CHEM345: Intermediate Organic Chemistry (Esselman, Martell, and Stowe)

University of Wisconsin – Madison

The Chemistry 345 Lectures 1, 2 & 5 are being taught by three instructors and six teaching assistants working in very close collaboration. As a result of this collaborative approach, all course resources, problem sets, and materials are shared. The course schedule and content will be approximately the same in all lectures and discussions. You must attend the discussion section that you are registered for due to space restrictions in the assigned rooms.

Instructor - Contact Information and Office Hours

Jeffrey Martell (**Lecture 1** MWF at 1:20 PM, 204 Educational Sciences)
Office Room: 8132A Chemistry (Shain Tower)
Office Phone: 608-263-6249
Office Hours: Tuesdays 9-10 AM and Wednesdays 11AM-noon
email: jdmartell@wisc.edu

Ryan Stowe (**Lecture 2** MWF at 9:55 AM, B10 Ingraham Hall)
Office Room: 1305A Chemistry
Office Phone: 608-890-2568
Office Hours: Tuesdays 4:30 - 5:30 PM and Thursdays 3:30 - 4:30 PM
email: rstowe@chem.wisc.edu, rstowe2@wisc.edu

Brian Esselman (**Lecture 5** MWF at 11:00 AM, 204 Educational Sciences)
Office Room: B324A Chemistry (enter through B324)
Office Phone: 608-262-1479
Office Hours: Tuesdays 2:30 - 3:30 PM and Wednesdays 2:25 - 3:25 PM
email: besselman@chem.wisc.edu, brian.esselman@wisc.edu, or esselman@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 Hours Spring 2020Links to an external site.). All of the TAs listed below are associated with Chem 345 lectures 1, 2, & 5 and are likely to know exactly what is going on in your organic course.
Meghan Campbell (mecampbell2@wisc.edu): Wednesday, 8:50 AM, Wednesday 9:55 AM
Colleen Chernowsky (chernowsky@wisc.edu): Wednesday, 12:05 PM, Friday 2:25 PM
Asif Habib (ahabib@wisc.edu): Monday, 12:05 PM, Monday 1:20 PM
Shane Lies (slies@wisc.edu): Thursday, 11:00 AM, Friday 8:50 AM
Andrew Owen (aowen4@wisc.edu): Wednesday, 2:25 PM, Thursday 2:25 PM
Cara Schwarz (ceschwarz@wisc.edu): Monday, 4:35 PM, Thursday 12:05 PM, Thursday 1:20 PM

Chemistry 345 Official Course Information

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.
Canvas Course URL: https://canvas.wisc.edu/courses/125618
Course Designations: Intermediate level; physical science breadth; counts as L&S credit
Requisite: CHEM 343 with a C or better

Chemistry 345 Learning Outcomes

Students will understand the role of spectroscopy and spectrometry in organic structure elucidation and be able to utilize spectra to analyze pure samples and product mixtures.
Students will be able to use the electronic and molecular structure of organic molecules to predict and rationalize their reactivity.
Students will be able to use molecular orbitals, potential energy surfaces, and electron-pushing reaction mechanisms to describe chemical reactivity with an emphasis on the reactions of aromatic compounds, pericyclic reactions, and the reactions of carbonyl-containing compounds.
Students will be able to propose multi-step synthetic schemes to generate complex organic molecules from simple starting materials using studied reactions.

Chemistry 345 (3 credits) Credit Hour Accounting

Learning in this course is structured in a blended and flipped model spread across many platforms. The numbers provided below are a good-faith estimate of the time needed to be spent on this course in each component. The exact hours will vary from student to student.

Activity	Time (hr)
Lecture	42
Discussion	15
Video Lectures & Textbook Reading	40
Homework	50
Exams	6.5
Total	153.5

Teaching and Learning Philosophy - Ellison (on leave Spring 2020, but still offering good advice...)

Knowledge can be broken down into 4 categories. What you know you know, what you know you don't know, what you don't know that you know, and what you don't know that you don't know. I believe that the most powerful of those categories is knowing what you don't know. It is only through recognizing what you don't know that you take the first steps toward learning. One of the

best ways to accomplish this is to try to explain why you know what you know. I highly encourage students to not be passive learners but to be teachers and thereby active learners.

