

Intermediate Organic Chemistry (CHEM345)

The Chemistry 345 - Lecture 5 is being taught as a stand-alone this term. This syllabus only applies to Lecture 5.



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Lecture 5 is held at 11 AM in room 1361 of the Daniels Chemistry Building.

This is a 3-credit class that meets for three 50-minute class period each week over the Spring semester and carries the expectation that students will work on course learning activities (reading, writing, problem sets, studying, etc) for about 2 hours out of classroom for every class period. This syllabus includes additional information about meeting times and expectations for student work.

Instructor - Contact Information and Office Hours

Professor Andrew Buller

Office: Room 5114A Chemistry

Office Phone: 608-262-8431

Office Hours: Mon. 4:30-5:30 PM and Thurs. 2:15-3:15 PM in Rm 5114A.

Email: arbuller@wisc.edu

TA Office Hours: You are encouraged to attend the office hours of any/all of the organic chemistry TAs, which are held in B317 Chem (Organic Chemistry TA Office).

Note: *Piazza* is an online resource being used this semester to answer content questions in as efficient a manner as possible. Please feel free to utilize this resource in addition to going to office hours.

Andrew Owen: Tue. & Thurs. 12:05 - 1:20 PM; aowen4@wisc.edu

Sam Kougiyas: Wed. 1:20 – 3:30 PM; kougiyas@wisc.edu

Office hours for all of the organic TAs can be found at the following link:

https://www.chem.wisc.edu/deptfiles/OrgLab/handouts/Organic_TA_Office_Hours_Spring_2018.pdf

Brief thoughts on being successful in organic chemistry

As each of you likely experienced in your first semester of organic chemistry, it takes work to do well with this subject. You can read the book cover to cover, but you will only start deep learning once you take out pen and paper and *start working problems for yourself*. To succeed in this class, you will need to carve out sufficient time over several days during the week to read the book, work practice problems, and discuss with your peers. There is simply no substitute for this experience. Developing mastery over any subject is deeply gratifying and, in addition to being a major discipline itself, organic chemistry forms the basis for much of pharmacology, biochemistry, and modern chemical biology. I invite each of you find your own motivation to learn this subject.

Course Learning Outcomes

Students who are successful in this course will be able to:

- 1) Determine the structure of organic compounds using information from mass spectrometry, infrared spectroscopy, and nuclear magnetic resonance.
- 2) Use structural information to evaluate reaction mechanisms.
- 3) Identify reactivity trends for aromatic and conjugated molecules, with special emphasis on carbonyl compounds.
- 4) Apply known reactions in the retrosynthesis of a complex molecule (one that bears multiple functional groups).
- 5) Apply your knowledge of structure and reactivity to propose mechanisms for new transformations.
- 6) Identify situations outside of an academic setting where organic chemistry is important.

Additional Course Information

Canvas Course URL: <https://canvas.wisc.edu/courses/76129>

Course Designations: Intermediate level; physical science breadth; counts as L&S credit

Instructional mode: face-to-face

Official Course Description: Chemistry 345 is the second course of a two-semester sequence in organic chemistry. It covers diverse themes in organic reactivity, building on a foundation provided in Chemistry 343. Chemistry 341 does not satisfy the prerequisite for 345.

Requisite: Grade of C or better in CHEM 343

Accommodations for Students with Disabilities

McBurney Disability Resource Center syllabus statement: “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 faculty [Prof. Buller] 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. Faculty [Prof. Buller], will work either directly with the student [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.”

<http://mcburney.wisc.edu/facstaffother/faculty/syllabus.php>

Discussion Meetings

The discussion sections will play many roles that will deepen your understanding of the course material. You will have a chance to talk to your TA and classmates about problem solving strategies, difficult course concepts, and common misconceptions. Discussion sections will often involve group work in some form or another; you will not be passively listening to your TA talk about chemistry. Furthermore, your TA's are highly successful organic chemists. This means that they can point out common issues that students struggle with and help you avoid them. They can provide you with learning insights that worked for them and they can help you interpret the textbook and lecture materials in a fairly sophisticated manner. Get the most out of each discussion by showing up ready to work and ready to discuss the week's material.

Diversity, Equity, and Inclusion are important throughout campus life, and these principles are particularly immediate in a discussion class. It is worth re-reading and reflecting on the official UW statement:

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.

