Canvas Course URL:  https://canvas.wisc.edu/courses/175519

Meeting Time and Location
MWF from 11:00 to 11:50 am in Room 1315 Chemistry

Instructional Mode + Credit Hour Accounting
Instruction in this course will primarily occur in a lecture format, although some periods will be devoted to other modes. The three credit hours derive from the traditional Carnegie Foundation definition – we meet for 150 min per week. In addition, success in this course will require additional hours of studying outside of lecture, for example there will be assigned readings and problem sets.

INSTRUCTORS AND TEACHING ASSISTANTS

Professor Daniel J. Weix (Part 1, Jan 22nd to March 9th)
Office hours: Most Saturday mornings, 10:15 am to 12:00 pm
Office: Rm 5132 Shain Tower, Chemistry
Phone: 262-0541
Email: dweix@wisc.edu (preferred)

While email is the preferred mode of contact, do not expect an immediate reply. Average turnaround will be about a day. In the rare event of an urgent matter, be sure to call me directly by telephone.

Professor Steve Burke (Part 2)
Office hours: TBD
Office: TBD
Phone: 262-4941
Email: burke@chem.wisc.edu (preferred)

I do not believe that the present flowering of science is due in the least to a real appreciation of the beauty and intellectual discipline of the subject. It is due simply to the fact that power, wealth and prestige can only be obtained by the correct application of science.

OFFICIAL COURSE DESCRIPTION

Course Description
Chem 841 is a graduate-level course in contemporary synthetic organic chemistry. The first half of the course covers fundamentals in synthesis and transformations of carbonyl compounds, focusing on strategies to control the stereochemistry of these reactions.

Requisites
CHEM 641 and graduate standing or permission of instructor. Importantly, I expect that you have command (not merely familiarity) with the material covered in introductory organic chemistry (Chapters 1-23 and Chapter 28 of the Loudon Book, for example) and some of the topics covered in 641/547. Selected advance topics we will assume you have seen before:

Conformational analysis
- cyclohexane, cyclohexene (1/2-chairs), A_{12} and A_{13} strain, carbonyls, bicycles
  see uploaded notes from Boger and Chapter 3 of Carey and Sundberg for reference

Stereochemistry
- diastereomers, enantiomers, descriptors
  see Chapter 2 of Carey and Sundberg text for reference

Thermodynamics and kinetics
- pKa values, relation to K_{eq} and ΔG
- concept of relative rates
- thermodynamics vs kinetics
- transition-state theory
- Hammond postulate
  see Chapter 4 of Carey and Sundberg text for reference

LEARNING OUTCOMES

Course 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

1. understand and properly use the concepts, models, and terminology common in contemporary organic synthesis;
2. use retrosynthetic logic in planning synthetic routes;
3. plan logical, stereocontrolled syntheses of complex polyketide-type structures;
4. develop understanding and utility of major catalytic organometallic synthetic methods;
5. develop understanding and utility of pericyclic reactions, including cycloadditions, sigmatropic rearrangements, and electrocyclic reactions;
6. develop understanding and utility of organocatalytic and biocatalytic reactions;
7. develop skills to survey, compile, and present assigned topics of current interest in synthetic organic chemistry as a group exercise.
GRADING

- This course will be scored out of $270 + 270 = 540$ points maximum ($1 \times 100$ pt midterm exam + $6 \times 25$ pt problem sets + $20$ points participation credit for part one).
- Problem sets will be distributed weekly and will be due on Monday in-class every week. These are open note and you are encouraged to work in groups. Do not look up solutions in the literature because this defeats the point of the exercise.
- Midterm for part I will be completed during a 2-hour block outside of class, tentatively Saturday morning, March 7th.
- You may earn up to $20$ points for participating in class (asking/answering questions). You will self-track this via CANVAS.