Being an active learner:

Teach- Find a classmate/friend/pet/mirror and explain your thought process. As stated above, teaching/explaining a concept allows you to reflect on your own understanding of the material. Be thorough in your discussion of the material and take note of any confusion so that you can address it later.

Ask questions- While your in lecture or reading the textbook write down any questions you have about the material. This is a great way to engage with the material as it is presented to you.

Attempt to answer all questions- Beyond the problem sets and the discussion questions, look to answer the questions that you pose yourself from lecture and the text. Before seeking the solution, attempt to answer the question yourself. It is okay not to know the answer as the self reflection and identifying the gaps in knowledge are the true goals of this exercise. This will help pinpoint where learning needs to occur.

Review what you got wrong- Take time to review your quizzes and exams. Organic chemistry builds on itself. Taking the time to address and clarify what you don't know will facilitate your future understanding of new course material.

Being an active learner takes work and practice. Part of our role as instructors is to help you with this process. We as your instructors are always happy to listen to your explanations as it in turn helps guide our teaching. I hope that students that take my class are able to take away not only an understanding of the course material, but more importantly, develop their own approach to addressing problems that they can carry on in their next adventure.

Teaching and Learning Philosophy - Esselman

"All real learnin' is painful." - Bob Clingan, West Bend West High School

The above quote is from one of the best teachers I've had. I was very lucky to have him as my advanced chemistry teacher and was greeted by these words on the first day of school. I was a little intimidated, but I knew that I was going to love that class. He was an old-school football coach, which shaped his outlook on teaching and learning chemistry. He knew that we needed to struggle with material to find out what we knew and what we didn't know. Without struggle, there is no clarification of what skills and knowledge have been mastered. Over the years, I have found a lot of truth in his statement. In challenging learning environments or courses that have high expectations, mastery of the material has required a lot of effort, a lot of toil, a lot of time, and a fair amount of pain.

Learning is not free and is not easy. To move from familiarity to understanding and mastery, in organic chemistry, is going to require a great deal of focus and effort. We promise that by the end of chemistry 343/344/345, you will be a more mature learner, a stronger thinker, and have a much better understanding of chemistry. To begin that journey you will likely need to improve in several areas:

1) Time management and dedication - It is critical that you work very hard and very efficiently to master the course concepts. First and second semester organic chemistry covers more material and at a greater depth than you have likely encountered before this stage in your education. Each concept and chapter builds upon the previous one. You must find a way to work at a consistently intense level for the entirety of the course. This is difficult. It will likely require you to develop greater intellectual and emotional stamina. You will need to work on organic chemistry each and every day. You cannot afford to fall behind; it is very difficult to recover.

2) Learning for Mastery - Most of the students entering organic chemistry are very, very intelligent. Most of the students entering organic chemistry have been very successful in high school and their past college courses. Unfortunately, that means that most of you have never been sufficiently challenged to develop the learning skills necessary to have success in organic chemistry and beyond. As is the case in many areas of learning, those with poor learning and study skills don't even know that they lack good learning skills. One of the best things you could do for yourself is to continually push your mind to understand the underlying concepts. You should continually check to make sure that you can answer all assigned course questions, explain the underlying concepts in writing and verbally, and to identify any areas where you have not mastered the course content.

Like many of you, I did very well in high school and never learned how to study or learn. I had this naive notion that going to lecture and hearing someone explain material to me would be sufficient; it was in high school. What I didn't understand is that high school courses move at an incredibly slow pace compared to my University courses. During my first semester at UW-Madison, I got along okay, but I didn't have the success that I was used to. I just thought that I wasn't as smart as those around me who were having more success. I went into Math 222 in my second semester without really having figured out how to study or to achieve mastery of learning. I did my homework and went to class so I assumed I was learning well enough to meet the course expectations. What I didn't understand is that only being able to get some of the assigned problems correct without looking them up was not the same as being able to solve all the assigned problems. During the first midterm, I managed to solve 2 of the 10 integration problems my first pass through the exam. While getting really frustrated and uttering a few choice words, I managed to solve one additional problem. I earned a 34 % when 56 % was required just to get a D. I went through a really bad couple of days when I thought that I was going to have to drop out of school, become homeless, and live under a bridge. I had never failed so completely and I had no idea how to deal with it. Due to the right help from the right people, I recovered emotionally and academically that term (Somehow, I managed a B in Math 222). The most important thing that I learned was that my success depended on real learnin'. I needed to put in the time and fight with the material until I could solve all of the problems all the time.

