CHEM 345: Intermediate Organic Chemistry

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

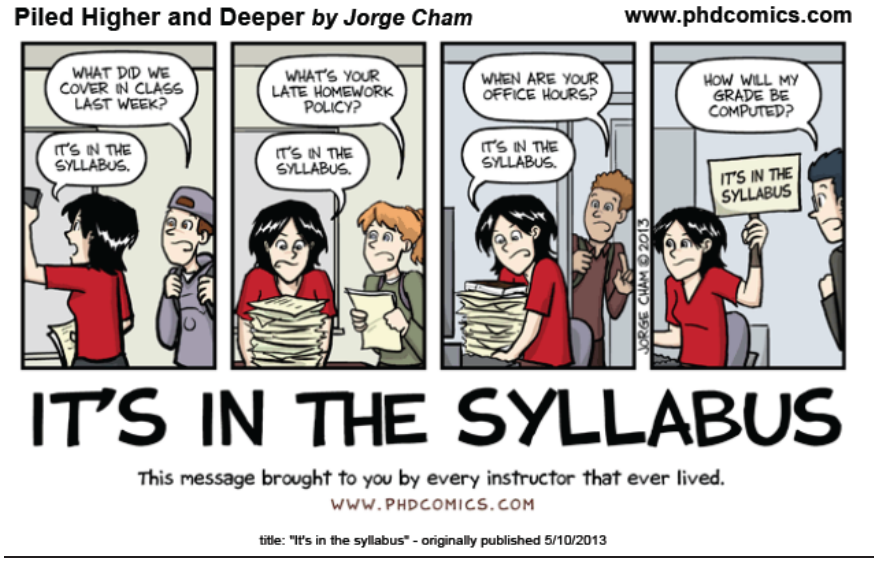
3 credits: Lecture 50 min three times per week
Discussion 50 min once per week

Lecture 1:
MWF 9:55-10:45 AM
Room: Chemistry 1361

Office Hours
Mondays and Wednesdays 2:00-4:30 PM Computer Science 1207
Tuesdays 9:30-11:30 AM Chemistry 1371
(or by appointment)

Teaching Assistants

Minxue Huang	mhuang@chem.wisc.edu
Jon Jaworski	jjaworski@chem.wisc.edu
Brad Jones	bjones@chem.wisc.edu



TA Office Hours

TA office hours are held in Chemistry B317 (Organic TA Office) There is a schedule for various TA office hours posted outside Chem B317. The TA's on the schedule are organic chemists and can answer your questions. They do not have to be assigned to our lecture section. I cover topics in a different order than the other instructors and as such it may take the TA a little bit of time to answer a question. (If someone asks me a question regarding general chemistry, I have to think quite a bit to figure out the correct answer. Though the deer in the headlight look in my eye usually is enough to convince them to find a gen chem TA).

Matt's Schedule:

Matt Bowman this fall is lecturing for two courses Chem 341 and Chem 345. There are 130 students in 341 and 255 students in 345. Matt will try to keep everything straight, but will not remember necessarily which student is in which lecture. These lectures are back to back but in different buildings. Because he has to split his mind to deal with each class, he might not be completely there. There will be weeks in which there will be an exam happening for both classes. At which point, any vestiges of his sanity will disappear and there will be drool, *lots and lots of drool*. (His sanity is not being helped much right now as Matt Bowman is writing in the third person). Please state in any email correspondence with him whether you are in 341 or 345. The answer to your questions may differ significantly. Please be patient. If he does not respond within 12 hours, try again.

Also, he does have a hand in at least one laboratory course (Chem 342) so again please be patient.

Also, the 341 lecture is directly after 345 lecture but in a different building, so when the bell rings, he will be leaving the lecture hall for the next class. He will be unable to answer questions after lecture.

