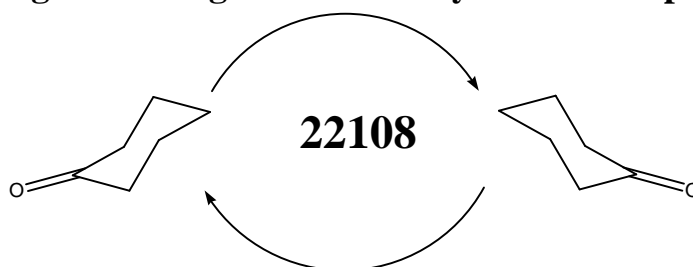


Lycoming College

Organic Chemistry II

Spring 2008



Course Description This course is designed to introduce the student to the chemistry of alcohols, arenes, and carbonyl compounds. The approach will be both mechanistically and synthetically based. The spectroscopic tools used to discern organic structure will also be examined in some detail. The lab portion of the course will focus on synthetic organic chemistry, qualitative organic analysis, and mechanism. **We will be building on some key concepts from Chem 220, such as, Lewis structures, formal charges, basics of polar reaction mechanisms, substitution/elimination pathways, and IR interpretation.**

Faculty Dr. Chriss E. McDonald, (work phone 321-4186, home 998-8647 (call up until 10 pm), email mcdonald@lycoming.edu), no specific office hours but I'm usually around.

Course Format

Lectures: MWF, 9:00-10:05, attendance will be taken daily.

Recitations: Problem solving sessions will be built into class time. We will also have a weekly help session in the early evening.

Assigned homework: There will be two assignments per topic. One from the book and a homemade one that will be handed out at the help session. These will not be graded but I expect you to do both. Homework will be discussed during the help sessions. Obviously the homework assignments will be a crucial study element for quizzes and tests. Answer keys will be posted on the Moodle thingy.

Moodle-based supplements: There is a website for this course which includes homework keys (primarily from the text), extra problems keys (homemade problems), sample exams from 2005, and study guides

Other sites of value include:

<http://chemfinder.cambridgesoft.com/> (useful for lab writeup info),

www.chem.ucla.edu/~webspectra/ (spectral interpretation),

www.lycoming.edu/chemistrydept/chemlink.htm (useful links from the departmental webpage)

www.mdli.com (a FREE chemical drawing program!!)

Exams: Exams 1-3 will be hour exams on the indicated days. The final exam will be an American Chemical Society standardized, multiple choice-type deal (cumulative over the whole of organic chemistry).

Labs: Similar to last semester. Prelab still in HBC 220. **T** 7:45 -11:35 (221M), **T** 1:00 – 4:50 (221N), **Th** 7:45 – 11:35 (221Q). Be on time and be prepared!!!!

Calculators, Cell Phones, and Communication Devices: You will need a simple calculator for lab. You will not need one for class. The use of graphing calculators, cell phones, PDA's, and any web-enabled devices are banned from class.

Grading

Your grade will be based on the total number of points you obtain out of a possible 620. Assignment of letter grades is based on the following scale: A 625 -562 (100 - 90%), B 561 – 500 (89 - 80%), C 499 - 437 (79 - 70%), D 436 - 375 (69 - 60%), F 374 - 0 (59 - 0%). The points will be distributed as follows:

quizzes	70 points
exams 1-3	300 points
final exam	100 points (cumulative ACS exam)*
<u>laboratory</u>	<u>150 points</u>
total	625 points

*a higher score on the final exam can be used to replace one lower score from exam 1-3.

As always you will have the opportunity to obtain bonus points through attendance at our colloquium series. Assuming you stay for the whole show and mind your manners you will receive 3 points per speaker. You may also receive up to 6 bonus points by writing a paper on a topic that we have mutually agreed upon (2 - 3 pages, typewritten, double spaced, with a minimum of two bibliographic sources). Any extra credit papers must be turned in before the final exam. The ceiling on bonus points is 12 (excluding those on exams).

Guidelines for Attending Colloquium

- i. Be on time.
- ii. The speaker has expended a lot of effort to prepare for the talk. Be attentive and polite.
- iii. If you can't stay for 45 minutes for an internal speaker or 60 minutes for an external speaker, don't come (please do not ask the speaker how long the talk will last).
- iv. Realize that questions for the speaker at the end is part of the talk and you will be expected to stay for that as well.

A Word About Learning Chemistry

Studying chemistry is hard work for most people (this is certainly true for me). I would recommend that you work on the lecture material **at least** one hour per day (7 days/week)

outside of class for starters. Once you see how things are going this amount can be adjusted as needed (I suggest a significant increase in study time prior to an exam). If you are having trouble, make sure and come and see me. I'm easy to talk to and will do whatever I can to help you. You will be responsible for all of the material listed on the following schedule for the indicated exams and quizzes. It is not sufficient to learn the material from the lecture alone. You are expected to read and think about the material prior to the lecture. The good student will read the text, read the notes, review concepts from Chem 220 that are fuzzy (see below), make lists of questions to ask me, and generally stay on top of things. We must necessarily cover a large amount of material so our pace must be geared towards those who are ready to learn. The hour exams will be cumulative in the sense that we need to know the earlier material to comprehend the latter. *Speaking of the cumulative nature of organic chemistry, here is a list of Chem 220 topics that significantly impact our studies in Chem 221. I strongly suggest these topics be reviewed prior to studying the relevant new material.*

<u>220 Topic</u>	<u>Text location</u>	<u>221 Topic</u>	<u>Text location</u>
Lewis structures	lab manual Appendix F	all mechanistic discussions	ubiquitous
functional groups	Chp 3	all synthetic discussions	ubiquitous
curved arrow notation	5.4,5, Appendix F	all mechanistic discussions	ubiquitous
formal, partial charges	2.1, Appendix F	all mechanistic discussions	ubiquitous
E ⁺ addition to alkenes	6.8-10	E ⁺ aromatic substitution	Chp. 16
S _N 2/S _N 1	Chp. 11	alcohols/ethers/carbonyls	Chps. 17,18
infrared spectroscopy	Chp. 12	NMR spectroscopy	Chp. 13

Attendance policy

Attendance at quizzes and exams is mandatory. Makeups will be administered only if I deem the reason for the absence to be legitimate and I am made aware of the absence beforehand!! Each documented, unexcused lecture absence beyond the first two will cost you one point from your total.