Fast-forwarding a few semesters, I had honed my learning skills and commitment to mastery. When preparing for my Chem 561 exam, my friend Hudd and I completed every single problem assigned during the semester 3 times. First, we completed every problem while

consulting our notes and books and discussing the problems with each other. Then, we started again and completed each problem without books and notes, but discussing each problem. The third pass through, we completed the problems in silence, swapped, and graded each other's work when done. The day of the exam we ran out of material to work on pretty early, so we played Madden Football and ordered a pizza. Then out of guilt Hudd suggested that we do something relevant so we made up a few equation derivations and other problems that had never been assigned. We knew the material so well, that we actually predicted one of the problems on the exam. Needless to say, Chem 561 went better for me than Math 222.

So, what changed? I had changed; I had grown. I had no longer accepted not knowing. I no longer accepted mediocrity. I demanded mastery and was willing to do whatever was necessary to make that happen.

3) Self-motivation - As an adult learner, you are responsible for your own learning and your own motivation. If you are taking organic chemistry, it's almost certainly because it is important to your future. Learning this material and gaining the skills necessary to master it will be critically helpful to your future. As such, you should not expect someone else to provide you with the desire to learn, the desire to master, or the desire to succeed. In order to put in the time and dedication necessary to achieve mastery of the course content, you will have to be very motivated. We can't motivate you. Your TAs cannot motivate you. Motivation must come from within!

Teaching and Learning Philosophy - Stowe

Nobody thinks clearly, no matter what they pretend. Thinking's a dizzy business, a matter of catching as many of those foggy glimpses as you can and fitting them together the best you can. That's why people hang on so tight to their opinions; because, compared to the haphazard way in which they're arrived at, even the goofiest opinion seems wonderfully clear, sane, and self-evident. And if you let it get away from you, then you've got to dive back into that foggy muddle to wangle yourself out another to take its place. (Dashiell Hammett, quoted in diSessa, 1988)

Learning is an active, messy business. When you try to figure out how something works, you call up and connect all sorts of skills and ideas that you perceive might be useful in crafting an explanation or model of the phenomenon in question. Building up and using an understanding of chemistry poses a challenge above and beyond most instances of "figuring out" in that most of the ideas and/or skills that seem like they should help explain the world (from our intuition) tend to lead us astray when mapped onto atoms and molecules. For example, the intuitive idea that more effort begets more result is handy when moving a heavy box but can be noticeably less helpful when trying to explain differences in properties between two different substances (as the heavier molecule does not necessarily have the higher boiling point). Atoms and molecules behave in weird, counterintuitive ways and research has shown that careful buildup is needed to support students in weaving together coherent and useful understanding. That's what we are trying to do here – give you explicit opportunities to connect topics back to fundamental ideas (such as forces and energy) as you grapple with explaining and modeling more and more complex systems. You need to engage with these opportunities to be successful in this course. As you think through

lecture material, engage in discussion sections, or approach problems, constantly be asking *why* a particular process might or might not occur in terms of forces and energy. We are not after pattern recognition or trivia – we are after robust, flexible, useful command of disciplinary core ideas. The ways of thinking that will help you construct and use a knowledge framework in organic chemistry are broadly useful to engaging in society as a scientifically literate citizen and will help with a wide variety of careers.

1) Time management and dedication - It is critical that you work very hard and very efficiently to master the course concepts. First and second semester organic chemistry covers more material and at a greater depth than you have likely encountered before this stage in your education. Each concept and chapter builds upon the previous one. You must find a way to work at a consistently intense level for the entirety of the course. This is difficult. It will likely require you to develop greater intellectual and emotional stamina. You will need to work on organic chemistry each and every day. You cannot afford to fall behind; it is very difficult to recover.

