

Enhanced Organic Chemistry I – CHM 2212 Syllabus

version 1

CHM 2212–1856, **Fall 2017**, Monday, Wednesday, Friday, 10:40 am – 11:30 am
221 Hernandez Hall (JHH), Professor Stephen A. Miller, miller@chem.ufl.edu, Office LEI 318A

Course Description. The first half of the CHM 2212/2213 sequence for chemistry majors. A study of structures, synthesis and reactions of organic compounds, with emphasis on mechanism and spectroscopy.

Prerequisites. CHM 2046 and CHM 2046L, or the equivalent; chemistry majors (CY or CY BIO) only.

1	August 21	1.1–1.3	Introduction, Lewis Structures, Formal Charge ☀
2	August 23	1.4–1.8	Formal Charge, Covalent Bonds, Atomic Orbitals, Valence Bond Theory, MO Theory
3	August 25	1.9–1.13	Hybridization, VSEPR, Polarity, Intermolecular Forces, Solubility
4	August 28	2.1–2.7	Molecular Representations, Functional Groups, Lone Pairs, 3D, Resonance •PS#1
5	August 30	2.8–2.12	Curved Arrows, Resonance Structures, Delocalization
6	September 1	3.1–3.4	Brønsted-Lowry Acids and Bases, Electron Flow, pK_a Values •PS#2
	September 4	Holiday	Labor Day
7	September 6	3.5–3.9	Equilibrium, Leveling, Solvation, Counterions, Lewis Acids and Bases
8	September 8	4.1–4.3	Alkanes, Alkane Nomenclature, Constitutional Isomerism, Stability •PS#3
9	September 11	4.4–4.8	Alkane Stability, Alkane Sources, Newman Projections, Conformational Analysis
10	September 13	4.9–4.12	Cycloalkanes, Cyclohexane Conformations, Monosubstituted Cyclohexanes
11	September 15	4.13–4.15	Disubstituted Cyclohexanes, <i>Cis-Trans</i> Stereoisomerism, Polycyclics •PS#4
12	September 18		Midterm Examination I (Chapters 1–4)
13	September 20	5.1–5.3	Isomerism Overview, Stereoisomerism, Chirality, the <i>R,S</i> System
14	September 22	5.4–5.6	Optical Activity, Stereoisomeric Relationships, Symmetry
15	September 25	5.7–5.9	Fisher Projections, Conformational Mobility, Resolution, Isomeric Relationships
16	September 27	6.1–6.4	Enthalpy, Bond Dissociation Energies, Entropy, Gibbs Free Energy, Equilibria •PS#5
17	September 29	6.4–6.7	Kinetics, Energy Diagrams, Nucleophiles and Electrophiles
18	October 2	6.8– 6.10	Mechanisms, Arrow Pushing, Curved Arrows
19	October 4	6.11–6.12	Carbocation Rearrangements, Reaction Arrows
		7.1–7.3	Substitution Reactions, Alkyl Halides, Possible Mechanisms
	October 6	Holiday	Homecoming
20	October 9	7.4–7.5	S_N2 Mechanism, S_N1 Mechanism •PS#6
21	October 11	7.6–7.8	Drawing the S_N1 , Drawing the S_N2 , Which Predominates
22	October 13	7.8–7.9	Which Predominates, S_N1 vs. S_N2 , Reagents for Transformations •PS#7
23	October 16		Midterm Examination II (Chapters 5–7)
24	October 18	8.1–8.4	Elimination Reactions, Alkenes, Nomenclature, Stereoisomerism
25	October 20	8.5–8.7	Stability, Elimination Mechanisms, E2 Mechanism
26	October 23	8.8–8.10	E2 Products, E1 Mechanism, Drawing the E1
27	October 25	8.11–8.14	Drawing the E2, Substitution vs. Elimination, Reagents, Mechanism, Products
28	October 27 ^T	9.1–9.4	Addition Reactions, Addition vs. Elimination, Hydrohalogenation, Hydration •PS#8
29	October 30	9.5–9.7	Oxymercuration, Hydroboration, Hydrogenation
30	November 1	9.8–9.10	Halogenation, Halohydrins, Dihydroxylation
31	November 3	9.11–9.13	Oxidative Cleavage, Predicting Addition Products, Synthesis Strategies
32	November 6	10.1–10.5	Alkynes, Nomenclature, Acidity, Preparation, Reduction •PS#9
33	November 8	10.6–10.11	Alkyne Hydrohalogenation, Hydration, Halogenation, Ozonolysis, Synthesis Strategies
	November 10	Holiday	Veterans Day
34	November 13	11.1–11.5	Radical Mechanisms, Chlorination, Halogenation Thermochemistry, Selectivity •PS#10
35	November 15	11.6–11.13	Halogenation Stereochemistry, Allylic Bromination, HBr Addition, Applications •PS#11
36	November 17		Midterm Examination III (Chapters 8–11)
37	November 20	12.1–12.6	Synthesis, Functional Group Transformations, Carbon Skeleton, Retrosynthesis
	November 22	Holiday	Thanksgiving
	November 24	Holiday	Thanksgiving
38	November 27	13.1–13.4	Alcohols and Phenols, Acidity, Preparation •PS#12
39	November 29	13.5–13.9	Diol Preparation, Grignard Reagents, Protection, Phenol Preparation, Alcohol Reactions
40	December 1	13.10–13.13	Reactions of Alcohols, Biological Redox, Phenol Oxidation, Synthesis Strategies
41	December 4	14.1–14.8	Ethers, Nomenclature, Preparation, Reactions, Epoxides, Nomenclature, Prep. •PS#13
42	December 6	14.9–14.12	Reactions, Thiols, Sulfides, Synthesis •PS#14
43	December 14	Final Exam	(Chapters 1–14) Thursday, December 14th, 12:30 pm – 2:30 pm, JHH 221