CHEM 22108 CHRONODYNAMICS

<u>Week</u>	<u>Date</u>	<u>Topic</u>	<u>Text</u>	<u>Q/E</u>
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1	1/7	introduction/radicals	5.2,3,8	
	1/9	representative radical chains	7.10,11 10.3-5	
	1/11	mass spectrometry	12.1-3, Powerpoint	
2	1/14	NMR theory	13.1-3,8,9, Powerpoint	
	1/16	chemical shift and coupling	13.10,11,13	
	1/18	proton NMR problems	-	Quiz 1
3	1/21	carbon NMR	13.4-7, Powerpoint	
	1/23	physical/spectroscopic properties of alcohols	17.1,2,11	
	1/25	substitution/elimination rxns of alcohols	17.6, 18.2	Quiz 2
4	1/28	redox chemistry of alcohols	17.7	
	1/30	ethers	18.1,2	
	2/1	Exam 1	-	Exam 1
5	2/4	epoxides	18.5,6	
	2/6	diene structure	1.7-11, 14.1	
	2/8	electrophilic additions to dienes	14.2-4	
6	2/11	the Diels-Alder rxn (finest in org. chem.)	14.4,5	
	2/13	intro to arenes	15.1-2	
	2/15	Huckel's rule and arene spectroscopy	15.3-8	Quiz 3
7	2/18	electrophilic aromatic substitution (EAS)	16.1-3	
	2/20	EAS on substituted arenes	16.4,5	
	2/22	EAS on disubstituted arenes	16.6	Quiz 4
	2/25		-	
	2/27	“Spring” Break Week	-	
	2/29		-	
8	3/3	substituent modifications and multisteppers	16.9-10, 24.8	
	3/5	aldehyde/ketone (A/K) intro, synth of A/K	19.1,2,14	
	3/7	Exam 2	-	Exam 2
9	3/10	addition of H ⁻ , R ⁻ to A/K	19.3,4,7, 17.4,5	
	3/12	addition of protic nucleophiles to A/K	19.5,6,8, 10	
	3/14	as above	as above	
10	3/17	A/K synthetic and mechanistic problems	Chp. 19	
	3/19	the Wittig rxn	19.11	Quiz 5 (W)
	3/21	Good Friday	-	
11	3/24	carboxylic acids	20.1-2,5 7,8,10	
	3/26	carboxylic acid derivatives	21.1,10	

	3/28	nucleophilic acyl substitution (NAS)	17.4,5, 21.2-7	Quiz 6
12	3/31	more NAS	as above	
	4/2	addition of H ⁻ , R ⁻ to acid derivatives	as above	
	4/4	Exam 3	-	Exam 3
13	4/7	keto-enol isomerism	22.1	
	4/9	enol-based rxns	22.2-4	
	4/11	generation of enolates	22.5,6	
14	4/14	alkylation of enolates (S _N 2)	22.7,8	
	4/16	addition of A/K to enolates	23.1-7	Quiz 7 (W)
	4/18	NAS of enolates, conjugate addition	23.8-10	
	4/21 -	final exams		

ORGANIC CHEMISTRY LAB SCHEDULE SPRING 2008

The lab component of this course is worth 150 points. Except for the three week Qualitative Organic Analysis lab, all of the lab writeups will be worth 15 points each.[#] The QOA lab will be worth a whopping 30 points. The week 2 quiz on IR, stoichiometry, and significant figures will be worth 15 points. Many of the experiments will be inquiry-based and will impact what we do in lecture as well. Students who do not conform to my notions of laboratory etiquette (as described in Chp. 1 of the lab manual) will be penalized. You will be expected to be on time, to read the experiment ahead of time, to perform the experiment in a safe manner, to keep your personal area and the common areas of the lab clean, and to be courteous to your labmates. **The penalty for late lab reports is 5% per school day. Lab reports cannot be turned in after any have been returned.**

WEEK	DATES	TOPIC	ASSIGNED READINGS	WRITEUP DUE*
1	1/8,10	Radical Polymerization of Methyl Methacrylate, Check-in	Chp. 46A	1/22,24
2	1/15,17	The Reaction 1-Octyne with Formic Acid [#]	Chp. 29	1/29,31
3	1/22,24	as above		
4	1/29,31	GC Analysis of an Isomeric Mixture Generated by E.A.S.	Chp. 37	2/12,14
5	2/5,7	The Acylation of Anisole	Chp. 36	2/19,21
6	2/12,14	as above		
7	2/19,21	Qualitative Organic Analysis	Chp. 38	3/25,27
Spring Break				
8	3/4,6	as above		
9	3/11,13	as above		
10	3/18,20	no lab		

[#]The 15 point **lab quiz** will be during the week 2 reflux period.

***Writeups (STAPLED) will be due at the beginning of prelab on the indicated day.**

11	3/25,27	The Synthesis of N-Methyl Prozac or The Synthesis of Virstatin	Chp. 44 or Chp. 45	part 1: 4/8,10
12	4/1,3	as above		
13	4/8,10	as above		part 2: final exam
14	4/15,17	as above, check-out		
