CHEM 345: Intermediate Organic Chemistry

Contact Information
Matt (Doc) Bowman
262-2519
Chemistry 5232
bowman@chem.wisc.edu

3 credits: Lecture 75 min four times per week
Discussion 75 min twice per week

Lecture 1:
MTWR 11:45-1:00 PM
Room: Chemistry 1361

Office Hours
Mondays 2:00-4:00 PM  Chem 1371
Tuesdays 9-11:00 AM  Chem 1371
(or by appointment)

Teaching Assistants
Michelle Fleetwood         fleetwood@wisc.edu
Minxue Huang               mhuang58@wisc.edu
Minsoo Ju                  ju3@wisc.edu

Piled Higher and Deeper by Jorge Cham

IT'S IN THE SYLLABUS
This message brought to you by every instructor that ever lived.
www.phdcomics.com

Title: "It's in the syllabus" - originally published 5/10/2013
Lectures
There are 24 usable days during a summer semester (compared to about 40 in a typical semester). To compensate, lectures are 75 minutes long. Saturation will unfortunately happen. I will try to break up the long lectures as much as possible. Moreover, they are on consecutive days. It does not allow much time for material to sink in, but plenty of time to burn out (me, especially). To be frank, the forty days in a typical semester are not enough to thoroughly cover what needs to be covered. My goal is to get you to the point where you can look at a reaction (rather it be in biochemistry or advanced synthetic chemistry or polymer science or 11th century Nordic studies) and be able to work it out. I will not cover every single reaction in organic chemistry because there are just too many of them. I have selected the most important ones (and those deemed by others as traditional organic reactions) and have done my best to organize them in a somewhat coherent manner. We have done that pretty well in weeks 1-6. Weeks seven and eight are a hodgepodge set of reactions that are important (some downright cool like spiropyrans and Bullvalene) but are different enough from the other reactions discussed that an adequate segue is not possible.

Due to the large amount of material to cover, I will be going quite quickly. Some of the details will be left for the TAs to go over in discussion. Please feel free to ask questions. Some answers might be better left after class or in office hours, but still ask them. Interrupt me if necessary.
Quite a few of my course evaluations in the past stated that they never read or opened the book. I do not recommend this course of action, but I do understand it. I follow a different order than the textbook, but a majority of the material from Chapters 12-13, 16-27, and some reactions and concepts outside the book will be covered. The course schedule has page numbers containing relevant information from the text along with key words that you can use in an index of any organic textbook for other explanations. Copies of the textbook are on reserve in the chemistry library for you to read. Instructors of Chem 344 may expect you to have this textbook for that lab course as well. Exams and quizzes are based on the material from lectures, power point tutorials, video lectures, discussion sections, and problem sets. The book is there to provide alternative explanations/approaches to help you understand the material covered.

**Video lectures**
Learn@UW will host a variety of video lectures. These are typically 5-10 minutes long. They are there to highlight important concepts or clarify points in organic chemistry. I am told that the VLC media player works quite well with these videos if they are downloaded first.

**Problem sets**
There will be a problem set for each lecture day except for the day of an exam or the day preceding an exam. These problem sets will not be graded and are there to help you out. Keys will be available by the next lecture day on Learn@UW.

**Practice exams**
I will make at least three practice exams available for each exam. The exams will be very similar to the practice exams in terms of directions. Answer keys for these exams will also be available. **DO NOT SIMPLY LOOK AT THE KEY. ATTEMPT THE PRACTICE EXAM FIRST. HAVE ANOTHER STUDENT IN THE CLASS GRADE IT AS YOU GRADE THEIRS. DISCUSS DISCREPANCIES AND ONLY THEN LOOK AT THE KEY.**
Academic Misconduct

You are all adults. There is no reason to cheat, but plenty of reasons not to. An F in the course is one of many reasons. Cheat sheets, notes, textbooks, someone else’s paper, iPods, cell phones, a crystal ball bearing the disembodied spirit of the Great Organic Chemist R. B. Woodward, etc... are prohibited from the exam. Use of these prohibited materials during an exam will result in a zero for the exam score. You will only be allowed pencils/pens and model kits for the exams.