T = Travel day for Dr. Miller. Lecture will be given by audio/video prepared by Dr. Miller. Questions answered by Teaching Assistants.

Required Textbook: David Klein. *Organic Chemistry, Second Edition*; Wiley, 2015. (ISBN 1118452283)
<https://www.amazon.com/Organic-Chemistry-2nd-David-Klein/dp/1118452283>

Required Student Study Guide: David Klein. *Student Study Guide and Solutions Manual to accompany Organic Chemistry, Second Edition*; Wiley, 2015. (ISBN 1118647955)
<https://www.amazon.com/Student-Solutions-accompany-Organic-Chemistry/dp/1118647955>

Publisher's Sales Website: <http://www.wiley.com/WileyCDA/WileyTitle/productCd-EHEP002933.html>

WileyPLUS Website: <https://www.wileyplus.com/WileyCDA/> class # 529975

Highly Recommended Model Sets: 1003A/Organic Chemistry Basic Set
<https://www.amazon.com/1003A-Organic-Chemistry-Basic-Set/dp/4902897563>
http://www.maruzen.info/hgs/catalog/product_info.php?products_id=4 or
HGS Researcher model set, Organic chemistry-B
<http://www.sigmaaldrich.com/catalog/search/ProductDetail/ALDRICH/Z277770> or
HGS Student model set, Fundamental organic chemistry
<http://www.sigmaaldrich.com/catalog/search/ProductDetail/ALDRICH/Z277703> or

Supplementary Textbooks: Organic Chemistry Textbooks by: Brown, Iverson, Anslyn, & Foote; Wade; McMurry; Vollhardt & Schore; Morrison & Boyd; Bruice; Hornback; Streitwieser & Heathcock.

E-Learning Website. All students will have access to the E-Learning in Canvas website: <http://elearning.ufl.edu/>

You will login with your Gatorlink account username and password. This is where you will find general class information, important news, office hours, handouts, class notes, and keys. This is also where you will be able to find out your point totals and histograms.

Class Requirements:

- 1) Fourteen problem sets (20 points each; 240 points max; the two lowest scores will be dropped)
 - 2) Six in-class quizzes (10 points each = 60 points)
 - 3) Three midterm examinations (150 points each = 450 total)
 - 4) Final examination (250 points)
- = 1000 points total**

Problem Sets. Problem sets will be **due at 11:59 pm** on the designated due dates. Answer keys will be posted around this time. The format is multiple choice with 20 questions and your answers will be turned in as an Assignment on E-Learning. The two lowest of the fourteen scores will be dropped. You may work in groups or alone. But, you may not copy answers. The problem sets are designed to prepare you for the examinations.