2) Learning for Mastery - Most of the students entering organic chemistry are very, very intelligent. Most of the students entering organic chemistry have been very successful in high school and their past college courses. Unfortunately, that means that most of you have never been sufficiently challenged to develop the learning skills necessary to have success in organic chemistry and beyond. As is the case in many areas of learning, those with poor learning and study skills don't even know that they lack good learning skills. One of the best things you could do for yourself is to continually push your mind to understand the underlying concepts. You should continually check to make sure that you can answer all assigned course questions, explain the underlying concepts in writing and verbally, and to identify any areas where you have not mastered the course content.

Like many of you, I did very well in high school and never learned how to study or learn. I had this naive notion that going to lecture and hearing someone explain material to me would be sufficient; it was in high school. What I didn't understand is that high school courses move at an incredibly slow pace compared to my University courses. During my first semester at UW-Madison, I got along okay, but I didn't have the success that I was used to. I just thought that I wasn't as smart as those around me who were having more success. I went into Math 222 in my second semester without really having figured out how to study or to achieve mastery of learning. I did my homework and went to class so I assumed I was learning well enough to meet the course expectations. What I didn't understand is that only being able to get some of the assigned problems correct without looking them up was not the same as being able to solve all the assigned problems. During the first midterm, I managed to solve 2 of the 10 integration problems my first pass through the exam. While getting really frustrated and uttering a few choice words, I managed to solve one additional problem. I earned a 34 % when 56 % was required just to get a D. I went through a really bad couple of days when I thought that I was going to have to drop out of school, become homeless, and live under a bridge. I had never failed so completely and I had no idea how to deal with it. Due to the right help from the right people, I recovered emotionally and academically that term (Somehow, I managed a B in Math 222). The most important thing that I

learned was that my success depended on real learnin'. I needed to put in the time and fight with the material until I could solve all of the problems all the time.

Fast-forwarding a few semesters, I had honed my learning skills and commitment to mastery. When preparing for my Chem 561 exam, my friend Hudd and I completed every single problem assigned during the semester 3 times. First, we completed every problem while consulting our notes and books and discussing the problems with each other. Then, we started again and completed each problem without books and notes, but discussing each problem. The third pass through, we completed the problems in silence, swapped, and graded each other's work when done. The day of the exam we ran out of material to work on pretty early, so we played Madden Football and ordered a pizza. Then out of guilt Hudd suggested that we do something relevant so we made up a few equation derivations and other problems that had never been assigned. We knew the material so well, that we actually predicted one of the problems on the exam. Needless to say, Chem 561 went better for me than Math 222.

So, what changed? I had changed; I had grown. I had no longer accepted not knowing. I no longer accepted mediocrity. I demanded mastery and was willing to do whatever was necessary to make that happen.

3) Self-motivation - As an adult learner, you are responsible for your own learning and your own motivation. If you are taking organic chemistry, it's almost certainly because it is important to your future. Learning this material and gaining the skills necessary to master it will be critically helpful to your future. As such, you should not expect someone else to provide you with the desire to learn, the desire to master, or the desire to succeed. In order to put in the time and dedication necessary to achieve mastery of the course content, you will have to be very motivated. We can't motivate you. Your TAs cannot motivate you. Motivation must come from within!

Where the Learnin' Happens

Lecture

The purpose of lecture is to provide a conceptual framework for you to understand the course material. Key concepts and examples will be highlighted. While many details will be discussed, the focus will be on the big concepts and how the current material connects to past learning and future expectations. Lectures will help define the depth and breadth of the course and will help you understand the course expectations. You cannot learn everything necessary for success in the course from these lectures alone. Lectures will only build the foundation of learning.

Each lecture will be recorded and the lecture notes and video posted. Please be patient; they will be posted as soon as is practical; these are large video files. Since there are videos of two complete previous courses, feel free to view those videos in place of the current Spring 2019 lecture video if it is not posted as soon as you would like.

Discussion Meetings

The discussion sections with your TA are probably the second most critical as part of your learning process. The discussions play many roles all of which serve to 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 productive ways of building up and using knowledge of chemistry. Discussion provides a great opportunity to talk about the material. Discussion sections will always involve group work of 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.

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 a great book chosen for its clear explanation and great practice problems. We 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 We can provide in lecture and should not be over-looked as a valuable tool. We highly recommend working the in-text problems as you go.