A percentage of the exams will be photocopied. Should an answer be changed and submitted for a regrading, academic misconduct has occurred and the perpetrator will receive an F in the course and be reported to the Dean’s office. Forgetting that you changed an answer and submitting it for a regrade is still academic misconduct.

I have been advised by the staff (some of them legal staff) that I cannot use pepper spray in dealing with wandering eyes. I will try to remember to remind the TAs proctoring the exams of that advice. If the TAs suspect anyone of this condition, they will announce for everyone to keep their eyes on their paper. If the problem persists, the TAs have the discretionary power to move any student suspected during an exam. You must be above reproach. Exams of adjacent students will be examined, and should there be ample evidence, lower exam scores including zeroes will be given to the perpetrator. Please fight against wandering eyes. Please shield your paper the best you can to remove any temptation from others.

Since not all students will take the exam at the same time, it is theoretically possible for some students to receive advance knowledge of a quiz/exam. Students leaking test/quiz questions to other students that have not taken the exam is also regarded as academic misconduct and shall be dealt with accordingly.

THERE ARE NO ACCEPTABLE EXCUSES FOR ACADEMIC MISCONDUCT. I HAVE CAUGHT SEVERAL STUDENTS AND THEY NOW HAVE A DARK MARK ON THEIR PERMANENT RECORD. I HAVE NO SYMPATHY FOR THOSE THAT CHOOSE TO CHEAT.
Grading (As transparent as I can be)
The grade will be based on exams and quizzes.
The maximum number of points possible will be **530 points**.
(There will be more than that available).

**ABCDF Simply Stated**
If you earn 90% of the total points, you will receive an A.
If you earn 77% of the total points, you will receive at least a B.
If you earn 57% of the total points, you will receive at least a C.
If you earn 40% of the total points, you will receive at least a D.

So if you receive an 88%, this can be an A, AB, or B depending on the final distribution. 89.5% is considered to be 90%
89.4999999999999999999999999999999999999999999999999999999999% is considered to be 89%. That is just how it is. **Don’t blame me, blame math.**

The actual lines are determined by a mixture of factors: final distribution, the historical grade history of all of the sections of Chem 345, the phase of the moon, where the darts end up on the board, improvement in the course, etc... There are a few things that I can say with certainty:
The 40% line is a hard line. Any score below that will be an F. **Regardless what exam averages are.**
The C line will never be lowered below 50%. A 52% may be a C or D. The AB range and BC range is very small. Historically for organic chemistry it is small. For my classes, it has typically been one or two percentage points.

The cutoffs represented above are the curve. This is based on several semesters of organic chemistry, so you know how you are doing throughout the semester. The lines may dip a little, but not much. Especially the A line. The last few times I’ve taught, it has barely budged. Please do not be surprised if your total points are 85% and your letter grade is a B. If the lines are lowered, they will be lowered so that **25% of the class will receive at least an AB and at least 55% of the class will receive at least a BC. The DF line will not move and the C line will never dip below 50%.**

**The Final Cutoffs will not be released.** There will always be someone with the highest AB, highest B, and so on. That is the way of the world. It is conceivable that someone will miss a cutoff by one point. We will try to choose the cutoffs so that does not happen. **There will not be any extra credit offered.**
Exams:
There are three regular exams plus the final exam. Each regular exam will be worth 100 points. The regular exams will be held during class on the following days: June 27, July 11, and July 25.

You may not drop any exam.
The final exam is worth 200 points and cannot be dropped. It will take place on Thursday, August 4. You will have two hours to take this exam, so that means there will be two timeslots: 11:00 am to 1:00 pm or 11:45 am to 1:45 pm. If neither of these times will work for you, please contact Matt immediately.

