CHEM 2325 **Organic Chemistry II** **Spring 2018**

Course Information
A study of chemical bonding and structure of organic molecules is made. Functional group reactions and syntheses are emphasized. Reaction mechanisms, nomenclature and isomerism are studied. Prerequisite: A minimum grade of "C" in CHEM 2323.

Location and Time: (2325-Section 02) CFS 123 MWF 9:00-9:50 am
(2325-Section 03) CFS 123 MWF 10:00-10:50 am

Instructor:
Dr. Dustin E. Gross
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Office: CFS 108
Office Hours: MWF 11:00-12:00 pm
(or by appointment)

Required Course Materials and Resources:

Text: J. Karty, Organic Chemistry, Principles and Mechanisms (W.W. Norton & Company) Either hardcopy or E-book will work.
SmartWork: Online homework site (you should have an access code in your Textbook)
Blackboard: There will be **daily pre-class worksheets** and other useful materials posted, including announcements for the course.

Course Format: Much of the class time will be devoted to working on problems in a team or individual environment and the amount of instructor-based lecturing will be limited. To facilitate this, I have converted the course material and my usual lecture notes into **daily pre-class worksheets** (available on Blackboard). Your goal should be to complete the worksheets **before** class so that you are prepared to apply the new ideas in class. Videos pertaining to the completing of these worksheets are also posted on Blackboard. These videos are very much in line with what you would experience in my "lecture". We will start each class with a short quiz session (see QOTD below) to assess your and/or your team's readiness. Following the quiz, you will then work together in teams to complete additional daily activities and select practice problems. Outside of class, you will have problem sets to complete online using SmartWork or from the textbook.

Pre-class worksheets (available on Blackboard). Print out, complete, and turn in a scanned copy on Blackboard before the start of class.

Quizzes of the Day (QOTD): Each class we will try to have a short quiz. The quizzes will consist of questions/problems from the previous class or the basic ideas from the current pre-class worksheets. Each quiz (individual and team) will carry equal weight towards your total quiz grade. No make-up quizzes will be given so make sure to attend class and be on time. Failure to take the individual quiz (I-QOTD) will preclude you from receiving a score on the team quiz (T-QOTD).

Online Homework Sets: We will be using the SmartWork site (there is a link on Blackboard) for these. Enrollment Key: **ORGCHEM12388** These problems are chosen to help you better understand the material. As an alternative, you may choose to do problems from the Karty text,

scan them and turn them in on Blackboard. If you choose the textbook option you must complete a sufficient amount of problems (~20 problems or 4-10 pages). These are extremely important, as the more problems you can work and understand the greater mastery of organic chemistry you will have.

Exams: Four mid-term exams will be given during the semester (2/12, 3/9, 4/9, 5/2). The exams will be comprehensive but focus on recently covered material. The format of the exams will be multiple choice and short answer. If unauthorized materials are used during an exam you will receive a zero (these include but are not limited to: cell phones, calculators, cheat sheets, other classmates' exams) and lose the opportunity to drop your lowest exam score. Also, see the Academic Dishonesty section below.

Final Exam: The final exam is mandatory and comprehensive. We will be using the ACS Standardized Exam. There is a study guide available online at the ACS exams website. The study guide is not required, and if you stay up with the course material, you should not need this resource.

Final Exam Times – 2325-02 (May 9th 9:30 am-11:30 am)
2325-03 (May 7th 10:30 am-12:30 pm)

Grading

Pre-class worksheets	4%	**Final Grade**
QOTDs	8%	A≥85%
Homework	8%	B≥70%
Exams (best 3/4, 18% each)	54%	C≥55%
Final exam	26%	D≥40%
Total	100%	F<40%

Other Notes:
Attendance will be very important to your success in this course. Past classes have shown a correlation between grades and attendance. This should not be a surprise! Additionally, disruptive use of electronic devices, such as text messaging and social media, during class is not only destructive to your own learning it is also distracting to others around you.

Letters of Recommendation:
If you would like a letter of recommendation in support of your application to scholarships or graduate, veterinary, pharmacy, dental, or medical school you should expect to earn a grade of A in this course.

