Organic Chemistry 2 for Majors – CHM 2213 Syllabus

version 1 (1/8/25)

CHM 2213, Class #18162, **Spring 2025**, Monday, Wednesday, Friday, 10:40 am – 11:30 am
221 Scott Family Hall (SFH), Professor Stephen A. Miller, miller@chem.ufl.edu, Office LEI 318A

Course Description. The second 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 2212 or the equivalent; chemistry majors (CY or CY BIO) only.

1	January 13	**14.1–14.7**	Infrared (IR) Spectroscopy, Signal Characteristics, Spectral Analysis
2	January 15	**14.8–14.16**	Mass Spectrometry, Fragmentation, Fragment Analysis, Hydrogen Deficiency Index
3	January 17	**15.1–15.4**	NMR Spectroscopy, ^{1}H NMR Spectra, Characteristics, Number of Signals •PS#14
	January 20	**Holiday**	MLK Jr. Day
4	January 22	**15.5–15.7**	NMR Chemical Shift, Integration, Multiplicity, Splitting
5	January 24	**15.8–15.12**	Drawing ^{1}H NMR Spectra, Spectral Analysis, ^{13}C NMR Spectra
6	January 27	**16.1–16.6**	Conjugated Dienes, MO Theory, Electrophilic Addition, Pericyclic Reactions •PS#15
7	January 29	**16.7–16.9**	Diels-Alder Reactions, MO of Cycloadditions, Electrocyclic Reactions
8	January 31	**16.10–16.13**	Sigmatropic Rearrangements, UV-Vis, Color, Vision
9	February 3	**17.1–17.4**	Aromatic Compounds, Nomenclature, Benzene, Stability of Benzene •PS#16
10	February 5	**17.5–17.8**	Other Aromatics, Heterocycles, Benzylic Reactions, Reduction, Spectroscopy •PS#17
	February 6	Thursday	**Midterm Examination I** (Chapters 14–17) E2–E3 (8:20–10:10 pm), TBD
11	February 7	**18.1–18.4**	Electrophilic Aromatic Substitution, Halogenation, Sulfonation, Nitration
12	February 10	**18.5–18.7**	Friedel-Crafts, Activating Groups
13	February 12	**18.8–18.11**	Deactivating Groups, Halogens, Directing Effects, Multiple Substituents
14	February 14	**18.12–18.15**	Synthesis, Nucleophilic Aromatic Substitution, Elimination-Addition, Mechanism
15	February 17	**19.1–19.5**	Aldehydes & Ketones, Nomenclature, Preparation, Nuc. Additions, O Nucs. •PS#18
16	February 19	**19.6–19.9**	Nitrogen Nucleophiles, Hydrolysis, Sulfur & Hydrogen Nucleophiles
17	February 21	**19.10–19.13**	Carbon Nucleophiles, Oxidation, Synthesis, Spectroscopy
18	February 24	**20.1–20.5**	Carboxylic Acids, Nomenclature, Structure & Properties, Preparation, Reactions •PS#19
19	February 26	**20.6–20.7**	Carboxylic Acid Derivatives, Reactivity
20	February 28	**20.8–20.11**	Acid Chlorides, Acid Anhydrides, Esters Preparation, Reactions of Esters
21	March 3	**20.12–20.15**	Amides, Nitriles, Synthesis, Spectroscopy •PS#20
	March 4	Tuesday	**Midterm Examination II** (Chapters 18–20) E2–E3 (8:20–10:10 pm), TBD
22	March 5	**21.1–21.3**	Alpha Carbon Chemistry, Enols & Enolates, Alpha Halogenation, Aldol Reactions
23	March 7	**21.4–21.5**	Claisen Condensations, Alpha Alkylation
24	March 10	**21.6–21.7**	Conjugate Addition, Synthesis
25	March 12	**22.1–22.3**	Amines, Nomenclature, Properties •PS#21
26	March 14	**22.4–22.8**	Preparation, Amines via Substitution, via Reductive Amination, Synthesis, Acylation
	March 17	**Holiday**	Spring Break
	March 19	**Holiday**	Spring Break
	March 21	**Holiday**	Spring Break
27	March 24 T	**TBD**	
28	March 26	**22.9–22.11**	Elimination, Amines with Nitrous Acid, Aryldiazonium Ions
29	March 28	**22.12–22.13**	Nitrogen Heterocycles, Spectroscopy
		23.1–3, 23.9	Organometallics, Organolithium Compounds, Alkene Metathesis
30	March 31	**24.1–24.5**	Carbohydrates, Monosaccharides, Aldoses, Ketoses, Cyclic Monosaccharides •PS#22
31	April 2	**24.6–24.7**	Reactions of Monosaccharides, Disaccharides
32	April 4	**24.8–24.10**	Polysaccharides, Amino Sugars, *N*-Glycosides
33	April 7	**25.1–25.3**	Amino Acids, Peptides, Proteins, Amino Acid Structure & Properties, Synthesis •PS#24
34	April 9	**25.4–25.8**	Peptide Structure, Sequencing, Synthesis, Protein Structure & Function •PS#25
	April 10	Thursday	**Midterm Examination III** (Chapters 21–25) E2–E3 (8:20–10:10 pm), TBD
35	April 11	**26.1–26.4**	Lipids, Waxes, Triglycerides, Reactions of Triglycerides
36	April 14	**26.5–26.8**	Phospholipids, Steroids, Prostaglandins, Terpenes
37	April 16	**27.1–27.3**	Synthetic Polymers, Nomenclature, Copolymers •PS#26
38	April 18	**27.4–27.5**	Polymers by Reaction Type, by Mode of Assembly
39	April 21	**27.6–27.8**	Polymers by Structure, by Properties, Recycling •PS#27
40	April 23	**TBD**	
41	May 1	**Final Exam**	(Chapters 14–27) Thursday, 12:30 pm – 2:30 pm, SFH 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***, ***Fourth*** *Edition*; Wiley, **2021**. (ISBN 1119659590) https://www.amazon.com/Organic-Chemistry-David-R-Klein/dp/1119659590 (2nd Ed. is close enough. 3rd Ed. is better.)

