Chem 343-3 Fall 2016 Syllabus

Instructor: Dr. Brian J. Esselman

Office: Room B324A Chemistry (enter through B324)

Office Phone: 608-262-1479

Office Hours: Mon 3:30 - 4:30 pm, Thurs 2:30 - 3:30 pm

email: besselman@chem.wisc.edu, brian.esselman@wisc.edu, or esselman@wisc.edu

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.

Teaching and Learning Philosophy

"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 kewn 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. I 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. In the compressed summer schedule, you cannot afford to take a day completely off. 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 don't have 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 naieve 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 acheive 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 committment 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 disussing 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. I can't motivate you. Your TAs cannot motivate you. Motivation must come from within!

Where the Learning Happens

Each phase of learning below is important for your success. Do not overlook any of them.

Lecture / Lecture Videos

The purpose of lecture, or a lecture video, 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. Lecture videos 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 lecture videos alone. The videos 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 each lecture from Fall 2015, feel free to view those videos in place of the Fall 2016 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 common misconceptions. 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 (5ht or 6th edition) is a great book chosen for its clear explanation and great practice problems. I recommend reading each chapter before or after each lecture video, 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 should not be over-looked as a valuable tool. I 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 oppurtunity 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 I are highly concerned about your learning. Unfortunately, there are 200+ 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. In the fall term, there two to three lecturer office hours per week. The organic teaching assistants hold office hours twice a week in B317. You are encouraged to attend as often as you need and see any TA. 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

I get a lot of emails, and I lose them in my inbox more than I'd like. In order to help bring your email to my attention, please include Chem 343/344/345 in the subject line of all emails you send me. Email should be limited to logisitical, 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 myself. 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 myself. 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 Learn@UW.

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 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.

Grading and Grading Philosophy

Chemistry 343 Grading - Fall 2016

There are approximately 575 points available in this course. There are three 25 pt quizzes, three 100 pt exams, 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. All points have equal value. The final letter grades based upon 575 course points will reflect the historic averages of Chem 343 with a course GPA near 2.74. (see the 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

200 pts. Final Exam

There are NO planned makeup quizzes or exams. You must attend your discussion section on the dates of the quizzes/exams.

Grading Philosophy

Grades are important to you, to me, 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. I 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 term and 100+ in the summer term. The final exam counts for 200 of 575 course points weighting it double the other exams. This favors students who have improved in their understanding and preparation as the course progresses. I endeavor to write exams that challenge students at all levels of learning and provide a wide grade distribution. My 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. I will always try to separate those that are trying to memorize patterns or use mneumonic devices from those who understand the content in terms of reactivity, structures, molecular orbitals, pKa's, etc.

Every semester, I 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 my mind, about how grading is supposed to work. Grading in my lecture of Chem 343/345 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 I like/dislike you*
5. *Needing a better grade for {insert school type here} school admissions*
6. *Wanting to take a course for which Chem 343/345 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 me to attempt to write the best exam that I 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 343/345). 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 343 term. The numbers in parenthesis are the normalized grade breaks.

I 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 2.74.

There are two times that I will deviate from this grading formula and the historic GPA.

1) **A truly exceptional lecture section** This is likely to be a very rare occurrence. But if the TAs and I 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, I will occasionally

raise the students grade by 1/2 a letter grade to acknowledge that acheivement. 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 acheives mastery in the second half of the course. Here's what I look for:

- a bad outlier of an exam (a normalized score about one standard deviation less then 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 (This has happened exactly once for a student not already getting an A, but I'm waiting and cheering for it to happen again!)

Exam Accommodations & Conflicts

McBurney VISA Accommodations

If you need accommodations for lecture, quizzes, and/or exams regarding a VISA obtained from the McBurney Disability Resource Center, please provide us a copy of your VISA as soon as possible. Please send an email to your discussion TA and myself with your VISA attached as a pdf with the subject line "[Chem 343] McBurney VISA accomodations." We will make arrangements with you, most likely using the undergraduate chemistry office to assist with exam/quiz accomodations.

Exam Conflicts

If you have a conflict with a regularly scheduled university course or exam for other university course, we will do our best to provide you with an alternate exam time. For each exam, however, it must be taken on the day that is scheduled for that exam. Please see the course schedule for all exam dates. About two weeks prior to the first exam, we will contact you requesting information about any exam conflicts. We will contact you for conflicts with future exams about two weeks prior to each of those exams as well. Please do not email us before we request the information, but please do respond promptly when the request email is sent.

Changing Lecture/ Discussion Enrollment

You must be enrolled in the discussion you attend. If you would like to change your enrollment it will be challenging due to the high enrollment and lack of additional space in Chem 343.

If you do wish to change sections, Laboratory Director Dr. Nick Hill can advise you. He handles enrollment issues for the organic division. Below is the information he requests along with any emails he receives regarding enrollment. It might be that the swap you request is not possible, but he will do his best to help facilitate the change.

To: Dr. Nick Hill (hill@chem.wisc.edu)

Required Info:

1) Your current lecture and discussion session (provide the 3XX number, not the day/time).

2) The discussion session that you want (provide the 3XX number).

3) Your student ID number.

4) Reason for needing to switch.

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. (I like one of the more expensive one simply for the nice snap/pop sound it makes when in use.)

ChemDraw (ChemDraw 15 Download Instructions)

As a UW student, you get ChemDraw free! This is pretty awesome! I highly recommend downloading the software and using it whenever you are sending an email question to a classmate, myself, or a TA. It is the same software that we use to draw all of the molecules for your problem sets, quizzes, and exams.

Academic Misconduct

Dealing with academic misconduct is the most painful/sad/annoying part of my 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 I had to deal with two 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 Integrity

From my 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 if they haven't taken the quiz.