Quizzes/Exams

The quizzes and exams are not just evaluation tools. These assessments (including the practice ones from previous terms) are teaching tools. They will give you the opportunity to clarify what you know and don't know. Use them to identify weak areas in your knowledge that you can address.

Office Hours

Your TAs and us are highly concerned about your learning. Unfortunately, there are 800+ of you and we can't reach out to each of you individually and make sure that you are having the success that you are looking for. In the past, the most successful students took good advantage of office hours on a weekly basis. The office hour information for Fall 2019 is posted on top of this page. You are encouraged to attend as often as you need and see any TA and instructor. Set an expectation for yourself to come to each meeting with an instructor with a list of questions and clearly identified problems that they needed help solving.

Email / Piazza

We get a lot of emails, and we lose them in the inbox more often than we'd like. In order to help bring your email to our attention, please include Chem 343 in the subject line of all emails you send us. Email should be limited to logisticals, concerns about grades, requests for alternate office hours, or any non-content related course questions. Content questions should be directed to Piazza and not sent via email to either the TAs or us. **Content questions received via email will be directed to Piazza.** Piazza is a great online resource where you can post questions, post answers to other students' questions, and receive answers to your questions from the TAs and us. Please remember to be very clear when wording your questions on Piazza. 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 the thinking/learning process.

Classmates

Nothing reveals productive and unproductive connections between ideas in organic chemistry better than trying to use what you know to predict, explain, or model a phenomenon using words or representations. 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. https://www.chem.wisc.edu/content/tutorsLinks to an external site.

Grading and Grading Philosophy

Chemistry 345 Grading - Spring 2020

There are approximately 599 points available in this course. There are three 25 pt quizzes, three 100 pt exams, three homework assignments (24 pts total) and one 200 point final. No points will be awarded for the problem sets or attending class. No exams or quizzes will be dropped; you must take them all at the regularly scheduled time unless you have a university course conflict. The final letter grades based upon 599 course points will reflect the historic averages of Chem 345 with a course GPA near 2.82. (see the example histogram below)

25 pts. Quiz 1 Discussion
100 pts. Exam 1
25 pts. Quiz 2 Discussion
100 pts. Exam 2
25 pts. Quiz 3 Discussion
100 pts. Exam 3
00 pts. Quiz 4 (Practice Only)
24 pts. Model Application Assessments

200 pts. Final Exam

There are NO planned makeup quizzes. You must attend your discussion class on the dates of the quizzes. For exams which are held in the evenings, if you have a conflict with a regularly scheduled university course, we will offer an alternate arrangement. You will be contacted approximately two weeks prior to each exam to coordinate. Please do not email us regarding exam conflicts prior to our course-wide email.

Grading Philosophy

Grades are important to you, to us, and to the university. Thus, **grade assignments must reflect achievement and learning**. How that is measured and what achievement looks like are issues that are up for debate and are subject-dependent. In CHEM 343/345, we consider the exams and quizzes in this course to be reasonable markers of achievement and learning. Certainly, there are better/alternate methods for assessing student learning, though none of which seem overly practical in a course that serves 200 - 350 students per fall/spring course and 100+ in the summer term. The final exam counts for 200 of 599 course points weighing it double the other exams or the quiz total. This favors students who have improved in their understanding and preparation as the course progresses. We endeavor to write exams that challenge students at all levels of learning and provide a wide grade distribution. Our goal is to have no one be perfect on the entire exam, at least one student provide a perfect answer to each question, and everyone demonstrate the learning that they have achieved. We will always try to separate those that are trying to memorize patterns or use mnemonic devices from those who understand the content in terms of reactivity, structures, molecular orbitals, pK_a values, etc.

