

# Organic Chemistry I – CHM 2210 Syllabus

CHM 2210-4928, Spring 2013, Monday, Wednesday, Friday, 4:05 pm – 4:55 pm

Classroom: Flint 50

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.

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1	January 7	1.1	Electronic Structure of Atoms
2	January 9	1.2	Lewis Model of Bonding
3	January 11	1.3 – 1.4	Functional Groups, Bond Angles and Shapes of Molecules
4	January 14	1.5 – 1.7	Polarity, Quantum Mechanics, Valence Bond and Molecular Orbital Theory
5	January 16	1.8 – 1.10	Resonance, Delocalized Systems, Bond Lengths, Bond Strengths
6	January 18	2.1 – 2.3	Alkane Structure, Constitutional Isomerism, Nomenclature <b>PS#1</b>
	January 21	No Class	Holiday – Martin Luther King, Jr. Day
7	January 23	2.4 – 2.5	Cycloalkanes, Conformations of Alkanes
8	January 25	2.5	Conformations of Cycloalkanes
9	January 28	2.6	Cis/Trans Isomerism in Cycloalkanes and Bicycloalkanes
10	January 30	2.7 – 2.9	Physical Properties of Alkanes and Cycloalkanes, Reactions, Importance
11	February 1	3.1 – 3.3	Chirality, Stereoisomerism, The <i>R,S</i> System <b>PS#2</b>
12	February 4	3.4 – 3.5	Acyclics with Multiple Chiral Centers, Cyclics with Multiple Chiral Centers
13	February 6	3.6 – 3.9	Stereoisomer Terminology, Optical Activity, Biological Significance, Resolution <b>PS#3</b>
14	February 8		<b>Midterm Examination I</b> (Chapters 1-3)
15	February 11	4.1 – 4.3	Arrhenius Acids and Bases, Brønsted-Lowry Acids and Bases, $pK_a$
16	February 13	4.4 – 4.5	Acid-Base Equilibrium Position, Thermochemistry and Mechanisms
17	February 15	4.6 – 4.7	Molecular Structure and Acidity, Lewis Acids and Bases
18	February 18	5.1 – 5.2	Alkene Structure, Nomenclature <b>PS#4</b>
19	February 20	5.3 – 5.4	Physical Properties of Alkenes, Naturally Occurring Alkenes
20	February 22	6.1 – 6.3	Reactions of Alkenes—Overview, Reactive Intermediates, Electrophilic Additions <b>PS#5</b>
21	February 25	6.3	Electrophilic Additions
22	February 27	6.3 – 6.5	Electrophilic Additions, Hydroboration—Oxidation, Oxidation
23	March 1	6.5 – 6.6	Oxidation, Reduction
	March 4	No Class	Holiday – Spring Break
	March 6	No Class	Holiday – Spring Break
	March 8	No Class	Holiday – Spring Break
24	March 11	6.7, 29.6A,D	Reactants and Products with Chiral Centers, Polymerization of Alkenes <b>PS#6</b>
25	March 13		<b>Midterm Examination II</b> (Chapters 4-6)
26	March 15	7.1 – 7.5	Alkyne Structure, Nomenclature, Properties, Acidity, Preparation
27	March 18	7.6 – 7.9	Electrophilic Addition, Alkyne Hydration, Reduction, Organic Synthesis
28	March 20	8.1 – 8.4	Haloalkane Structure, Nomenclature, Physical Properties, Preparation <b>PS#7</b>
29	March 22	8.5	Halogenation Mechanism
30	March 25	8.6 – 8.8	Allylic Halogenation, Radical Autoxidation, Radical Addition of HBr to Alkenes
31	March 27	9.1 – 9.3	Nucleophilic Substitution in Haloalkanes, Mechanisms, $S_N1$ and $S_N2$ Reactions <b>PS#8</b>
32	March 29	9.3	Evidence for $S_N1$ and $S_N2$ Reactions
33	April 1	9.3 – 9.5	$S_N1$ and $S_N2$ Reactions, Several Nucleophilic Substitution Reactions, Beta Elimination
34	April 3	9.6 – 9.7	Beta Elimination Mechanisms, Evidence for E1 and E2 Mechanisms
35	April 5	9.8 – 9.10	Substitution vs. Elimination, S/E Competitions, Neighboring Group Participation <b>PS#9</b>
36	April 8		<b>Midterm Examination III</b> (Chapters 7-9)
37	April 10	10.1 – 10.3	Structure and Nomenclature of Alcohols, Physical Properties, Acidity and Basicity
38	April 12	10.4 – 10.5	Reactions of Alcohols with Active Metals, Haloalkanes and Sulfonates
39	April 15	10.6 – 10.8	Dehydration of Alcohols, The Pinacol Rearrangement, Oxidation of Alcohols
40	April 17	10.8 – 10.9	Oxidation of Alcohols, Thiols
41	April 19	11.1 – 11.5	Structure of Ethers, Nomenclature, Physical Properties, Preparation, Reactions <b>PS#10</b>
42	April 22	11.6 – 11.9	Silyl Ethers, Epoxides, Synthesis of Epoxides, Epoxide Reactions
43	April 24	11.10 - 11.12	Ethylene Oxide and Epichlorohydrin, Crown Ethers, Sulfides <b>PS#11</b>
44	May 3		<b>Final Exam</b> (Chapters 1-11) Friday, May 3rd, 10:00 am – 12:00 pm, Flint 50