Textbook: *Organic Chemistry*, 6th Ed., Marc Loudon
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 **630 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%. 89.4999999999999999999999999999999999999999999999999999999999999999999999999999999999999999999% 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.
Confusion about curves and AB's and BC's. 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 four regular exams plus the final exam. Each regular exam will be worth 100 points. The regular exams will be Monday evening exams held from 7:15 to 8:45 pm in a lecture hall to be posted on learn@UW on a handout called Exam Information Sheet. Please check your schedules for potential conflicts. The dates are February 8, February 29, April 4, and April 25. Please notify me **ASAP by email** of any conflicts so alternative arrangements can be made. **Notifying me the week of an exam is NOT ADVISABLE as I will be cranky.**

You may not drop any exam.
The final exam is worth 200 points and cannot be dropped.
It will take place on Friday, May 13 **(probably just a coincidence)** from **12:25 pm to 2:25 pm**. Unfortunately, this date is set by the University and I can only grant makeup exams in a VERY limited manner such as two exams within a 24 hour period. Please do not ask for a makeup exam due to airline tickets going home for the summer. I'm afraid that is not listed as a valid reason.

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. You can drop one quiz. They will be due the following week 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.

Leter of Recumdendation Policee:

I try to teech about ~ 802.5 undergarduates each year. Unfortunately I wont be able to get to know all of you. That makes righting detailed rec leters nearly impossible. Rec leters from me will include grade and class rank and my impresion of you. I can rite them but I highly suggest that u git a rec from a prof in a small, higher level curse or bitter yet a prof that u work four in a research groop. 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 401 Fridays	1:20-2:10	2373	Minxue Huang
Section 402 Fridays	2:25-3:15	2311	Minxue Huang
Section 403 Fridays	3:30-4:20	2373	Minxue Huang
Section 404 Fridays	12:05-12:55	B351	Brad Jones
Section 405 Fridays	1:20-2:10	B351	Jon Jaworski
Section 406 Fridays	2:25-3:15	B357	Brad Jones
Section 407 Fridays	3:30-4:20	B357	Jon Jaworski
Section 408 Fridays	4:35-5:25	B357	Jon Jaworski
Section 409 Fridays	1:20-2:10	B357	Brad Jones

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 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.

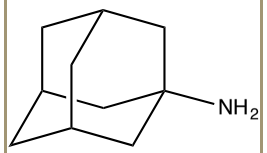
The Organic TA Office is in room B317. There is a schedule posted outside the door of various TA's and when they will be available to help you. Feel free to ask any of them for help even if they are not a TA for Chem 345.

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/

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.

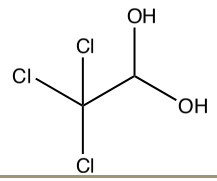
SEPTEMBER 2016 Chem 345

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
Page Numbers correspond to Organic Chemistry 6th Ed. by Loudon and Parise			1	2	3	4
5	6	7 NMR Chemical Shift and Integration pg 611-626	8	9 NMR Chemical Shift and Integration and Splitting/Coupling pg 627-665	10	11
12 NMR Chemical Shift and Integration and Splitting/Coupling pg 627-665	13	14 13C NMR and IR Grignards/Sodium Borohydride pg 569-590, 970-977	15	16 Cyanohydrin and Hydrate Formation Pg 963-969,	17	18
19 Acetal/Hemiacetal formation pg 978-983	20	21 Imines/Reductive Amination pg 984-986, 1199-1201	22	23 Wittig Reaction, Clemmensen Wolff-Kishner pg 988-994	24	25
26 **Review Exam I 7:15-8:45 PM**	27	28 Irreversible Rxns: Carbanions and Hydrides pg 1079-1083, 1086	29	30 Acyl transfer/ RCO2H derivatives pg 1004-1024, 1060-1064		
		**NOTES:** **1-adamantylamine is an antiviral that was once used to treat influenza but no longer. Side effects include "nervousness, anxiety, agitation, insomnia, difficulty in concentrating" according to Wikipedia. Yep, 1-adamantylamine is definitely a molecule to associate with organic chemistry.**				

