

Organic Chemistry I – CHM 2210 Syllabus

version 1

CHM 2210–4B54 (10732), Summer B 2019

Monday, Tuesday, Wednesday, Thursday, Friday, 3:30 pm – 4:45 pm

Classroom: LEI 207

Professor Stephen A. Miller, miller@chem.ufl.edu, Office LEI 318A

Course Description. The first half of the CHM 2210/2211 sequence, intended for majors and pre-professional students. A study of the structures, syntheses, and reactions of organic compounds.

Prerequisites. CHM 2046 and CHM 2046L or the equivalent.

1	July 1	1.1 – 1.2	Electronic Structure of Atoms, Lewis Model of Bonding #1–9
2	July 2	1.2 – 1.3	Lewis Model of Bonding, Functional Groups #10–19
3	July 3	1.4 – 1.7	Shapes of Molecules, Polarity, Quantum Mechanics, VB and MO Theory #20–28
	July 4	Holiday	Independence Day
4	July 5	2.1	Alkane Structure #1–3
		2.7 – 2.9	Physical Properties of Alkanes and Cycloalkanes, Reactions, Importance #18–22
5	July 8	1.8 – 1.10	Resonance, Delocalized Systems, Bond Lengths, Bond Strengths #29–33
		2.2 – 2.3	Constitutional Isomerism, Alkane Nomenclature #4–6
6	July 9	2.3 – 2.5	Alkane Nomenclature, Cycloalkanes, Conformations of Alkanes #7–12 PS#1
7	July 10	2.5 – 2.6	Conformations of Cycloalkanes, Cis/Trans Isomerism and Bicycloalkanes #13–17
8	July 11	3.1 – 3.4	Chirality, Stereoisomerism, R,S, Acyclics with Multiple Chiral Centers #1–8 PS#2
9	July 12	3.5 – 3.9	Cyclics with Multiple Chiral Centers, Stereoisomer Terminology, Optical Activity, Biological Significance, Resolution #9–16 PS#3
10	July 15		Midterm Examination I (Chapters 1-3)
11	July 16	4.1 – 4.5	Arrhenius Acids and Bases, Brønsted-Lowry Acids and Bases, pK_a , Acid-Base Equilibrium Position, Thermochemistry and Mechanisms #1–8
12	July 17	4.5 – 4.7	Thermochemistry, Mechanisms, Molecular Structure, Acidity, Lewis Acids, Bases #9–14
		5.1 – 5.1	Alkene Structure #1–3
13	July 18	5.1 – 5.4	Alkene Structure, Nomenclature, Properties, Naturally Occurring Alkenes #4–10 PS#4
14	July 19	6.1 – 6.3	Reactions of Alkenes, Reactive Intermediates, Electrophilic Additions #1–11 PS#5
15	July 22	6.3 – 6.5	Electrophilic Additions, Hydroboration–Oxidation, Oxidation/Reduction #12–16
16	July 23	6.5 – 6.7	Oxidation, Reduction, Reactants and Products with Chiral Centers #17–24
		29.6 A,D	Polymerization of Alkenes #1–3 PS#6
17	July 24		Midterm Examination II (Chapters 4-6)
18	July 25	7.1 – 7.5	Alkyne Structure, Nomenclature, Properties, Acidity, Alkyne Preparation #1–7
19	July 26	7.6 – 7.9	Electrophilic Addition, Hydration, Reduction, Org. Synthesis #8–13
		8.1 – 8.2	Haloalkane Structure, Nomenclature #1–2
20	July 29	8.3 – 8.5	Haloalkane Physical Properties, Preparation, Halogenation Mechanism #3–12 PS#7
21	July 30	8.6 – 8.8	Allylic Halogenation, Radical Autoxidation, Radical Addition of HBr #13–18
		9.1 – 9.2	Nucleophilic Substitution in Haloalkanes, Mechanisms, S_N1 and S_N2 #1–4
22	July 31	9.3 – 9.3	Evidence for S_N1 and S_N2 Reactions #5–13 PS#8
23	August 1	9.3 – 9.7	S_N1 and S_N2 Evidence, S_N Reactions, Beta Elimination, E1 and E2 Evidence #14–22
24	August 2	9.7 – 9.10	Experimental E1 and E2 Evidence, Substitution vs. Elimination, S/E Competitions, Neighboring Group Participation #22–28 PS#9
25	August 5		Midterm Examination III (Chapters 7-9)
26	August 6	10.1 – 10.5	Structure and Nomenclature of Alcohols, Physical Properties, Acidity and Basicity, Reactions of Alcohols with Active Metals, Haloalkanes and Sulfonates #1–12
27	August 7	10.6 – 10.9	Dehydration of Alcohols, The Pinacol Rearrangement, Alcohol Oxidation, Thiols #13–19
		11.1 – 11.4	Structure of Ethers, Nomenclature, Physical Properties, Preparation #1–4 PS#10
28	August 8	11.5 – 11.12	Ether Reactions, Silyl Ethers, Synthesis & Reactions of Epoxides, Crown Ethers, Sulfides #5–15 PS#11
29	August 9		Final Exam (Chapters 1-11) In Class, LEI 207

