

ORGANIC CHEMISTRY

Professor Kersey Black

Goals

The course will focus on the molecular structure and chemical reactivity of organic compounds. Organic chemistry is a branch of chemistry which provides the foundation for all biological phenomena and is central to the development of new materials, just to name two areas of broad applicability. In this class you will develop your understanding of this area of chemistry and also develop problem solving and learning skills which will prove useful in other contexts. Every person enrolling in this class can succeed. Most of you will find the subject challenging and at times perhaps a bit frustrating, but experience suggests that you will also find satisfying your ultimate mastery of the material.

Course Structure

Your introduction to organic chemistry can be broken into three components:

Content/Information -- to be reviewed and in some cases memorized

Concepts/Principles -- which need to be understood and applied

Problem solving -- the forum for bringing it all together

Modus Operandi

The text presents a clear and systematic introduction to organic chemistry. Therefore,

> your text will serve as the primary source of content in this course.

I may occasionally alter the text's emphasis or perhaps provide alternate explanations.

However, I will not duplicate that presentation of basic content through a "lecture." Rather,

> class time will be used to discuss what you have gleaned from your text and to practice its application in solving problems.

In this way we will address together the other two aspects of the course -- conceptual understanding and problem solving. These areas of your learning are most effectively developed through your active participation in class. Therefore,

> your primary responsibility as a member of this class is to come prepared to participate in discussion, group activities and problem solving exercises in class.

To do this you will need to read the material and work as best you can the problems appropriate to a given section of the text *before* its scheduled time in class. I do not expect mastery after your first time through the material, but I do expect serious engagement in the process. This work is essential to your contributing to our classroom work and to your profiting from the time we spend working together.

Letting the text provide the basic content of the course frees me to help you in ways other than just providing information. Specifically I think I can be of most use to you in helping you develop conceptual understanding and learn the art of solving problems in organic chemistry. Under this structure,

> my responsibility is as guide and resource while you learn organic chemistry.

I will do whatever I can to help you while you work to master the material. I will provide sample exercises, provide context for what you are studying, and I will discuss difficult points from a different perspective than found in the text. As I hope is evident, work in class will follow naturally from your work outside of class with your text and classmates. In this syllabus is a detailed schedule for when chapters are to be discussed. You should always know what you should be working on. If in doubt, please ask questions.

Problems

There is simply no better way to learn organic chemistry than by working lots of problem, and the evaluation of your work through exams will focus on precisely this skill. It follows that we will spend considerable time in class developing your skills together, but you will need to commit to significantly more practice outside of class. Your text is filled with good problems of appropriate difficulty, and working these problems diligently is an excellent method for mastering the material and preparing for exams. Detailed solutions for all of these problems are available in the solution manual. While an excellent resource, this manual is also dangerous. I will caution you at the outset that *it is of no value at all to simply read a problem in the text and then look at the solution in the manual*. To become more skillful you must struggle with working out complete solutions using your text, paper and pencil (yes, paper and pencil) long before consulting the solution manual.

NUTS & BOLTS**Instructors**

Dr. Kersey Black	KSC 230 (x 73091)	Dr. Ramel Romeo	MH 133H (x 72746)
Dr. Anna Wenzel	KSC 213 (x 70912)	Dr. Scott Williams	KSC 227 (x 71603)
Dr. Frank Nguyen	KSC 238 (x 70924)	Tom Davis	KSC 238 (x 70714)

Meetings

- Practice & Discussion: MWF 8-8:50; Broad Hall 210 (Pitzer campus)
- Laboratory: M-F 1:15-5:15 pm and M-W 6:00-10:00 pm KSC 242. A lab day will be assigned based on your schedule and declared lab day preference.

Materials

- W. H. Brown, C. S. Foote and B. Iverson, "Organic Chemistry," 4th Ed., Thomson/Brooks Cole Publishers, Belmont, CA, 2005
- B. Iverson and S. Iverson, "Student Study Guide: Organic Chemistry," 4th Ed., Thomson/Brooks Cole Publishers, Belmont, CA, 2005 (highly recommended)
- Organic Chemistry 116-117 Laboratory Manual (required -- purchase as JSD office in lobby).
- Laboratory notebook: A bound notebook which creates duplicate pages is required. A quadrille notebook by the National Book Co. is commonly used (at the bookstore)
- Zubrick, "The Organic Chem Lab Survival Manual", 7th Ed., Wiley, 2006 (required - could share with another chemist and save \$)
- Molecular Models: (recommended -- 2 chemists can split a set and save \$, at the bookstore)

Practice Exams & Keys for Current Work -- <http://homer.jsd.claremont.edu>

- Exams and quizzes from a previous year are available the above address. Click *Courses*, and then on the appropriate link under *Chem 116* (*user = organic, password = chemistry*)

Other Resources

- Each other -- Don't underestimate the effectiveness of working with friends.
- Me -- at office hours, by appointment, over lunch ...

Other Textbooks for practice problems

- Two good textbooks along with their respective solution manuals will be placed on two-hour reserve at the Bauer Reading Room (CMC campus). These will likely be: Wade, "Organic Chemistry," and Solomons, "Organic Chemistry."