Academic Dishonesty:
All students are expected to engage in all academic pursuits in a manner that is above reproach. Students are expected to maintain honesty and integrity in the academic experiences both in and out of the classroom. **Any student found guilty of dishonesty in any phase of academic work will be subject to disciplinary action.** The University and its official representatives may initiate disciplinary proceedings against a student accused of any form of academic dishonesty including but not limited to, cheating on an examination or other academic work which is to be submitted, plagiarism, collusion and the abuse of resource materials.
For More University Wide Policies: see http://www.shsu.edu/syllabus/.

Course Description and Objectives

This is the second half of a two-semester course in organic chemistry. The first part of this course covered chapters 1-9, 11-12, and 16 in the Karty textbook. You are expected to have sufficient knowledge of the material in these chapters. This semester we will continue using the Karty text; specifically, we will cover chapters 10, 13-15, and 17-26.

It is an overall goal of this two-part course to improve the problem solving and structure-property relationship skills. In addition, students successfully completing this course should be able to:

- Understand molecular structure and geometry as the result of atomic electronic geometry (hybridization).
- Distinguish the hydrocarbons into alkanes, alkenes, alkynes, aromatics, or composites based on structure.
- Distinguish the major functional groups; alcohols, ethers, amines, amides, nitriles, ketones, aldehydes, esters, carboxylic acids, acid halides, and acid anhydrides based on structure.
- Name, using IUPAC rules, alkanes, alkenes, alkynes, alkyl halides, alcohols, ether, ketones, aldehydes, esters, amines, amides, nitriles, carboxylic acids, acid halides, acid anhydrides, and composites.
- Predict the reactions and preparation of alkanes, alkyl halides, alkenes, alcohols, ethers, aromatic compounds, aldehydes, ketones, amines, carboxylic acids, esters, amides, nitriles, acid halides, and acid anhydrides.
- Understand the general condensation reactions.
- Understand and utilize the relative acid-base properties of atoms in various functional groups.
- Understand and discuss structure-stability trends for reactive intermediates and stable molecules.
- Predict the behavior of molecules under reaction conditions.
- Predict relative physical and chemical properties of similar molecules based on comparative structure.
- Predict possible products of reactions as well as the major product.
- Derive an acceptable mechanism for a reaction based on an understanding of the structure and properties of the starting materials, the reagents, and the products.
- Compose a reasonable synthesis of relatively simple organic compounds based on structure and knowledge of basic reactions.
- Apply structural features of a compound to explain the chemical properties and stabilities observed.
- Understand and interpret IR, MS, and NMR spectroscopic data.

Understanding **where electrons in a molecule go and why** will help you get through this class successfully. For much of the subject we deal with electron rich species bonding to electron deficient sites (**nucleophiles attacking electrophiles**). There are also acid/base reactions (usually **simple proton transfers**). Remember that the equilibrium lies towards the weak acid weak base side of the reaction; they are after all more stable. Another thing that will make this course (and your life) easier is when you have a specific mechanism understood; try to generalize it by substituting in various nucleophiles or electrophiles.

Course Schedule (Tentative – Subject to change)

Unit	Chapters	Description	Exam Date
1	10, 13, 14	• Nucleophilic Substitution and Elimination Reactions 2: Reactions That Are Useful for Synthesis • Organic Synthesis 1: Beginning Concepts • Orbital Interactions 2: Extended π Systems, Conjugation, and Aromaticity	Exam 1 2/12
2	15, 17-19	• Structure Determination 1: Ultraviolet-Visible and Infrared Spectroscopies • Nucleophilic Addition to Polar π Bonds 1: Addition of Strong Nucleophiles • Nucleophilic Addition to Polar π Bonds 2: Addition of Weak Nucleophiles and Acid and Base Catalysis • Organic Synthesis 2: Intermediate Topics of Synthesis Design; Useful Reduction and Oxidation Reactions	Exam 2 3/9
3	20-22	• Nucleophilic Addition-Elimination Reactions 1: The General Mechanism Involving Strong Nucleophiles • Nucleophilic Addition-Elimination Reactions 2: Weak Nucleophiles • Electrophilic Aromatic Substitution 1: Substitution on Benzene; Useful Accompanying Reactions	Exam 3 4/9
4	23-26	• Electrophilic Aromatic Substitution 2: Substitution Involving Mono- and Disubstituted Benzene and Other Aromatic Rings • The Diels-Alder Reaction and Other Pericyclic Reactions • Reactions Involving Free Radicals • Polymers	Exam 4 5/2