#xx–yy designates the Lecture Note slide numbers

T = Travel day for Dr. Miller (none currently). Lecture will be given by audio/video prepared by Dr. Miller. Questions answered by Teaching Assistants.

Required Textbook: Brown, Iverson, Anslyn, Foote. *Organic Chemistry, Eighth Edition*; Brooks/Cole, 2018. (ISBN 9781305580350) <https://www.amazon.com/Organic-Chemistry-William-H-Brown/dp/1305580354>

Required Study Guide: Iverson, Iverson. *Study Guide with Student Solutions Manual, Eighth Edition*; Brooks/Cole, 2018. (ISBN 1305864506) <https://www.amazon.com/Student-Solutions-Iverson-Organic-Chemistry/dp/1305864506>

Publisher's Sales Website: <https://www.cengage.com/c/organic-chemistry-8e-brown>

Publisher Support: <http://support.cengage.com/magellanweb/ClassLandingPage.aspx?optId=1-1ZVPNI8>

Highly Recommended Model Sets:

HGS Researcher model set, Organic chemistry-B

<https://www.ebay.com/itm/Researcher-Organic-Chemistry-B-Set-HGS-Polyhedron-Molecular-Model/282843560008>

HGS 1003Alpha/Organic Chemistry Basic Set

<https://www.amazon.com/1003Alpha-Organic-Chemistry-Basic-Set/dp/0998549738/> or

HGS 1013Alpha Organic Chemistry Set for Student

<https://www.amazon.com/1013Alpha-Organic-Chemistry-Set-Student/dp/0998549770/>

HGS Student model set, Fundamental organic chemistry

<http://www.sigmaaldrich.com/catalog/search/ProductDetail/ALDRICH/Z277703> or

Duluth Labs Organic Chemistry Molecular Model Student Set - MM-006

<https://www.amazon.com/Duluth-Labs-Organic-Chemistry-Molecular/dp/B01N1NHS2W> or

Supplementary Textbooks: Organic Chemistry Textbooks by: Wade; McMurry; Vollhardt & Schore; Morrison & Boyd; Bruice; Hornback; Streitwieser & Heathcock.

Canvas Website. All students will have access to the Instructure/Canvas website: <https://ufl.instructure.com/>

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 = 1000 points total

- 1) Eleven problem sets (20 points each; 200 points max; the lowest score will be dropped)
- 2) Ten in-class quizzes (10 points each = 100 points)
- 3) Three midterm examinations (150 points each = 450 total)
- 4) Final examination (250 points)

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 Canvas. The lowest of the eleven 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 ten 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 Lecture Notes will be available in Canvas (see above) in pdf format. They are organized by book chapter. These Lecture Note 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 Lecture Note templates and bring them to class to facilitate notetaking.

Office Hours. Subject to change, office hours will be held **Mondays from 1:00 pm – 2:00 pm** and **Fridays from 10:00 am – 11:00 am** 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. Additionally, students are encouraged to visit the Organic Chemistry Learning Center, located in JHH 205 (Hernandez Hall). This Center is staffed with Graduate Student Teaching Assistants in the mornings and afternoons Monday–Friday. The open hours of the OCLC are roughly 9:00 am to 3:00 pm and the final schedule will be posted on Canvas.

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 ten 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 ten semesters that I taught CHM 2210, the grade distributions are 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%

Summer B 2017:			Summer A 2018:		
Grade	#	percent	Grade	#	percent
A	13	25.0 %	A	31	17.6 %
A-	10	19.2 %	A-	26	14.8 %
B+	4	7.7 %	B+	21	11.9 %
B	3	5.8 %	B	23	13.1 %
B-	1	1.9 %	B-	2	1.1 %
+	13	25.0 %	C+	24	13.6 %
C	2	3.9 %	C	31	17.6 %
C-	5	9.6 %	C-	8	4.6 %
D+	1	1.9 %	D+	4	2.3 %
D	0	0.0 %	D	5	2.8 %
D-	0	0.0 %	D-	1	0.6 %
F	0	0.0 %	F	0	0.0 %
Total	52	100.0%	Total	176	100.0%

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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