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<th>Grading</th>
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REQUIRED TEXTBOOK, SOFTWARE & OTHER COURSE MATERIALS

- **Required:** there is no formal required textbook, but you should have access to your sophomore organic textbook. The Loudon textbook is on reserve in the library as well. We will also make use of other textbooks that are available online, “The Art of Writing Reasonable Organic Reaction Mechanisms,” “Modern Organic Synthesis, An Introduction,” (Zweifel and Nantz) and “Advanced Organic Chemistry, Parts A & B” (Carey and Sundberg).
- **Recommended:** The Clayden book is a useful “bridge” book between sophomore organic and graduate level material. If you are planning to continue in organic chemistry, this book would be a valuable purchase. It can be found used for a low price – look for the 2nd edition.
- **Supplemental:** Canvas has links to several other textbooks and Burke will suggest further books.
- **Molecular Model Kit:** Nearly any kit will suffice, such as the HGS “Organic Chemistry Basic” Set (Maruzen, ~$28). Many other suppliers, including Darling and Duluth Labs.
- I will NOT be using Sapling
- I WILL be using Canvas

EXAMS, QUIZZES, PAPERS & OTHER MAJOR GRADED WORK

- Midterm exams and the final are closed. You are being graded on your mastery of the material and all work must be your own. Unless noted, no outside assistance of any kind is permitted, such as notes, books, or electronics of any kind.
- **Midterm 1:** 3/7/2020 (Saturday) from 10:15 am to 12:15 pm
- **Midterm 2:** TBD by Burke
- Make up exams for planned, reasonable absences must be arranged in advance. Emergencies will be dealt with on a case-by-case basis in a humane way.

HOMEWORK & OTHER ASSIGNMENTS
Problem sets will be assigned weekly for the first \( \frac{1}{2} \) of the course and graded. Extensive reading and studying outside of lecture will be required for success in the course.

PARTICIPATION
You will receive 2 points of credit for any kind of participation during lecture for a maximum of 20 points for the semester.

RULES, RIGHTS & RESPONSIBILITIES
Beyond the normal duties of doing assignments (the Guide’s to Rules, Rights, and Responsibilities), attending lecture, and trying your best, I expect you all to:

1. Be Prepared. In order to gain the full benefit of lecture and discussion, you must come prepared. Assigned readings and problems should be completed before our scheduled class time.

2. Participate. I am bound to cover some topic poorly or make a mistake, leading to confusion. If you are brave enough to ask, your fellow students and I will be grateful. Be willing to work problems in front of me and your classmates, even if you are not sure of your answer! Exposing your thinking to criticism is scary, but it is the best way to learn and improve.

3. Collaborate. While the midterm exams must be your own work, you should collaborate with your classmates on homework problems and for studying. As in #2, a willingness to discuss your ideas and give/take criticism is essential to succeed at the highest levels. Effective collaboration also requires you to be respectful of your classmates and to behave professionally.

ACADEMIC INTEGRITY
By enrolling in this course, each student assumes the responsibilities of an active participant in UW-Madison’s community of scholars in which everyone’s academic work and behavior are held to the highest academic integrity standards. Academic misconduct compromises the integrity of the university. Cheating, fabrication, plagiarism, unauthorized collaboration, and helping others commit these acts are examples of academic misconduct, which can result in disciplinary action. This includes but is not limited to failure on the assignment/course, disciplinary probation, or suspension. Substantial or repeated cases of misconduct will be forwarded to the Office of Student Conduct & Community Standards for additional review. For more information, refer to studentconduct.wiscweb.wisc.edu/academic-integrity/.

ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES
The University of Wisconsin-Madison supports the right of all enrolled students to a full and equal educational opportunity. The Americans with Disabilities Act (ADA), Wisconsin State Statute (36.12), and UW-Madison policy (Faculty Document 1071) require that students with disabilities be reasonably accommodated in instruction and campus life. Reasonable accommodations for students with disabilities is a shared faculty and student responsibility. Students are expected to inform Prof. Weix of their need for instructional accommodations by the end of the third week of the semester, or as soon as possible after a disability has been incurred or recognized. Prof. Weix will work either directly with the you or in coordination with the McBurney Center to identify and provide reasonable instructional accommodations.
Disability information, including instructional accommodations as part of a student's educational record, is confidential and protected under FERPA. [https://mcburney.wisc.edu/apply-for-accommodations/](https://mcburney.wisc.edu/apply-for-accommodations/)

**DIVERSITY & INCLUSION**

Diversity is a source of strength, creativity, and innovation for UW-Madison. We value the contributions of each person and respect the profound ways their identity, culture, background, experience, status, abilities, and opinion enrich the university community. We commit ourselves to the pursuit of excellence in teaching, research, outreach, and diversity as inextricably linked goals.

The University of Wisconsin-Madison fulfills its public mission by creating a welcoming and inclusive community for people from every background – people who as students, faculty, and staff serve Wisconsin and the world. [https://diversity.wisc.edu/](https://diversity.wisc.edu/)