Textbook Reading

It is quite difficult for most students to understand the course material at the depth needed for a high-level of success without reading the textbook. Loudon's organic textbook (6th edition) is an excellent book, with clear explanations and interesting practice problems. I recommend reading each chapter before or after each lecture, depending on your preference. A thorough reading of the textbook on any topic you are struggling with is critical. The explanations and examples provided will be helpful to your mastery of the material. It will provide more depth and breadth to the course material than I can provide in lecture and is an essential tool. Successful students will routinely work the in-text problems on a near-daily basis.

Email / Piazza

Emails to Prof. Buller should be limited to logisticals, concerns about grades, requests for alternate office hours, or any non-content related course questions. In order to help bring attention to your email, please include Chem 343 in the subject line of all emails you send me. Content questions should be posted to Piazza, an online resource where you can post questions, post answers to other students' questions, and receive answers to your questions from the TAs and Prof. Buller. Content questions should be directed to Piazza and not sent via email. Content questions received via email will be directed to Piazza.

Please remember to be very clear when wording your questions. Pictures of structures from ChemDraw are very helpful. Chemdraw is an expensive piece of chemistry software that you have free access. It is a high-quality chemistry drawing program that you can download (see below) and it will allow you to draw structures to accompany your questions. Pictures or scanned images are also okay on Piazza, but you will likely find Chemdraw easy to use to make high-quality organic chemistry drawings. Piazza can be accessed from within Canvas by the link on the sidebar.

Problem Sets, Textbook Practice Problems, Previous Quizzes/Exams

The only way to make sure you are learning at the right depth and pace is to complete the practice problems available. If you cannot transfer what you know to new molecules or new structures, it identifies a gap in your knowledge and understanding. Answer keys are provided to the problem sets and textbook, use these to check your learning. Answer keys are intentionally not provided to some of the previous quizzes/exams. This is done to encourage you to talk to your classmates and instructors about any answers that you are unsure of and to work through problems that you can't simply look up the answer to and shortcut your learning process.

Classmates

Nothing reveals your misconceptions and misunderstandings regarding organic chemistry than trying to explain something in words. If you are working with one or more classmates on a regular basis, both of you will benefit from the opportunity to talk about organic chemistry. Helping others through material is a great way to take your own learning of a concept from superficial to mastery.

Tutors

The Department of Chemistry maintains a list of private tutors available for hire. Although the private tutors included on the list have been affiliated with the department in some way, we provide this list as a resource and cannot guarantee the quality of any individual private tutor.

Grading and Grading Philosophy

There are 500 points available in this course. There are three 100-point exams and one 200-point final. No points will be awarded for the problem sets or attending class. No exams will be dropped; you must take them all at the regularly scheduled time unless you have a university course conflict. When conflicts arise, please notify Prof. Buller as soon as possible and at least one week in advance to the schedule exam time. The final letter grades based upon 500 course points and are anticipated to reflect the historic averages of Chem345 with a course GPA near 3.0.

100 pts. Exam 1 – Wednesday February 21st, 2018

100 pts. Exam 2 – Wednesday March 21st, 2018

100 pts. Exam 3 – Wednesday May 2nd, 2018

200 pts. Final Exam

Exams will be given during regular class periods.

Grading Philosophy

First, understand that I (Prof. Buller), do not personally have a desired grade distribution. It is my sincere, if slightly quixotic, hope that each of you demonstrates the mastery of organic chemistry necessary to receive an A. We endeavor to write exams that challenge students at all levels of learning and provide a wide grade distribution. The final exam counts for 200 of 500 course points. Our goal is to make this exam a challenging and interesting forum to demonstrate your critical thinking skills and knowledge of organic chemistry. Because each topic we discuss builds on the prior concepts, the significant weighting of this exam favors students who have improved in their understanding and preparation as the course progresses. Our ideal for each examination is for no one to achieve a perfect score, at least one student provide a perfect answer to each question, and everyone demonstrate the learning that they have achieved. We strive to distinguish those who are trying to memorize patterns or use mnemonic devices from those who understand the content in terms of reactivity, structures, molecular orbitals, pKa's, etc.

We anticipate many emails about grades, with some even suggesting that a better grade is desired than was assigned. Some emails may contain a significant misconception about how grading is supposed to work. Grading in this lecture of Chem345 is not about any of the following and are not considered as rationale for wanting/deserving a better grade than what you have earned:

1. Effort/Hard work
2. Attitude toward organic chemistry
3. Attendance of office hours, lecture, or discussion
4. How much your TA or Prof. Buller like/dislike you
5. Needing a better grade for {insert school type here} school admissions
6. Wanting to take a course for which Chem345 is a prerequisite

In the event that a re-grade is warranted due to a mistake on the part of the grader, please be aware that the entire exam will be re-graded and it is entirely possible that resulting score could go up *or down*.