In-class Quizzes. The six in-class quizzes, which will be **unannounced and randomly distributed** during the semester, will be short and are designed to encourage you to attend class and to keep up with the course. They may occur at the beginning, middle, or end of class. They should be very easy for those who have read the assigned material. The quizzes can only be taken during the class period in which they are administered. They cannot be made up without an official, written University excuse.

Midterm Examinations. There will be three midterm examinations and each will focus on the chapters designated. The midterms are not designed to be cumulative; but you should expect some natural amount of material from a previous midterm to be important and necessary. Please bring and display your Gator1 Card for the exams.

Final Examination. The final examination will be cumulative. To do well, it will be important to keep up during the semester and review all notes and assignments for the course. **Working problems—frequently and consistently**—may be the best overall approach to mastering the course material. Please bring and display your Gator1 Card for the final.

Assignment Regrading. If you have a question concerning the grading of an assignment, you may submit the entire assignment for complete regrading. The assignment must be submitted for regrading by the next class meeting after the date the assignment was returned to the class.

Online Note Templates will be available at E-Learning (see above) in pdf format. They are organized by book chapter. The templates are made and posted to help you follow the lecture; hopefully this will allow you to spend less time writing and more time thinking. Students are encouraged to download and/or print the note templates and bring them to class to facilitate notetaking.

Office Hours. Subject to change, office hours will be held **Mondays from 2:00 pm – 2:50 pm** and **Thursdays from 3:00 pm – 3:50 pm** in **Sisler Hall 340** (third floor, southeast corner). Occasionally, a student TA will substitute for Dr. Miller and notice of this should be posted online. If you find 340 empty, please find Dr. Miller in his regular office. A third office hour will be held **Fridays from 1:00 pm – 1:50 pm** also in **Sisler Hall 340** by Brian Longbottom and Ronnie Levinson, two undergraduates who excelled in my 2212/2213 sequence last year. Additionally, students are encouraged to visit the Organic Chemistry Learning Center, located in JHH 205. This Center is staffed with Graduate Student Teaching Assistants in the mornings and afternoons Monday–Friday. The open hours of the OCLC are roughly 8:30 am to 6:00 pm and the final schedule will be posted on E-Learning.

Conflict Examinations. *Conflict examinations* will be given only for University-excused absences provided the appropriate documentation is supplied **one week in advance of the examination period**. Conflict exams are administered before the regularly scheduled examination; **no** makeup examinations will be given after the regularly scheduled examination.

Attendance. Attendance for this class is not recorded. However, the six unannounced and random in-class quizzes will generally reflect your attendance pattern.

Class Numbers. To facilitate the grading and return of exams and quizzes, I request that you write your name and **class number** on each one. The class numbers will be assigned after a few classes.

Grading. Grades will be curved based on points earned out of 1000. The curve will be based on the distribution and any result is possible. Everyone could receive A's; everyone could receive D's. There is no individual penalty for a class that performs well. For the nine semesters that I taught CHM 2210, the grade distributions are below. Grade distributions for CHM 2212 and CHM 2213 are also given below. Note that the percent of students receiving some kind of A has varied from 19% to 50%, but has usually been near the lower end of that range.

Spring 2008:			Fall 2008:			Fall 2009:			Fall 2011:		
Grade	#	percent	Grade	#	percent	Grade	#	percent	Grade	#	percent
A	20	19.4 %	A	26	19.8 %	A	35	20.7 %	A	27	16.0 %
B+	13	12.6 %	B+	13	9.9 %	A-	6	3.6 %	A-	9	5.4 %
B	16	15.5 %	B	38	29.0 %	B+	35	20.7 %	B+	12	7.1 %
C+	23	22.3 %	C+	7	5.3 %	B	9	5.3 %	B	35	20.8 %
C	20	19.4 %	C	31	23.7 %	B-	19	11.2 %	B-	29	17.3 %
D+	1	1.0 %	D+	3	2.3 %	C+	23	13.6 %	C+	8	4.8 %
D	5	4.9 %	D	6	4.6 %	C	30	17.8 %	C	36	21.4 %
F	4	3.9 %	F	7	5.3 %	C-	2	1.2 %	C-	4	2.4 %
I	1	1.0 %				D+	3	1.8 %	D+	4	2.4 %
						D	2	1.2 %	D	0	0.0 %
						D-	1	0.6 %	D-	0	0.0 %
						F	4	2.4 %	F	4	2.4 %
Total	103	100.0 %	Total	131	100.0 %	Total	169	100.0 %	Total	168	100.0 %

