

Chem 545 Synthetic Organic Chemistry (3 credits)

Pre-requisite: Chem 542

Spring 2017

Instructor: Dr. Ming Xian, Fulmer 468, 335-6073, mxian@wsu.edu

Office Hours: by appointment.

Class location and time: Fulmer 432, 12:10-13:00 MWF

Course Textbooks:

It is highly encouraged (especially if you want to stay in this field) that you have access to as many of the following books as possible:

1. "Greene's Protective Groups in Organic Synthesis, 4th Edition" by Peter G. M. Wuts and Theodora W. Greene
2. "Strategic Applications of Named Reactions in Organic Synthesis" by Laszlo Kurti and Barbara Czako
3. "Advanced Organic Chemistry: Reactions, Mechanisms and Structure, 5th Edition" by Michael B. Smith and Jerry March
4. "Transition Metals in the Synthesis of Complex Organic Molecules, 2nd Edition" by Louis S. Hegedus

Course Description: This course will provide a survey of modern synthetic methods in organic chemistry. Reagents and reaction conditions, reaction mechanisms, and selectivity issues will be discussed.

Course Objective: To broaden the understanding of a variety of organic reactions. The students are expected to learn/understand all lectured information and to do additional coursework (handouts) to cultivate their expertise by being exposed to a variety of other related examples in each topic.

Learning Outcomes:

After completing this course, a student should be able to (1) make informed decisions about HOW to effect organic transformations, (2) analyze chemo-, regio-, and stereoselectivity issues, (3) use their understanding of the reaction mechanism to rationalize/predict outcomes, and (4) interpret and understand the relevant synthetic literature.

Grading:

Grades will be determined based on your performance on written exams and quizzes. Homework will be voluntary. The scores on these exams will be used to assign letter grades based on the following scale:

A	90-100	B	80-83	C	70-73	D	60-63
A-	87-89	B-	77-79	C-	67-69	F	<60
B+	84-86	C+	74-76	D+	64-66		

Lecture Topics

Acid/base chemistry, pKa

Protection/Deprotection

-OH Oxidation

C=O Reduction

Enolate chemistry

Alkylation

Aldol reaction

Organocatalysis

Olefination

C=C bond functionalizations

Umpolung Chemistry

Cyclic additions (Diels-Alder, [3+2])

Sigmatropic rearrangements

Transition metal catalyzed reactions

Name reactions review
Total synthesis of natural products

Students with Disabilities:

Reasonable accommodations are available for students with a documented disability. If you have a disability and need accommodations to fully participate in this class, please either visit or call the Access Center (Washington Building 217; 509-335-3417) to schedule an appointment with an Access Advisor. All accommodations MUST be approved through the Access Center.

Academic Integrity:

Academic integrity will be strongly enforced in this course. Any student caught cheating on any assignment will be given an F grade for the course and will be reported to the Office Student Standards and Accountability. Cheating is defined in the Standards for Student Conduct WAC 504-26-010 (3). It is strongly suggested that you read and understand these definitions:

<http://conduct.wsu.edu/default.asp?PageID=338>

Safety Statement:

Washington State University is committed to enhancing the safety of the students, faculty, staff, and visitors. It is highly recommended that you review the Campus Safety Plan (<http://safetyplan.wsu.edu/>) and visit the Office of Emergency Management web site (<http://oem.wsu.edu/>) for a comprehensive listing of university policies, procedures, statistics, and information related to campus safety, emergency management, and the health and welfare of the campus community.

Class Schedule:

Week 1	Jan 9 Intro., pKa, acid/base	Jan 11 Protection/Deprotection I	Jan 13 Protection/Deprotection II
Week 2	Jan 16 MLK day (No class)	Jan 18 Epoxidation	Jan 20 (Quiz) Epoxidation
Week 3	Jan 23 Azide/SNO reactions	Jan 25 Umpolung and dithiane	Jan 27 Enolate chemistry
Week 4	Jan 30 Enolate Chemistry	Feb 1 Enolate Chemistry	Feb 3 (Quiz) Enolate Chemistry
Week 5	Feb 6 Cyclizations	Feb 8 Cyclizations	Feb 10 C=O addition, Brown Allylation
Week 6	Feb 13 Allylation/crotylation	Feb 15 Exam 1	Feb 17 Review exam

Week 7	Feb 20 President Day No class	Feb 22 Oxidation/reduction	Feb 24 Oxidation/reduction
Week 8	Feb 27 Oxidation/reduction	Mar 1 C=C formations	Mar 3 (Quiz) C=C formations
Week 9	Mar 6 C=C oxidation/dihydroxylation	Mar 8 Name rxn	Mar 10 Name rxn
Week 10	Mar 13 Spring break	Mar 15 Spring break	Mar 17 Spring break
Week 11	Mar 20 Diels-Alder	Mar 22 Diels-Alder	Mar 24 Exam 2
Week 12	Mar 27 Sigmatropic rearrang.	Mar 29 Sigmatropic rearrang	Mar 31 Sigmatropic rearrange
Week 13	Apr 3 Metal rxn	Apr 5 Metal rxn	Apr 7 (Quiz) Metal rxn
Week 14	Apr 10 Metal rxn	Apr 12 Metal rxn	Apr 14 Metal rxn
Week 15	Apr 17 Total synthesis (Discoderm)	Apr 19 Total synthesis	Apr 21 (Quiz) Total synthesis
Week 16	Apr 24 Review	Apr 26 Review	Apr 28 Review
Week 17	May 1 Final Exam		