Every semester, we get a lot of emails about grades, many of them suggesting that a better grade is desired than was assigned. Often these emails include a significant misconception, in our opinion, about how grading is supposed to work. Grading in our lecture of Chem 345 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 instructor like/dislike you
5. Needing a better grade for {insert school type here} school admissions
6. Wanting to take a course for which Chem 345 are prerequisites

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 and is based upon a few assumptions. Firstly, it assumes that all assignments are of equal difficulty and can be compared directly. This is certainly not the case in this course as the mean and standard deviation vary significantly from assignment to assignment. Secondly, it assumes that there is some universal standard (such as 80 % = **B**) that should be attained for a particular grade. Furthermore, without intervention it often creates grade distributions in difficult classes

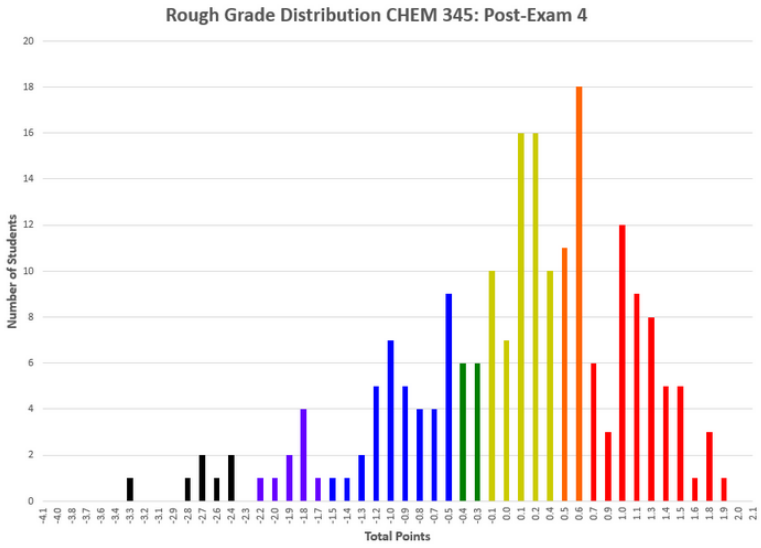
with GPA's that are much lower than desired or reasonable. This forces odd adjustments to be made to scores to make them *fit* with the instructor's desired grade distribution. This seems artificial and doesn't help students gauge their performance in light of mysterious adjustments. (Often times, people misuse the word *curve* here to mean a positive adjustment in everyone's score.)

A much simpler approach is to allow the scores to fall where they do from assessment to assessment 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 far 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.

normalized score = (your score - average score)/(standard deviation)

If your score is +1, you rocked that assessment! If your score is near zero, you have achieved an average grade on that assignment (~ **B** in Chem 345). If you have a score of -1, your achievement is not where it needs to be. This information will be added to the title of each quiz or exam once the information is available. To put this in terms that might fit better your expectation of **A**/**AB**/**B**/**BC**/**C**/**D**/**F**, see the rough breakdown below. This shows the grade breakdown in pretty colors from a previous chemistry 345 term. The numbers in parenthesis are the normalized grade breaks. ***Do not attempt to use percentage scores to estimate your current or projected course grade. Additionally, do not use the points needed for a particular grade from a previous term to estimate your current or projected course grade.***

We did choose a wavelength scale (**A** = red) rather than a frequency scale (**A** = violet) for the color coding which could be another subject for debate. The historic GPA and the GPA of this example section below is 2.79.



There are two times that we will consider deviating from this grading formula and the historic GPA.

1) **A truly exceptional lecture section** This is likely to be a fairly rare occurrence. But if the TAs and us do a remarkable job of teaching and all of you do an amazing job of learning and somehow students exceed our expectations based upon past experience, we'll shift the grades up a bit.

2) **An exceptional student performance** This is a more frequent occurrence (1 to 2% of students per term). 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. This typically occurs when a student is not academically well-prepared for organic and struggles on exams 1 and 2, but shows a high amount of growth and achieves mastery in the second half of the course. Here's what we look for:

- a bad outlier of an exam (a normalized score about one standard deviation less than the student's normalized average)
- a positive trend in exam performance (a positive slope of ~ 0.4 std dev/exam throughout the course)
- a consistent trend of performance (a bad 1st or 2nd exam, not a bad 3rd or 4th exam)
- a good final exam performance (at least better than the exam performance)

or

- a A for anyone scoring over 90 % on the final (happened several times for students not already getting an A by their total score, but we're waiting and cheering for it to happen many more times)

There is absolutely no need to email us to argue that you are a student deserving a higher grade. We will look at every student grade individually and in context of all of the course performances. Emailing us will likely not alter our assessment of your performance and your assigned letter grade.