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**Required Textbook:** Brown, Foote, Iverson, Anslyn. *Organic Chemistry, Sixth Edition*; Brooks/Cole, 2011. (ISBN 084005498X) <http://www.amazon.com/Organic-Chemistry-William-H-Brown/dp/084005498X>

First chapter free preview: [http://www.cengagebrain.com/shop/content/brown5498x\\_084005498x\\_02.01\\_chapter01.pdf](http://www.cengagebrain.com/shop/content/brown5498x_084005498x_02.01_chapter01.pdf)

**Required Study Guide:** Iverson, Iverson. *Study Guide with Student Solutions Manual*; Brooks/Cole, 2011. (ISBN 1111426813) <http://www.amazon.com/Student-Solutions-Iverson-Anslyn-Chemistry/dp/1111426813/>

**Publisher's Website:** <http://www.cengagebrain.com/micro/ufchem>  
<http://www.cengagebrain.com/shop/isbn/9780840054982?cid=D2S>

**Highly Recommended Model Sets:** HGS Polyhedron molecular model student set, student organic chemistry-C <http://www.sigmaaldrich.com/catalog/search/ProductDetail/ALDRICH/Z277746> 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: Wade; McMurry; Vollhardt & Schore; Morrison & Boyd; Bruice; Hornback; Streitwieser & Heathcock.

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**E-Learning Website.** All students will have access to the E-Learning website: <https://lss.at.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.

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#### **Class Requirements:**

- 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)
- = 1000 points total**

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**Problem Sets.** Problem sets will be **due at 4:55 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 Assessment on E-Learning. 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.

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**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.

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**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 may 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.

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**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.

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**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 second class meeting after the date the assignment was returned to the class.

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**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.

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**Office Hours.** Subject to change, office hours will held Thursdays from **3:00 pm – 3:50 pm** and Fridays from **1:55 pm – 2:45 pm in Leigh Hall 328** (the Polymer Conference Room). Additional/individual office hours should be possible and should be scheduled by email. Additionally, students are encouraged to visit the Organic Chemistry Learning Center, located in Rooms 257 and 258 in Flint 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 8:30 am to 6:00 pm and the final schedule will be posted on E-Learning.

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**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.

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

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

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**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. The last four semesters that I taught CHM 2210, the grade distributions were as follows:

<b>Spring 2008:</b>			<b>Fall 2008:</b>			<b>Fall 2009:</b>			<b>Fall 2011:</b>		
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%

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**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.

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**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:

<http://www.dso.ufl.edu/sccr/honorcodes/honorcode.php>

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**Copyright Notice.** All handouts used in this course are copyrighted and may not be copied without my expressly granted permission. "Handouts" include all materials generated for this class, which include but are not limited to syllabi, quizzes, exams, problems, in-class materials, review sheets, problem sets, or other materials. Tutors and tutoring services are expressly forbidden from copying any or all of these materials. Only students currently enrolled in the class may make a single copy of this material for their personal use.

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