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 whaterver 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 I'm stupid and I might be... but I'm 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. I'm sure of it. I've checked.

Course Schedule – Chemistry 343 Lecture 3

Monday	*Wednesday*	*Friday*	*Discussion*
Sept 5 Labor Day	**Sept 7** Chapter 1 Bonding and Structure 1.1 – 1.2	**Sept 9** Chapter 1 Bonding and Structure 1.3 – 1.9	Discussion Activity 1
Sept 12 Chapter 1 /2 Bonding and Alkanes 2.1 – 2.5	**Sept 14*** Chapter 2 Alkanes 2.6 – 2.9	**Sept 16** Chapter 3 Acids and Bases 3.1 – 3.4	Discussion Activity 2 **Quiz 1 (Ch 1-2)**
Sept 19 Chapter 3 Acids and Bases 3.1 – 3.4	**Sept 21** Chapter 3 Acids and Bases 3.1 – 3.4	**Sept 23** Chapter 4 Alkenes 4.1 – 4.5	Discussion Activity 3 **Quiz 1 (Ch 1-2)**
Sept 26 Chapter 4 Alkenes 4.6 – 4.8	**Sept 28** Chapter 4 Alkenes 4.9	**Sept 30**** Chapter 5 Addition Reactions of Alkenes 5.1 – 5.3	Exam Review 1 Discussion Activity 4
Oct 3 Review for Exam 1 **Exam 1 5:45 – 7:15 pm**	**Oct 5** Chapter 5 Addition Reactions of Alkenes 5.4 – 5.5	**Oct 7** Chapter 5 Addition Reactions of Alkenes 5.6 – 5.8	Discussion Activity 5
Oct 10 Chapter 6 Principles of Stereochemistry 6.1 – 6.3	**Oct 12** Chapter 6 Principles of Stereochemistry 6.4 – 6.10	**Oct 14** Chapter 6 Principles of Stereochemistry 7.7 – 7.8	Discussion Activity 6
Oct 17 Chapter 7 Cyclic Compounds and Stereochemistry of Reactions 7.1 – 7.5	**Oct 19** Chapter 7 Cyclic Compounds and Stereochemistry of Reactions 7.6	**Oct 21** Chapter 7 Cyclic Compounds and Stereochemistry of Reactions	Discussion Activity 7 **Quiz 2 (Ch 5 – 6)**

Oct 24 Chapter 8 Introduction to Alkyl Halides, Alcohols, Ethers, Thiols, and Sulfides 8.1 – 8.4	**Oct 26** Chapter 8 Introduction to Alkyl Halides, Alcohols, Ethers, Thiols, and Sulfides 8.5 – 8.8	**Oct 28** Chapter 9 Chemistry of Alkyl Halides 9.1 – 9.4	Exam Review 2 Discussion Activity 8
Oct 31 Review for Exam 2 **Exam 2 5:45 – 7:15 pm**	**Nov 2** Chapter 9 Chemistry of Alkyl Halides 9.5 – 9.7	**Nov 4†** Chapter 9 Chemistry of Alkyl Halides 9.8 – 9.10	Discussion Activity 9
Nov 7 Chapter 9 Chemistry of Alkyl Halides	**Nov 9** Chapter 10 Chemistry of Alcohols and Thiols 10.1 – 10.3	**Nov 11** Chapter 10 Chemistry of Alcohols and Thiols 10.4 – 10.5	Discussion Activity 10
Nov 14 Chapter 10 Chemistry of Alcohols and Thiols 10.6 – 10.13	**Nov 16** Chapter 11 Chemistry of Ethers, Epoxides, Glycols, and Sulfides 11.1 – 11.2	**Nov 18** Chapter 11 Chemistry of Ethers, Epoxides, Glycols, and Sulfides 11.3 – 11.4	Discussion Activity 11 **Quiz 3 (Ch 9 – 10)**
Nov 21 Chapter 11 Chemistry of Ethers, Epoxides, Glycols, and Sulfides 11.5 – 11.11	**Nov 23** Chapter 14 Chemistry of Alkynes 14.1 – 14.4	**Nov 25** **Thanksgiving Break**	Discussion Activity 12
Nov 28 Chapter 14 Chemistry of Alkynes 14.5 – 14.6	**Nov 30** Chapter 14 Chemistry of Alkynes 14.7 – 14.10	**Dec 2** Chapter 15 Dienes, Resonance, and Aromaticity 14.7 – 14.10	Exam Review 3 Discussion Activity 12
Dec 5 Review for Exam 3 **Exam 3 5:45 – 7:15 pm**	**Dec 7** Chapter 1-15 Semester Review Lecture	**Dec 9** Chapter 15 Dienes, Resonance, and Aromaticity 15.7 – 15.8	Problem Set 15 & Exam Review 4

Dec 12	Dec 14
Chapter 15 Dienes, Resonance, and Aromaticity 15.7 – 15.8	Q &A Review for Final Exam

Final Exam Time and Location TBD

* Last day to drop courses or withdraw without notation on transcript.
**Last Day for 50% tuition adjustment on dropped classes.
†Last Day to Drop courses.

	Monday	Tuesday	Wednesday	Thursday	Friday
Section	304, 305, 308 309, 310, 321 322, 323, 324	301, 302, 303 306, 307, 311 312, 325, 326 327, 328	341, 342, 343	344, 345, 346 347	348
Quiz 1	9-19-2016	9-20-2016	9-14-2016	9-15-2016	9-16-2016
Quiz 2	10-17-2016	10-18-2016	10-19-2016	10-20-2016	10-21-2016
Quiz 3	11-14-2016	11-15-2016	11-16-2016	11-17-2016	11-18-2016

Course schedule is subject to change.