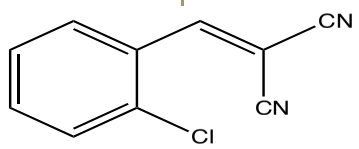
OCTOBER 2016 Chem 345

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
					1	2
3 Acyl transfer/ RCO2H derivatives pg 1004-1024, 1060-1064	4	5 Acid chlorides anhydrides pg 1024-1027, 1067-1075	6	7 Amides pg 1048-1049,1053, 1064-1065, 1378-1383, 1425-1426	8	9
10 Amide Coupling Peptide Synthesis pg. 1391-1399	11	12 Nitrile Chemistry and Strecker Synthesis pg 1065-1067, 1388-1389	13	14 Rearrangements: Baeyer-Villiger Beckmann	15	16
17 **Review Exam II 7:15 pm-8:45 pm**	18	19 EAS: Halogenation and deuteration pg 799-803, 810-820	20	21 EAS: Halogenation and deuteration pg 799-803, 810-820	22	23
24 EAS: Friedel Crafts Vilsmeier-Haak pg 805-810	25	26 EAS: Sulfonation and Nitration pg 803-804, 822-825	27	28 Sandmeyer Reaction pg 1206-1209	29	30
31 Nucleophilic Aromatic Substitution pg 885-887, 1342-1345		**NOTES:**				

NOVEMBER 2016 Chem 345

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
	1	2 Grubbs Alkene Metathesis pg 907-911	3	4 Advanced Organometallics: Suzuki and Heck Rxns pg 891-906	5	6
7 **Review Exam III 7:15 pm-8:45 pm**	8	9 Hoffmann and Curtius Rearrangements pg 1216-1220	10	11 Tautomerization and Aldol Reaction pg 1103-1113, 1119-113,1152-1153	12	13
14 Tautomerization and Aldol Reaction pg 1103-1113, 1119-113,1152-1153	15	16 Claisen pg 1133-1152, 1030-1032	17	18 Conjugate addition, Michael Rxn, Robinson pg 1156-1166	19	20
21 Mannich Not in book (Aldol with an imine electrophile)	22	23 Umpolung Benzoin Condensation Dithiane Reactions (Not in book)	24 **No Classes**	25 **No Classes**	26	27
28 Enamine pg 986-987 Cuprates pg 1168-1171	29	30 **Review Exam IV 7:15 pm-8:45 pm**				
		**NOTES:** **Chloral hydrate is an example of a stable hydrate due to the presence of three electronegative chlorines destabilizing the aldehyde. It is widely used in 1920 crime novels as knockout drops or "Mickies." On a historical basis though, it the the cheap starting material for the infamous insectide DDT, which limited the spread of malaria and of the bald eagle.**				

DECEMBER 2016 Chem 345

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
			1	2 Specialized Bromination pg 841-845, 1113-1118	3	4
5 Pericyclic Reactions pg 1449-1458	6	7 Pericyclic Reactions Cycloadditions Diels Alder pg 1463-1467	8	9 Pericyclic Reactions Electrocyclic Reactions pg 1458-1462	10	11
12 Pericyclic Reactions Sigmatropic Rearrangements pg 1467-1479	13	14 **Review Day**	15	16 **Star Wars premiers (Don't expect much from Matt on this date)**	17	18
19 **Final Exam 12:25-2:25 PM**	20	21	22	23	24	25
26	27	28	29	30	31	
		**CS gas (more commonly known as tear gas) is actually a solid that melts around 93 °C. Typically, it is dissolved in an inert non-flammable solvent such as dichloromethane and packed into cannisters. Upon pulling a pen, a small incendiary vaporizes the solution and spreads it. It acts as a *REVERSIBLE* Michael acceptor to nucleophilic sites around the eyes. This causes the burning sensation.**				

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 September 15.

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?

Do you have a tophat subscription for this semester?

Add these numbers together: