

## CHEM 2451 ORGANIC CHEMISTRY

### Syllabus for Winter Quarter 2015

**Instructor:** Dr. Peter J. Harrington  
**Office:** BW 222  
**Phone:** 303-871-2746 303-905-5491 (cell)  
**email:** [peter.harrington@du.edu](mailto:peter.harrington@du.edu) [pjh@betterpharmaprocesses.com](mailto:pjh@betterpharmaprocesses.com)  
**Office Hours:** MWRF 10 – 11 AM 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 profession 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 use four ink colors. I suggest you have four colors available 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 current lecture material.

**Homework.** Set aside time after every lecture to read the textbook, review your notes and complete textbook problems. Textbook problems relevant to each lecture are posted on Canvas. Some exam questions are taken from the textbook problems.

**Science and Engineering Learning Center:** Need extra help? The Science and Engineering Learning Center is a collaborative space staffed by undergraduate and graduate teaching assistants trained to assist students with first and second year chemistry, physics, and engineering lecture and laboratory courses. The goal of the center is to help students grow as problem solvers by assisting with homework sets, lab reports, and exam preparation. The center is not one-on-one tutoring, but is rather a support system where students can get guidance from teaching assistants as well as their peers. The center is open to all DU students. All services are free. The Science and Engineering Learning Center is located in the north-west corner of the first floor of the Anderson Academic Commons (west of the writing center).

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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 620 points: 600 points for the exams and 20 points for completion of the online course evaluation at the end of the quarter. 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	570	546	521	496	471	446	422	397	372	347	322

**Grade Curve.** The raw score class average for each exam is announced in class and on Canvas. 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 curved exam score is posted on Canvas. The maximum curved exam score is 200 points.

**Exam Review/Corrections.** Answer keys are posted on Canvas 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 still in my possession at the end of Spring Quarter 2015 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 problem sessions. Cell phones, laptops, and calculators must be turned off and 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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**Syllabus for Winter Quarter 2015**  
**Tentative Lecture Schedule**

5 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
7	Continued	
9	Continued	
12	Continued	
14	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
16	Continued	
19	<b>NO CLASSES</b> MLK Day	
21	Continued	
23	Continued	
26	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
28	Continued	
30	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
2 February	Continued	
4	<b>EXAM 1</b> Chapters 1 – 3	
6	Chapter 4 Continued	
9	Continued	

11	Radical Chain Mechanism for HBr Radical Stability Order Addition of $X_2$ and $X_2/H_2O$ Oxymercuration/Reduction Hydroboration/Oxidation	<b>Chapter 5</b> pp. 178 - 225
13	Continued	
16	Continued	
18	Enantiomers/Asymmetric Carbons Plane of Symmetry Nomenclature Enantiomers Polarimetry/Optical Rotation Diastereomers/Meso Compounds	<b>Chapter 6</b> pp. 226 - 267
20	Continued	
23	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
25	Continued	
27	Continued	
2 March	Continued	
4	<b>Exam 2</b> Chapters 4 – 7	
6	Nomenclature Alkyl Halides/Alcohols/ Thiols/Ethers/Sulfides <b>on 3/5</b> Bronsted Acidity and Basicity Grignard and Organolithium Reagents Alkane Free Radical Halogenation	<b>Chapter 8</b> pp. 323 – 376
9	$S_N2$ Kinetics/Mechanism Alkyl Halide $\alpha$ and $\beta$ substitution Nucleophilicity Basicity/Size/Solvation	<b>Chapter 9</b> pp. 377 - 399
11	Continued	
12-15	<b>FINAL EXAM</b> date/time on Web Central Chapters 1 – 9	