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. The TAs and us had to deal with several cases of academic misconduct last year and it was pretty unpleasant and heartbreaking all around. 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 IntegrityLinks to an external site.

From our experience, the two most common forms of academic misconduct in this course are related to re-grades and sharing information about quizzes/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 or whatever during quiz/exam is bad, very bad.
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 or quiz, sit far enough away from anyone else and in a posture that no proctor can think you are cheating. Make sure all of 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 possible repercussions. We're sure of it. We've checked.

Recommended and Required Course Materials

Required:
Organic Chemistry 6th edition by Marc Loudon

Recommended:
Solution Manual Organic Chemistry 6th 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. (Brian likes one of the more expensive one simply for the nice snap/pop sound it makes when in use. Aubrey prefers the one in the green box that gives you construction flexibility.)

Letters of Recommendation

As you can imagine, between all the lectures (Chem 343/345) and 3 laboratory sessions (Chem 344) annually, we get a lot of requests for letters of recommendation. We are happy to help you in your future plans when we are able to, but there are a few things we'd like you to consider before making a letter of recommendation request.
1) Good letters of recommendation tell a good story. What story can we tell about you? How well do we know you? Were you an office hour regular? Did you do particularly well in the course? Did you show dramatic improvement from beginning to end? Did we get to see your success in more than one course? Sometimes students want to get letters from instructors that they appreciated or from instructors of courses that they enjoyed. These are not bad things, but they

should not be the primary concern when choosing someone to ask for a letter of recommendation. Try to get letters from instructors who can paint you in the best possible light.
2) Please prepare a detailed explanation of what you need the letter for, and when you will need it by. We will likely need significant prompting and prodding to get the letter written/submitted. Plenty of lead time is always appreciated.
3) This is a large course with many students. More detailed, and thus more effective, letters generally come from research advisors and instructors of much smaller courses. In order for us to tell a good story, we will need to know you and how you think via office hours and a high-quality performance in the lecture course.

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 [us] 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 [We], 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.phpLinks to an external site.

Diversity and Inclusion

Institutional statement on diversity: "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/Links to an external site.

Course Schedule – Chemistry 345 Lecture 1, 2, & 5

Monday	*Wednesday*	*Friday*	*Problem Set and Discussion*
Jan 20 **No Class** **MLK Jr Day**	**Jan 22** Chapter 12 IR Spectroscopy and Mass Spectrometry 12.1 – 12.6	**Jan 24** Chapter 13 NMR Spectroscopy 13.1 – 13.12	**PS 12** **Disc 1**
Jan 27 Chapter 13 NMR Spectroscopy 13.1 – 13.12	**Jan 29*** Chapter 13 NMR Spectroscopy 13.1 – 13.12	**Jan 31** Chapter 12-15 Aromaticity 15.7	**PS 13** **Disc 2**
Feb 3 Chapter 16 Chemistry of Benzene and Its Derivatives 16.1 – 16.4	**Feb 5** Chapter 16 Chemistry of Benzene and Its Derivatives 16.1 – 16.4	**Feb 7** Chapter 16 Chemistry of Benzene and Its Derivatives 16.5	**PS 16** **Quiz 1 (12, 13, & 16)** **Disc 3**
Feb 10 Chapter 16 Chemistry of Benzene and Its Derivatives 16.6	**Feb 12** Chapter 17 Allylic and Benzylic Reactivity 17.1 – 17.2	**Feb 14**** **Exam Review 1** **(12, 13, 15, & 16)**	**PS 16, PS 17** **Disc 4**
Feb 17 Chapter 17 Allylic and Benzylic Reactivity **Exam 1 5:30-7:00 pm** **Monday, Feb 17th** 17.3 – 17.5	**Feb 19** Chapter 18 Chemistry of Aryl Halides, Vinylic Halides and Phenols 18.1 – 18.4	**Feb 21** Chapter 18 Chemistry of Aryl Halides, Vinylic Halides and Phenols 18.5 – 18.9	**PS 17, PS 18** **Disc 5**
Feb 24 Chapter 19 Chemistry of Aldehydes and Ketones 19.1 – 19.7	**Feb 26** Chapter 19 Chemistry of Aldehydes and Ketones 19.8 – 19.9	**Feb 28** Chapter 19 Chemistry of Aldehydes and Ketones 19.10 – 19.11	**PS 19** **Quiz 2 (17 – 18)** **Disc 6**
Mar 2 Chapter 19 Chemistry of Aldehydes and Ketones 19.12 – 19.14	**Mar 4** Chapter 20 Chemistry of Carboxylic Acids 20.1 – 20.8	**Mar 6** Chapter 20 Chemistry of Carboxylic Acids 20.9 – 20.11	**PS 20** **Disc 7**