It would be wonderful for each student to achieve true master of organic chemistry. In practice, this seems to not occur and, unfortunately, instructors and students have helped create a general state of confusion about how grades are assigned, generally. Setting a certain % grade for an A/B/C is entirely artificial. This scenario assumes that all exams are of equal value and can be compared directly. This is certainly not the case in this course as 1) the material is cumulative, 2) the mean and standard deviation will vary significantly from exam to exam, and 3) it assumes that there is some universal standard (such as 80 % = B) that should be attained for a particular grade.

A cleaner approach is to allow the scores to fall where they do for each exam and to determine each grade relative to the mean in units of standard deviation. This allows us to attempt to write the best exam that we possibly can that advances learning, probes misconceptions, and highlights areas of deficiency. This is an imperfect approach, but more instructive than simply looking at raw scores or % scores without considering the mean and standard deviation. In order to do this, simply use the formula below and apply an actual (simple) curve.

$$\text{normalized score} = (\text{your score} - \text{average score}) / (\text{standard deviation})$$

If your score is +1, you rocked that exam! If your score is near zero, you have achieved an average grade (~ B in Chem 345). If you have a score of -1, your achievement is not where it needs to be. This information will be made available for each exam once the information is available. *Do not attempt to use percentage scores to estimate your current or projected course grade.*

The historic GPA for CHEM345 is around 3.0. I am prepared for this course to meet and exceed this standard. Grades will deviate from a roughly normal distribution in only two scenarios:

1) **An exceptional lecture section** This is likely to be a fairly rare occurrence. But if *all* of you do an amazing job of learning (and we do a sufficient job teaching), we'll shift the grades up as needed to reflect your accomplishment.

2) **An exceptional student performance** This is a more frequent occurrence. If a student demonstrates that their raw score does not reflect their achievement, we will consider raising the student's grade by 1/2 a letter grade to acknowledge that achievement. Evidence of growth and achieves mastery is indicated by:

- a bad outlier of an exam (a normalized score about one standard deviation less than the student's normalized average)
- a consistent trend of positive trend in performance
- an exceptional performance on the final exam

Academic Misconduct

Folks, please don't cheat. Cheating is bad. Cheating is sad.

Dealing with academic misconduct is the most painful/sad/annoying part of our job. Historically in Chem 343/345, penalties have ranged from a zero on the related-work and a letter on file with the Dean of Students office to failure/removal from the course with larger UW Dean's office penalties. Out of respect, for yourselves, each other, and your instructors please behave in an appropriate manner with regards to all of the assessments.

[UW Dean of Students Office - Academic Integrity](#)

From our experience, the two most common forms of academic misconduct in this course are related to re-grades and sharing information about exams. Here are some general thoughts and suggestions on the topic... (no particular organization or forethought)

- 1) *Do not talk to people about the quiz or exam until after the key is posted.*
- 2) *Do not turn in work or thoughts that aren't your own.*
- 3) *Looking at someone else's exam, or notes you brought in during an exam is cheating.*
- 4) *If it feels like you might be doing something icky and dishonest, you may well be! Try doing something else instead.*
- 5) *Do not change your answers on your exam and ask for a re-grade. You might think we are stupid and we might be... but we're not that stupid.*
- 6) *When you come to the exam, sit far enough away from anyone else and in a posture that no proctor can think you are cheating. Make sure all your stuff is in airplane mode, like your phones, computers, purses, backpacks, etc... If all your stuff is put away, shut down, zipped up, and not connected to the internet, so no one can think you're trying to cheat.*
- 7) *In the words of one of your classmates from a previous semester about sharing exam related information, "It wouldn't be moral and since this class is curved, revealing knowledge of the exam wouldn't be beneficial to my grade either."*
- 8) *Cheating to gain a few points is not worth the repercussions.*

Recommended and Required Course Materials

Required:

Organic Chemistry 6th (or 5th) edition by Marc Loudon

Recommended:

Solution Manual Organic Chemistry 6th (or 5th) edition

Molecular Model Kit

Several model kits are available online, at the UW Bookstore, and from AXΣ in the Mills Street Atrium of the Chemistry Building. It is not important which model kit you acquire, none of them are perfect and all are helpful.

ChemDraw ([ChemDraw 15 Download Instructions](#))

As a UW student, you get ChemDraw15 free! This is pretty awesome! We highly recommend downloading the software and using it whenever you are posting on Piazza. It is the same software that we use to draw all of the molecules for your problem sets, quizzes, and exams.

The syllabus draws extensively (and occasionally word-for-word) from the Chem343 syllabus written by Dr. Brian Esselman.