Exams will be graded and returned at the next lecture. PLEASE, PLEASE, PLEASE PICK THEM UP. LOOK AT THEM. MAKE SURE THE SCORES WERE ENTERED CORRECTLY AND THAT YOU UNDERSTAND WHAT YOU MISSED.

Exam regrade policy: Mistakes in exam grading will occasionally be made. You will have one week after exams are returned to submit the entire exam for regrading. Keep in mind, since mistakes may or may not be in your favor, the exam grade can actually be lowered. All decisions on the regrades are final. DO NOT UNDER ANY CIRCUMSTANCES CHANGE AN ANSWER AND SUBMIT IT FOR A REGRADE. THIS IS ACADEMIC MISCONDUCT AND WILL BE DEALT WITH HARSHLY. Oh, out of principle, I refuse any exam regrade requests that use the word “deserve.”

Regrade submittal procedure: Email Matt Bowman that you are submitting an exam for a regrade. Write on the exam score sheet which problem needs to be regraded and why. DO NOT CHANGE ANYTHING ELSE. Place the exam in Matt Bowman’s mailbox in Chemistry 1146.

Any student that falls just below a cutoff will have their final exam automatically regraded.
Exam Penalties:
Though technically, the regular exams are worth 100 points apiece and
the final exam is worth 200 points, it is possible to score a negative
value on the exam. There are four exam penalties that you should be
aware of and **AVOID** at all costs. **CONSIDER YOURSELF WARNED.**

**Texas Carbon Penalty (TCP):** If one of your answers has a carbon
drawn that has five bonds to it, that is an affront to organic chemistry.
Such a blasphemous creation will result in a five point penalty in
addition to missing any points on that question.

**Acid-Base Arrow Question (ABAQ):** To describe what is happening
in a reaction, chemists used the curved arrow notation. This shows
the movement of electrons. The most important example of this is in
acid-base reactions. I will show you the answer to this question along
with examples of wrong answers. **THIS IS THE ONE OF THE MOST
FUNDAMENTAL CONCEPTS IN ORGANIC CHEMISTRY.** It is used in
343, 345, 344, biochemistry, etc... If you cannot answer this question,
then -5 points.

**Name Penalty:** The most important question on any exam is the one
that has you fill in the following blank:
Name:____________
Yet, the number of people that do not do this are staggering. (8% of
the exams last spring left this blank or missed it).
EIGHT PERCENT!!!!!!!! There is no excuse for this. **THIS IS YOUR
WARNING!**

1.) You will need to write your name (First and Last) on the name
line appearing on the scoresheet and the page with problem
one.
2.) You will need to circle your TA’s name on the scoresheet.
3.) You will need to write the first two letters of your last name
(legibly) in a box. (**NOT INITIALS**)

You must do all three of these to avoid the Name penalty. This penalty
will be two points.

**Time Penalty:** Writing on the exam before the TA’s say start or after
time is called can be a five point penalty.
After that whole exam penalty rant, here is a photo of a bunny.

Drawing carbons with 5 bonds are trademark acts of monsters and bunny-haters.
Take Home Quizzes:

There will be four take-home quizzes worth 10 points each. They will be handed out on June 16, June 30, July 14, and July 28. You can drop one quiz. They will be due the following Tuesday in Matt Bowman’s mailbox in Chemistry 1146. The take home quiz is open book, open note, open classmate, but is not open TA/tutor/me. By open classmate I mean it is okay to converse with one another, but it is absolutely NOT okay to dissect each other or figure out answers by the use of haruspicy. In any event, I suggest you try the quiz on your own first.

Letter of Recommendation Policee:

I try to teach about ~ 802.5 undergraduates each year. Unfortunately I won't be able to get to know all of you. That makes writing detailed letters nearly impossible. Rec letters from me will include grade and class rank and my impression of you. I can write them but I highly suggest that you get a rec from a prof in a small, higher level course or better yet a prof that you work four in a research group. They are more likely to give a better and more full depiction of you and will likely use spell check.
Study tips

Between 1-4 hours after each lecture, start the problem set. **Do not wait for the answer key to be posted to start the problem set.** Between 4-8 hours after each lecture, recopy your notes for that lecture. Look for the patterns.

