CHEMISTRY 547: Advanced Organic Chemistry
Syllabus, Fall 2017

Department of Chemistry
University of Wisconsin, Madison

Instructor: Tehshik Yoon (tyoon@chem.wisc.edu)
Office Hours: 5317 Chemistry, Mondays, 2:00–4:00pm

Class Meetings: 1315 Chemistry, MWF 12:05pm–12:55pm

Course Description: A third semester of descriptive organic chemistry
Instructional Mode: Face-to-face
Prerequisite: Chemistry 345
Credits: 3 credits, based on the traditional Carnegie definition. Chem 547 has three classroom meetings per week comprising both traditional lecture and problem-solving modalities.

Course Designation and Attributes: Level – Advanced. Breadth – Physical Sci. Counts toward the Natural Sci req. L&S Credit – Counts as Liberal Arts and Science credit in L&S. Honors – Accelerated Honors. Not repeatable for credit

Learning Outcomes: Chem 547 is course in advanced organic chemistry appropriate for upper-level undergraduates and beginning graduate students. By the end of the semester, students will be able to

- identify and recall key reagents used in contemporary organic synthesis;
- analyze organic transformations using frontier molecular orbital (FMO) theory as a conceptual tool;
- apply concepts of chemical structure, bonding, and reactivity to predict the outcomes of pericyclic reactions, carbonyl reactions, and redox reactions.
- rationalize and predict the outcome of simple organometallic reactions.

Textbook: While there is no formal textbook for this course, readings will be suggested from from Louden, the textbook used for Chem 343 and 345 at UW–Madison, which will be placed on reserve at College and Memorial Libraries. Other materials will be handed out in class and posted to Learn@UW.

Exams: Two in-class midterm exams (100 pts each) covering each of three main units, and a cumulative final examination (200 points)

- Exam 1: October 12
- Exam 2: November 16
- Final exam: December 15 (5:05pm – 7:05pm)

Homework: Problem sets will be assigned weekly. These will not be collected, but your answers will be discussed in weekly problem sessions, to be held during normal lecture times.

Participation: You will receive 2 points of extra credit each time you work a problem at the board during discussion section, up to a maximum of 20 points for the semester. You will also receive participation credit for asking or answering questions during lecture.

Grading: This course will be scored out of 420 points maximum (2 x 100 pt midterm exams + 1 x 200 pt final exam + 20 points participation credit). I will do my best to replicate the distribution from prior years. (Approximate distribution: 30% A, 15% AB, 20% B, 15% BC, 15% C).

Class conduct: Chem 547 is designed to be interactive and collaborative in nature. This will require us to agree to the following classroom conduct expectations:

1. Participate. Ask questions during lecture; you are unlikely to be the only one confused about the material. Volunteer to work problems in discussion section, *even if you don't think you know the answer.* My job is to help you learn how to figure it out.

2. Collaborate. While the exams and final project must be your own work alone, I encourage you to do homework in groups and to help one another with discussion problems. All interactions with your classmates should be respectful and professional; engage productively with your classmates of all races, national origins, sexual orientations, genders and gender identities, religious backgrounds, physical abilities, and socioeconomic backgrounds.

3. Academic integrity. By this point in your education, you should all understand how critical academic integrity is to your training as a scientist, professional, and citizen. Please feel free to contact me if you have questions about what academic integrity entails for this course, and refer to the webpage below for the Dean of Students Office's policies of academic integrity:

http://www.students.wisc.edu/doso/academic-integrity/

McBurney Visas: McBurney accommodations are gladly made. Please inform me early in the semester to make arrangements.

Tentative Course Outline

	Sep 5 Introduction	7 Arrow pushing
10 MO Theory	12 MO Theory	14 Discussion
17 Cycloadditions	19 Cycloadditions	21 Discussion
24 Cycloaddition stereochemistry	26 Other cycloadditions	28 Discussion
Oct 1 Sigmatropic rearrangements	3 Nucleophiles and electrophiles	5 Discussion
8 Enolates	19 Alkylations	12 **EXAM 1**
15 Conjugate additions	17 Aldol reactions	19 Discussion
22 Aldol stereochemistry	23 Chiral auxiliaries	26 Discussion
29 Claisen/Dieckmann	31 Wittig/Horner–Wadsworth–Emmons	Nov 2 Discussion
5 Mannich/Enamine	7 Redox reactions	9 Discussion
12 Reductions	14 Reductions	16 **EXAM 2**
19 Oxidations	21 Discussion	23 *THANKSGIVING (no class)*
26 Oxidations	20 Organometallics	30 Discussion
Dec 3 Metathesis	5 Heck Reaction	7 Discussion
10 Suzuki reaction	12 Tsuji-Trost Reaction	15 (Saturday) **Final Exam**