Spring 2013:			Fall 2013:			Fall 2015:			Spring 2016:		
Grade	#	percent	Grade	#	percent	Grade	#	percent	Grade	#	percent
A	14	8.9 %	A	39	22.5 %	A	30	17.1 %	A	34	18.8 %
A-	15	9.6 %	A-	48	27.8 %	A-	26	14.8 %	A-	14	7.7 %
B+	20	12.7 %	B+	11	6.4 %	B+	22	12.5 %	B+	22	12.2 %
B	25	15.9 %	B	7	4.0 %	B	23	13.1 %	B	27	14.9 %
B-	18	11.5 %	B-	13	7.5 %	B-	2	1.1 %	B-	18	9.9 %
C+	18	11.5 %	C+	29	16.8 %	C+	24	13.6 %	C+	37	20.4 %
C	19	12.1 %	C	19	11.0 %	C	31	17.6 %	C	16	8.8 %
C-	8	5.1 %	C-	1	0.6 %	C-	8	4.6 %	C-	5	2.8 %
D+	8	5.1 %	D+	1	0.6 %	D+	4	2.3 %	D+	5	2.8 %
D	3	1.9 %	D	2	1.2 %	D	5	2.8 %	D	1	0.6 %
D-	4	2.6 %	D-	1	0.6 %	D-	1	0.6 %	D-	2	1.1 %
F	5	3.2 %	F	2	1.2 %	F	0	0.0 %	F	0	0.0 %
Total	157	100.0 %	Total	173	100.0 %	Total	176	100.0 %	Total	181	100.0 %

Fall 2016 (CHM 2212):			Spring 2017 (CHM 2213):			Summer 2017:			Fall 2017 (CHM 2212):		
Grade	#	percent	Grade	#	percent	Grade	#	percent	Grade	#	percent
A	14	34.1 %	A	7	18.4 %	A	13	25.0 %	A		
A-	5	12.2 %	A-	7	18.4 %	A-	10	19.2 %	A-		
B+	3	7.3 %	B+	5	13.2 %	B+	4	7.7 %	B+		
B	11	26.8 %	B	10	26.3 %	B	3	5.8 %	B		
B-	1	2.3 %	B-	3	7.9 %	B-	1	1.9 %	B-		
C+	4	9.8 %	C+	4	10.5 %	C+	13	25.0 %	C+		
C	0	0.0 %	C	1	2.6 %	C	2	3.9 %	C		
C-	0	0.0 %	C-	0	0.0 %	C-	5	9.6 %	C-		
D+	0	0.0 %	D+	0	0.0 %	D+	1	1.9 %	D+		
D	1	2.4 %	D	0	0.0 %	D	0	0.0 %	D		
D-	1	2.4 %	D-	0	0.0 %	D-	0	0.0 %	D-		
F	1	2.4 %	F	1	2.6 %	F	0	0.0 %	F		
Total	41	100.0 %	Total	38	100.0 %	Total	52	100.0 %	Total		

Accommodations for students with disabilities. Students requesting classroom accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the Instructor when requesting accommodation.

UF Honor Code: We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.

On all work submitted for credit by students at the university, the following pledge is either required or implied: **"On my honor, I have neither given nor received unauthorized aid in doing this assignment."** "The university requires all members of its community to be honest in all endeavors. A fundamental principle is that the whole process of learning and pursuit of knowledge is diminished by cheating, plagiarism and other acts of academic dishonesty. In addition, every dishonest act in the academic environment affects other students adversely, from the skewing of the grading curve to giving unfair advantage for honors or for professional or graduate school admission. Therefore, the university will take severe action against dishonest students. Similarly, measures will be taken against faculty, staff and administrators who practice dishonest or demeaning behavior."

Cheating and Plagiarism. Cheating and/or plagiarism will not be tolerated. The minimum penalty will be an automatic zero on the assignment in question. Suspension from the University may also result. Do not risk it. It is not worth it. Plagiarism consists of passing off as one's own the ideas, words, writings, etc. that belong to someone else. You are committing plagiarism if you copy the work of another person and turn it in as your own, even if you have that person's permission. See:

<https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code>

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