Organic chemistry is very cumulative. Once you start, you cannot stop. (Oh and you need to start right away). Material on exam I will be tested again on exams II, III, IV, and the Final. Likewise, with subsequent topics. The problem sets will not only cover current material but past material as well.

In the course schedule, the relevant page numbers from the text are listed. The exams are going to be based on the material from the lectures, lecture notes, problem sets, and discussions. The text is there to help you understand the material. I strongly suggest that you read the relevant pages either before or after lecture.

Make flash cards. Carry these with you wherever you go. Flip through them throughout each day.

A very good way to study is to study in groups. Multiple problem sets will be available to work on along with several practice exams. I suggest you form groups to study in. You can go about this by talking to classmates in discussion, etc... The sooner you set up these groups the better off you will be. If you wish a classroom to meet in, I can see about reserving one for you.

The best way to understand organic chemistry is constant practice. The TA's and I will do our best to provide quite a bit of practice in the form of problem sets and practice exams. Should you desire more practice, there are the problems at the end of each chapter in the book as well as multiple websites. Should you find a discrepancy in what the TA's, book, internet, or myself, please bring it to our attention immediately. It may be a case of a subtlety, an outright error, or an over generalization. Regardless, we'll try to explain the discrepancy.
Discussion Sections
Due to the generous funding by the Madison Initiative for Undergraduates and the College of Letters and Science, we are able to offer discussion sections. There is a lot of material to cover, and little time to cover it. Sometimes, what I can briefly cover in the lecture will be better covered in your discussion section. The TAs in this course have experience in teaching organic chemistry, through labs, discussion sections, and tutoring. They may have a different way of looking at a topic. As a result, if you do not understand something from me, you may understand it from them. All discussion sections are held in the chemistry building.

Section 301 WR 8:55-10:10 B355 Michelle Fleetwood
Section 302 WR 10:20-11:35 B355 Michelle Fleetwood
Section 303 WR 10:20-11:35 B357 Minsoo Ju
Section 304 TW 2:35-3:50 B355 Minxue Huang
Section 305 TW 1:10-2:25 2377 Minxue Huang
Section 306 TW 2:35-3:50 B357 Minsoo Ju

Proper use of discussion sections:
Make mistakes. People learn from mistakes. Be vocal. Go to the front of the board and write your answers. If they are correct, congratulations. If they are incorrect, all the better as it gives an opportunity to learn something and help out your fellow classmates. Remember, you are only really judged by your exams. Not your peers. Do not be afraid of making mistakes. Better to make them in discussion than on an exam. There are many correct answers in organic chemistry (and many more incorrect ones). The TA’s are there to give insight on the nuances of organic chemistry.

Get to know your fellow students. Set up study sessions with them. Try problems from problem sets independently and then consult on the answers before looking at the answer key. Try teaching each other.

Improper use of discussion sections:
Just sitting there.
**Additional Help**

In addition to the TA's and my office hours, there are a couple of places where you can find assistance.

The Organic TA Office is in room B317. There is a schedule posted outside the door of various TA's and when they will be available to help you. Feel free to ask any of them for help even if they are not a TA for Chem 345.

Alpha Chi Sigma Chemistry Fraternity has offered tutoring for chemistry classes in the past. Please contact them about their current help sessions.