Recommended Student Study Guide: David Klein. ***Student Study Guide and Solutions Manual to accompany Organic Chemistry****, Fourth Edition*; Wiley, **2021**. (ISBN 1119659582)
https://www.amazon.com/Organic-Chemistry-David-R-Klein/dp/1119659582

Publisher's Sales Website: https://www.wiley.com/en-us/Organic+Chemistry%2C+4th+Edition-p-9781119776741
WileyPLUS Website: https://learn.wileyplus.com/courses/168060

Highly Recommended Model Sets:
HGS Maruzen 1003Alpha/Organic Chemistry Basic Set
https://www.amazon.com/1003Alpha-Organic-Chemistry-Basic-Set-dp-0999722417/dp/0999722417 or
HGS Maruzen 1005Alpha/Organic Chemistry Standard Set
https://www.amazon.com/1005Alpha-Organic-Chemistry-Standard-Set/dp/0998549789 or
Duluth Labs Organic Chemistry Molecular Model Student Set - MM-004 (or MM-003 or MM-005)
https://www.amazon.com/dp/B01AJCPJLI
Duluth style models from other Amazon vendors: **Lulu**, **Swpeet**, **Yuntec**, **Linktor**, **Hilitchi**, **Dalton Labs**, **LogicLabs**.
But look for Organic sets rather than Organic/Inorganic sets.

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

Canvas Website. All students will have access to the Canvas website: https://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) Thirteen problem sets (20 points each; 240 points max; the **lowest** score will be dropped)
2) Six online 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 Canvas. The lowest of the thirteen scores will be dropped. You may work in groups or alone. But, you may not copy answers. The problem sets are mostly foundational material necessary for the examinations.

Online Quizzes. The six 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. You will take them as an Assignment on Canvas after class. They should be easy for those who have attended class that day. The quizzes can only be taken the day they are announced. 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. You are strongly encouraged to work all of the **old exams** (posted on Canvas) as well as **end-of-chapter problems** from our textbook, and the others listed above. 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 (Templates) will be available on Canvas (see above) in pdf format. They are organized by book chapter. The Lecture Notes show important course material but have blank space for your notes to be taken during lecture. This method is designed to require less time writing and allow more time thinking. Students are encouraged to download and/or print the Lecture Notes and bring them to class to facilitate notetaking.

Office Hours. Subject to change, office hours will be held **Tuesdays 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 SIS340 empty, please find Dr. Miller in his regular office. Additional office hours will likely be held **following class on select Mondays, Wednesdays, and Fridays** in the SFH second floor conference rooms—schedule permitting. Additionally, office hours will be conducted by undergraduates who have completed the 2212/2213 sequence previously.

Conflict Examinations. *Conflict examinations* will be given only for University-excused absences provided the appropriate documentation is supplied. Conflict exams are ideally administered *before* the regularly scheduled examination—not after. See: https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/

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

Class Numbers. To facilitate the grading and return of exams, I request that you write your name and **class number** on each one. The class numbers will be assigned before the first exam.

