious Holy Days
- Withdrawal from class