GUTS offers tutors as well. They can be contacted at:
Student Activity Center
Office #4413
333 E Campus Mall
Madison, WI 53715-1380
Phone: 608-263-5666
E-mail: guts@rso.wisc.edu
http://guts.studentorg.wisc.edu/

The College of Engineering Undergraduate Learning Center is offering drop in tutoring this summer Monday through Thursday from 3:30-6 pm in Room 405 Wendt Commons. Hours are available on their Website http://ulc.engr.wisc.edu

There are also private tutors available. The General Chemistry Office (Room 1328) has a list of tutors and prices. If you do work with a tutor, please let them know that I post notes, problem sets, practice exams, and tutorials on Learn@UW. Anyone can access the Learn@UW Chem 345 site by using the visitor login. They should go to learnuw.wisc.edu and click on visitor login.

**USER NAME:** orgchem.pseudo
**PASSWORD:** orgchem.pseudo
They will be able to access any handouts using that login.
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| 13C NMR and IR pg 569-590  
NMR Chemical Shift and Integration pg 611-626 | NMR Chemical Shift and Integration and Splitting/Coupling pg 627-665  
Grignards and Sodium Borohydride pg 970-977 | NMR Chemical Shift and Integration and Splitting/Coupling pg 627-665  
Cyanohydrin and Hydrate Formation pg 963-969, Acetal/Hemiacetal formation pg 978-983 | Exam One | | |
| 20     | 21      | 22        | 23       | 24     | 25       | 26     |
| Acetal/Hemiacetal formation pg 978-983  
Imines/Reductive Amination pg 984-986, 1199-1201  
Wittig Reaction pg. 990-994 | Imines/Reductive Amination pg 984-986, 1199-1201  
Clemmensen Wolff-Kishner Reduction pg 988-990 | Rearrangements: Baeyer-Villiger  
Wittig Reaction  
Clemmensen Wolff-Kishner Reduction | | | |
| 27     | 28      | 29        | 30       | 31     | 32       | 33     |
| Exam One | Irreversible Rxns: Carbanions and Hydrides pg 1079, 1083, 1086 | Acyl transfer/RCO2H derivatives pg 1004-1024, 1060-1064  
Acid chlorides anhydrides pg 1024-1027, 1067-1075 | Amides pg 1048-1049, 1053, 1064-1065, 1378-1383, 1425-1426  
Amide Coupling Peptide Synthesis pg. 1391-1399 | | | |

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<td><strong>Exam Two</strong></td>
<td>Tautomerization and Aldol Reaction pg 1103-1113, 1119-1130, 1152-1153</td>
<td>Claisen Condensation Malonic Ester Synthesis Acetoester Synthesis pg 1133-1152, 1030-1032</td>
<td>Conjugate addition, Michael Rxn, Robinson pg 1156-1166</td>
<td>Mannich Reaction Not covered in Loudon</td>
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<td><strong>Umpolung Benzoin Condensation Dithiane Reactions</strong> (Not in book)</td>
<td>Enamine pg 986-987 Cuprates pg 1168-1171</td>
<td>Advanced Organometallics Suzuki, Heck Pg 891-906 Grubbs Pg 907-911</td>
<td>Curtius and Hoffmann Rearrangements</td>
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<td>Nucleophilic Aromatic Substitution pg 885-887, 1342-1345</td>
<td>Pericyclic Reactions pg 1449-1458</td>
<td>Pericyclic Reactions Cycloadditions Diels-Alder Pg 1463-1467</td>
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<td>2 Pericyclic Reactions Sigmatropic Rearrangements pg 1467-1479</td>
<td>3 Review</td>
<td>4 <strong>Final Exam</strong> 11:00-1:00 pm or 11:45-1:45 pm</td>
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Chem 345: Survey

Please answer the following questions so I can adapt Chem 345 to better suit your needs. Please turn this page in to Matt Bowman's mailbox in Chemistry 1146 by June 20.

What is your year? (Freshman, Grad Student, Returning Adult, etc...)

What is your major?

What do you hope to get out of this class? (Besides a good grade)

When is the ideal time for office hours (day and time)?

Do you learn a lot from textbooks?

Who was your 343 instructor?

What other classes are you currently enrolled in?

Have you found electronic homework to be helpful in your other classes?

Did you have a subscription to TopHat?