

**CHEM 2451 ORGANIC CHEMISTRY**  
**Syllabus for Winter Quarter 2014**

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**Office Hours:** MTRF 10 – 11 AM in Olin 232 or by appointment

**Required Text and Solutions Manual:**

*Organic Chemistry, 5<sup>th</sup> Edition*, by Marc Loudon  
*Study Guide and Solutions Manual to Accompany Organic Chemistry, 5<sup>th</sup> Edition*  
by Marc Loudon and Joseph G. Stowell

**Recommended Model Kit:**

Molymod #62053 Molecular Modeling Set from Indigo Instruments

**Course Objective.** Your primary course objective is to master the subject matter of the first quarter of the three-quarter course in organic chemistry. An understanding of organic chemistry is essential for mastery of subsequent undergraduate courses in biochemistry and physical chemistry and for achieving the high test scores necessary for admission to post-graduate or professional school. Your secondary course objective is to gain insight into the logical progression of scientific inquiry and scientific discovery. When the goals of undergraduate, post-graduate, and professional school are completed, this insight you have gained and an appreciation of organic chemistry in the world within and around you will help you make well-informed decisions in your chosen professions and as citizens, neighbors, parents, children, and patients.

**“The purpose of education is to nurture thoughtfulness. The lesser function of thinking is to solve puzzles and problems.”**

Albert Einstein

**Lectures.** The lectures will loosely follow the progression of the textbook at a pace of approximately one chapter per week. The lectures are presented on the board at a pace which should allow you to take notes and think critically about the material presented. I will use four ink colors. I suggest you have four colors to reproduce the material presented. Questions are welcome at any time during the lecture.

**Problem/Help Sessions.** Thursday problem-solving sessions provide an opportunity for you to test your command of the material by solving problems taken from online sources. Exam questions may include material from these problem-solving sessions.

**Homework.** Set aside time after every lecture to read the textbook, review your notes and complete three relevant problems. The textbook problem numbers for each lecture are posted on Blackboard. Some exam questions will be taken from the textbook problems list.

**Assignments.** There will be six 10-point assignments. The primary objective of these assignments is to ensure that you are keeping up with the lecture material and textbook problems. Exam questions may include material from these assignments.

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**Exams and Grading.** There will be two 50 minute exams and one 105 minute comprehensive final exam. Each exam is worth 200 points. If your lowest 50 minute exam score is lower than your final exam score, the 50 minute exam score will be replaced by the final exam score. There are no make-up exams. If you miss a 50 minute exam for any reason, the 0 for that exam will be replaced by the final exam score. Your final grade will be based on 660 points: 600 points for the exams and 60 points for six assignments. Your course grade will be determined using the following scale:

	A		B			C			D		
Letter	A	A-	B+	B	B-	C+	C	C-	D+	D	D-
%	92	88	84	80	76	72	68	64	60	56	52
Points	607	581	554	528	502	475	449	422	396	370	343

**Grade Curve.** The raw score class average for each exam is announced in class and on Blackboard. If the raw score class average is below 144 points (72% C) your grade will be curved. To illustrate, if the raw score class average is 130, 14 points will be added to your raw exam score. Your raw exam score, your curved exam score, and your letter grade taken from the chart above are provided for each exam. Your curved exam score is posted on Blackboard. The maximum curved exam score is 200 points.

**Exam Review/Corrections.** Answer keys are posted on Blackboard for each exam. The exam answer key is reviewed point-by-point during the recitation after the exams are returned. Grading corrections on exams 1 and 2 should be submitted for review within two weeks after the answer key is reviewed. Grading corrections on the final exam should be submitted for review within the first two weeks of the next quarter.

**Graded Document Retention.** All graded materials will be returned. Graded materials that are still in my possession at the end of Spring Quarter 2013 will be shredded and recycled.

### Cell Phones, Laptops, and Calculators in the Classroom

Turn off cell phones during class. Laptops are permitted during lecture and recommended during recitation problem sessions. Cell phones, laptops, and calculators must be put away during exams.