SCHEDULE OF EVENTS

WEEK	DATES	DISCUSSION TOPICS	TEXT
1	Sept. 5	Introductions -- excavating things you learned in Introductory Chemistry	
	7	Bonding Basics -- its easy when you only use a half dozen elements	Ch. 1
2	Sept. 10	Probs: 21-30, 33, 34, 38, 40-43, 47, 48, 51, 53, 54, 55-58, 64, 65, 69, 71	
	12		
	14	Alkanes and Cycloalkanes -- finally, some real organic molecules Probs: 16-18, 20, 21, 22, 25, 26, 28, 30, 31, 32, 34, 36, 41, 43, 45, 48, 49	Ch. 2
3	Sept. 17	Mini Exam (Chap. 1)	
	19		
	21		
4	Sept. 24		
	26	Stereoisomerism and Chirality -- all of that whacky 3D stuff	Ch. 3
	28	Probs: 13, 15, 16, 17, 18, 22, 23, 25, 30, 31	
5	Oct. 1		
	3	Acids and Bases -- passing a proton around among friends	Ch. 4
	5	Probs: 8, 10, 11, 14-16, 19, 21, 23, 26, 28, 31, 34-36, 38, 43, 45	
6	Oct. 8	Alkenes I: Structure & Properties -- pi bonds, did I hear someone say pi? Probs: 11, 12, 14, 16, 18, 20, 22, 24	Ch. 5
	10	Exam #1 (Chaps. 1,2,3,4)	
	12		
7	Oct. 15	Alkenes II: Reactivity & Transformations -- time to make new things	Ch. 6
	17	Probs: 15-17, 20, 21, 24, 26, 29, 33, 35, 36, 39, 40, 44, 47, 13	
	19		
8	Oct. 22	Fall Break	
	24		
	26	Alkynes -- if one pi bond is good, then two must be great	Ch. 7
9	Oct. 29	Probs: 7-12, 14, 16, 17, 20, 23	
	31		
	2	Haloalkanes and Radical Reactions -- don't tell the DHS	Ch. 8
10	Nov. 5	Exam #2 (Chaps. 5,6,7)	
	7	Probs: 9, 12, 14, 15, 16, 20, 24, 26, 28	
	9		
11	Nov. 12	Substitution & Elimination -- near the center of your o-chem universe	Ch. 9
	14	Probs: 10, 12-15, 18, 20, 22, 23, 25, 28, 29, 32, 34, 37, 38, 40, 41, 43, 45-47, 49	
	16		
12	Nov. 19		
	21		
	23	Thanksgiving	
13	Nov. 26	Alcohols -- a very important to all that comes later	Ch. 10
		Probs: 15, 17, 19, 20, 23, 25-28, 29, 31, 33, 34, 35, 36, 38, 40, 41-43, 45	
	28	Exam #3 (Chaps. 8,9)	
	30		
14	Dec. 3		
	5		
	7	Ethers, Sulfides, and Epoxides -- some cool bits an pieces in your tool kit	Ch. 11
15	Dec. 10	Probs: 10, 12, 15, 16, 18, 24, 26, 27, 31, 34, 36, 38	
	12		
	14	Reading Day	
16	Dec. 20	Final Exam 9:00 AM (day and time not to be altered - plan accordingly)	

EVALUATION OF YOUR WORK

	Percent
Start-up Problems & in-Class Exercises: Start-ups are a small set of problems will be due at the start of each chapter. We will also have individual and group in-class work, which I will occasionally collect and grade.	10
Exams: Mini exam + Three midterms = 5 + 15 + 15 + 15	50
Final Exam: Material from the last two chapters and comprehensive.	20
Laboratory Work: Products, notebook, reports & quizzes.	20
Grand total:	100

* Four chapters before a first exam seemed too long. Therefore, I have decided to give you a mini exam after just the first chapter and a proper exam after four. This also seems a good idea because it emphasizes the importance of mastering the review of fundamentals in the first chapter. It will also provide you with some early feedback while the scores importance is less.

Grade Determination

Grading will not be on a curve. I provide at the outset the following grade scale:

A	88 %
B	75 %
C	62 %
D	50 %

Thus, you are at the outset guaranteed a "B", for example, if your grand total percentage is above 75%. People very near (meaning within 1-2%) a border line will likely receive the higher grade with a minus sign affixed or the lower grade with a plus sign, but that is not guaranteed. The cutoffs listed above are not arbitrary. They are derived from experience with this course over many years. However, the cutoffs are absolute. If everyone is above 88%, then everyone earns an A. Of course, the converse is also true.

I have decided to provide an absolute scale for several reasons, but two are worth mentioning. First, I want to encourage collaboration between you. You are very often helped significantly by working in groups, so I don't want you competing with each other. Second, I want you to be well informed all through the semester as to what you need to do to achieve whatever success you desire in this course.

Policy for late, botched or missed assignments

I recognize that during the semester there will be occasions when other demands on your time will make it difficult to meet the requirements of this course. Thus, you should know in advance:

- **START-UPS** are due when they are due. No screwing around. (I will drop your lowest.)
- **EXAMS** will be offered only at their scheduled times -- make-up and early exams are not fair to other students or to me. Therefore, no make-ups except in the case of a doctor certified medical illness. A missed exam will result in a score of 0.
- The **FINAL EXAM** will be offered *only* at the scheduled time set by the Colleges. Plan your escape from Claremont accordingly.
- **BONUS TIME!!** At the end of the term, the lowest score *on any exam* will be replaced with your Final Exam score, assuming that it is better (it will be). This should encourage you to study for the comprehensive final knowing that by doing well you not only get a good final exam grade, but also a bonus of applying that score towards a previous deficit.