Mar 9 **Exam Review 2**	**Mar 11** Chapter 21 Chemistry of Carboxylic Acid Derivatives **(17 – 20)** **Exam 2 5:30-7:00 pm** **Wednesday, Mar 11th** 21.1 – 21.7	**Mar 13** Chapter 21 Chemistry of Carboxylic Acid Derivatives 21.8 – 21.9	**PS 21** **Disc 8**
Mar 16 **Spring Break**	**Mar 18** **Spring Break**	**Mar 20** **Spring Break**	**Spring Break**
Mar 23 Chapter 21 Chemistry of Carboxylic Acid Derivatives 21.10 – 21.11	**Mar 25** Chapter 22 Chemistry of Enolates, Enols, and α,β-Unsaturated Carbonyl Compound 22.1 – 22.2	**Mar 27†** Chapter 22 Chemistry of Enolates, Enols, and α,β-Unsaturated Carbonyl Compounds s 22.1 – 22.3	**PS 21, PS 22** **Disc 9**
Mar 30 Chapter 22 Chemistry of Enolates, Enols, and α,β-Unsaturated Carbonyl Compounds 22.4 – 22.6	**Apr 1** Chapter 22 Chemistry of Enolates, Enols, and α,β-Unsaturated Carbonyl Compounds 22.7 – 22.12	**Apr 3** Chapter 22/Chapter 23 Chemistry of Amines 23.1 – 23.8	**PS 22, PS 23** **Quiz 3 (21 – 22)** **Disc 10**
Apr 6 Chapter 23 Chemistry of Amines 23.8 – 23.10	**Apr 8** Chapter 23 Chemistry of Amines 23.11 – 23.12	**Apr 10** Chapter 23 Chemistry of Amines 23.11 – 23.12	**PS 23** **Disc 11**
Apr 13 Chapter 26 Aromatic Heterocycles 26.1 – 26.3	**Apr 15** Chapter 26 Aromatic Heterocycles 26.4	**Apr 17** **Exam Review 3**	**PS 26** **Disc 12**
Apr 20 Chapter 28 Pericyclic Reactions **(21 – 23, 25)** **Exam 3 5:30-7:00 pm** **Monday, Apr 20th** 28.1 – 28.2	**Apr 22** Chapter 28 Pericyclic Reactions 28.3	**Apr 24** Chapter 28 Pericyclic Reactions 28.4	**PS 28** **Disc 13**

Apr 27	Apr 29	May 1	PS 24, 27
Chapter 28	Chapter 24	Chapter 27	Disc 14
Pericyclic Reactions	Carbohydrates	Peptides	
28.4 - 28.6	24	27	

*Last day to drop or add courses without penalty, permission, and transcript record.
**Last Day for 50% tuition adjustment on dropped classes.
†Last day to drop courses.

	Wednesday	Thursday	Friday
Section	401, 403, 404	402	405, 406, 407, 408, 421, 422, 423, 424, 425, 426, 427, 428, 471, 472, 473, 474, 475, 476, 477, 478
Quiz 1	*2-5-2020*	*2-6-2020*	*2-7-2020*
Quiz 2	*2-26-2020*	*2-27-2020*	*2-28-2020*
Quiz 3	*4-1-2020*	*4-2-2020*	*4-3-2020*

Final Exams:

Lecture 1 (Martell): Friday, May 8th, 7:45 AM – 9:45 AM

Lecture 2 (Stowe): Wednesday, May 6th, 10:05 AM – 12:05 PM

Lecture 5 (Esselman): Friday, May 8th, 12:25 PM – 2:25 PM