### Lecture and Testing Accommodations

If you have a disability/medical issue protected under the Americans with Disabilities Act (ADA) and Section 504 of the Rehabilitation Act and need to request accommodations, please make an appointment with the **Disability Services Program (DSP)**; 303.871.2372/ 2278/ 7432; located on the 4<sup>th</sup> floor of Ruffatto Hall; 1999 E. Evans Ave. Information is also available on line at <http://www.du.edu/disability/dsp>. See the *Handbook for Students with Disabilities*.

### Honor Code of the University of Denver

To review your rights and responsibilities with respect to the Honor Code of the University of Denver, visit the website for the Office of Student Conduct at: [www.du.edu/honorcode](http://www.du.edu/honorcode)

I reserve the right to modify the syllabus and lecture schedule as necessary.

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**Tentative Lecture Schedule**

6 January	Introductions/Syllabus Lewis Dot Structures VSEPR Theory Resonance Structures/Hybridization Polarity of Bonds and Molecules Molecular Orbital Theory	<b>Chapter 1</b> pp. 1 - 45
8	Continued	
10	Continued	
13	Nomenclature Alkanes and Cycloalkanes Boiling Point/Melting Point/Solubility Intermolecular Attractive Forces Bond Rotation/Newman Projections Torsional and Steric Strain	<b>Chapter 2</b> pp. 46 - 86
15	Continued	
17	Continued	
20	<b>NO CLASSES</b> MLK Day	
22	Continued	
24	Lewis and Bronsted Acids and Bases Ka and pKa Arrows for Reactions/Resonance Predicting Acidity/Basicity Kinetics and Thermodynamics	<b>Chapter 3</b> pp. 87 - 121
27	Continued	
29	Alkene Structure and Bonding Stereoisomerism Nomenclature Alkenes/Cycloalkenes Addition of H <sub>2</sub> Heats of Formation and Hydrogenation Alkene Stability Order Addition HX and H <sub>2</sub> O/HA Markovnikov's Rule Carbocation Stability/Rearrangement Energy Diagrams/Hammond's Postulate	<b>Chapter 4</b> pp. 122 - 177
31	Continued	
3 February	Continued	
5	<b>EXAM 1</b> Chapters 1 - 4	
7	Radical Chain Mechanism for HBr Radical Stability Order Addition of X <sub>2</sub> and X <sub>2</sub> /H <sub>2</sub> O Oxymercuration/Reduction Hydroboration/Oxidation	<b>Chapter 5</b> pp. 178 - 225
10	Continued	

12	Continued	
14	Enantiomers/Asymmetric Carbons Plane of Symmetry Nomenclature Enantiomers Polarimetry/Optical Rotation Diastereomers/Meso Compounds	<b>Chapter 6</b> pp. 226 - 267
17	Continued	
19	Cycloalkanes: Torsional and Angle Strain Cyclohexane Chair/Boat Conformations Axial and Equatorial/1,3-Diaxial Strain Cyclohexanes with Two Substituents Bicyclic/Spirocyclic Compounds Stereochemistry as Tool for Mechanisms	<b>Chapter 7</b> pp. 268 - 322
21	Continued	
24	Continued	
26	Continued	
28	Nomenclature Alkyl Halides/Alcohols/ Thiols/Ethers/Sulfides Bronsted Acidity and Basicity Grignard and Organolithium Reagents Alkane Free Radical Halogenation	<b>Chapter 8</b> pp. 323 – 376
3 March	Continued	
5	<b>Exam 2</b> Chapters 5 – 7	
7	S <sub>N</sub> 2 Kinetics/Mechanism Alkyl Halide α and β substitution Nucleophilicity Basicity/Size/Solvation E2 Kinetics/Concerted Mechanism E2 Stereoselectivity/Regioselectivity	<b>Chapter 9</b> pp. 377 - 411
10	Continued	
12	Continued	
13-19	<b>FINAL EXAM</b> date/time on Web Central Chapters 1 – 9	