Syllabus

Time and Place: M W F 01:05 PM-01:55 PM; Room, Chem. Sci. & Eng. Bldg. 19-106

Instructor: Dr. Shiyue Fang, Ph.D.
Tel: 487-2023, Email: shifang@mtu.edu
Course documents: Please log in Canvas at https://mtu.instructure.com/login
Office hours: By appointment; best time is the hour after each class

Primary Textbook (Required):  
Advanced Organic Chemistry, Reactions and Mechanisms, 2nd edition by Bernard Miller

Useful Reference Books:  
Organic Chemistry, by Marc Loudon  
Organic Chemistry, an Intermediate Text, by Robert V. Hoffman  
Advanced Organic Chemistry, Reaction Mechanisms, by Reinhard Bruckner

Prerequisite: CH2420 or the equivalent

Course Description: Through study of new types of organic reactions and more in depth examination of reactions learned in introductory organic chemistry classes, this course is intended to develop student’s chemical intuition necessary for advanced work in organic chemistry. To this end, theory and mechanism are largely taught during the description of various types of reactions. Specific topics include:

1. Hybridization, and electron flow curved-arrow notation – Review (these materials are not in the textbook, the following materials are all from the textbook); no homework
2. Resonance theory – Review; homework: p18 1.1a, 1.1d, 1.1g, 1.1 k, 1.1n, 1.2a
3. Six-membered heterocyclic rings – Structure and reactions; homework: p346 11.1a, 11.1b, 11.1e, 11.1h, 11.2a, 11.2e, 11.3 56 and 68 only
4. Five-membered heterocyclic rings – Structure and reactions; homework: p377 12.1a-c, 12.1f, 12.1j, 12.4a, 12.4b, 12.4d, 12.4g
5. Electrocyclic reactions – Theory and reactions; homework: p50 2.4a-d, 2.4f, 2.5b
6. Cycloaddition and cycloreversion reactions – Theory and reactions; homework: p86 3.2e, 3.2f, 3.2h, 3.3b, 3.3f
7. Sigmatropic reactions – Theory and reactions; homework: p126 4.3a-d, 4.4a-e, 4.4i-j
8. Carbenes, carbenoids and nitrenes – Structure and reactions; homework: p287 9.3a, 9.3c, 9.3e, 9.3h, 9.3k, 9.3l, 9.3m
9. Migration to electron-deficient centers (Depending on time availability); homework: p178 6.1a, 6.1c, 6.1e, 6.1f, 6.3b, 6.3c, 6.3d, 6.3f, 6.3i, 6.3k, 6.3m, 6.3o
10. Organophosphorus and organosulfur chemistry (Depending on time availability); no homework
11. Total synthesis of natural products from current journal articles (Depending on time availability); no homework

Homework: Homework will not be graded and you are not required to turn them in. You can find keys to the problems in Canvas (https://mtu.instructure.com/login). It is important to try to solve the problems first, and then to check if correct or not. Repeat the process until you can solve the problem correctly without looking at the answers. Homework may be included in quizzes and exams. For quizzes, only those related to the materials covered in the two weeks before the quiz will be overed.

Grading:  
Quizzes: 400  
Mid-term exam: 250  
Final exam: 350

Grades will be given in other every week at the beginning of Monday’s class. The questions are covered by materials taught in the latest two weeks before the quiz. There will be no make-up quizzes; if you can not be in class on time, you must inform me by email in advance. The mid-term and final exams will be comprehensive. A total of 850 points will guarantee an “A” and 750 a “B”. All questions will be from your notes taken in class and your homework.

Tentative Quiz and Exam Schedule: 16/Sept Q1 (80 points), 30/Sept Q2 (80), 14/Oct Q3 (80), 28/Oct Middle term (250), 11/Nov Q4 (80), 2/Dec Q5 (80), 16/?/Dec (will be available from record and registration office) Final (350).

Study Suggestions: Make sure to come to class every time, take detailed notes in class. After several classes, if you find difficult to follow, you need to preview relative sections of the book before each class; otherwise, you do not need to. Review your note no later than two days after the class; if you find something difficult to understand, read book or ask classmates or me; never let questions to build up! Before each quiz or exam, review your note and the homework if any. All questions will be selected from them with little modification.