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 eight semesters that have I taught CHM 2212 and CHM 2213, the grade distributions are below. Note that the percent of students receiving some kind of A has varied from 34% to 55%. Additional information about UF grading policies can be found here: https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies/

Fall 2016 (CHM 2212):

Grade	#	percent
A	14	34.1 %
A-	5	12.2 %
B+	3	7.3 %
B	11	26.8 %
B-	1	2.3 %
C+	4	9.8 %
C	0	0.0 %
C-	0	0.0 %
D+	0	0.0 %
D	1	2.4 %
D-	1	2.4 %
F	1	2.4 %
Total	41	100.0%

Spring 2017 (CHM 2213):

Grade	#	percent
A	7	18.4 %
A-	7	18.4 %
B+	5	13.2 %
B	10	26.3 %
B-	3	7.9 %
C+	4	10.5 %
C	1	2.6 %
C-	0	0.0 %
D+	0	0.0 %
D	0	0.0 %
D-	0	0.0 %
F	1	2.6 %
Total	38	100.0%

Fall 2017 (CHM 2212):

Grade	#	percent
A	10	26.3 %
A-	8	21.1 %
B+	8	21.1 %
B	3	7.9 %
B-	3	7.9 %
C+	4	10.5 %
C	0	0.0 %
C-	0	0.0 %
D+	0	0.0 %
D	1	2.6 %
D-	0	0.0 %
F	1	2.6 %
Total	52	100.0%

Spr. 2018 (CHM 2213):

Grade	#	percent
A	10	26.3 %
A-	3	7.9 %
B+	6	15.8 %
B	6	15.8 %
B-	8	21.1 %
C+	1	2.6 %
C	1	2.6 %
C-	0	0.0 %
D+	0	0.0 %
D	0	0.0 %
D-	0	0.0 %
F	0	0.0 %
Total	35	100.0%

Fall 2018 (CHM 2212):

Grade	#	percent
A	10	27.0 %
A-	5	13.5 %
B+	7	18.9 %
B	5	13.5 %
B-	3	8.1 %
C+	4	10.8 %
C	2	5.4 %
C-	0	0.0 %
D+	0	0.0 %
D	1	2.7 %
D-	0	0.0 %
F	0	0.0 %
Total	37	100.0%

Spring 2019 (CHM 2213):

Grade	#	percent
A	10	25.6 %
A-	5	12.8 %
B+	7	18.0 %
B	13	33.3 %
B-	2	5.1 %
C+	0	0.0 %
C	2	5.1 %
C-	0	0.0 %
D+	0	0.0 %
D	0	0.0 %
D-	0	0.0 %
F	0	0.0 %
Total	39	100.0%

Fall 2019 (CHM 2212):

Grade	#	percent
A	19	35.9 %
A-	6	11.3 %
B+	6	11.3 %
B	6	11.3 %
B-	5	9.4 %
C+	3	5.7 %
C	3	5.7 %
C-	4	7.5 %
D+	1	1.9 %
D	0	0.0 %
D-	0	0.0 %
F	0	0.0 %
Total	53	100.0%

Spr. 2020 (CHM 2213):

Grade	#	percent
A	20	37.0 %
A-	10	18.5 %
B+	7	13.0 %
B	6	11.1 %
B-	4	7.4 %
C+	2	3.7 %
C	4	7.4 %
C-	0	0.0 %
D+	0	0.0 %
D	0	0.0 %
D-	0	0.0 %
F	1	1.9 %
Total	54	100.0%

Accommodations for students with disabilities. Students requesting academic/classroom accommodations should connect with the Disability Resource Center. https://disability.ufl.edu/get-started/ The obtained accommodation letter should be discussed with the instructor as soon as possible in the semester.

Course Evaluations. "Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at https://gatorevals.aa.ufl.edu/students/. Students will be notified when the evaluation period opens and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via https://ufl.bluera.com/ufl/. Summaries of course evaluation results are available to students at https://gatorevals.aa.ufl.edu/public-results/."

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://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/

Privacy. Our class sessions may be audio-visually recorded for the use of enrolled students. Students who participate during class are agreeing to have their audio or video recorded. As in all courses, unauthorized recording and unauthorized sharing of recorded materials are prohibited.

Absences. Course materials will be provided to you with an excused absence, and you will be given a reasonable amount of time to make up work. To find more information on the university attendance policies, click here https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/.

UF Syllabus Policy. The UF *Policy on Course Syllabi* can be found here: https://syllabus.ufl.edu/syllabus-policy/

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