

# CHEMISTRY 7240 Syllabus

<b>Lecture</b>	MWF 9:40 AM in HEB 2002
<b>Discussion</b>	Thu. 11:50 AM in HEB 2002
<b>Instructor</b>	Prof. Ilya Zharov      HEB 3416, zharov@chem.utah.edu www.chem.utah.edu/faculty/zharov/group
<b>Office Hours</b>	NONE, stop by my office/lab any time, or talk to me after class, e-mail to make an appointment
<b>Required Text</b>	Modern Physical Organic Chemistry, Anslyn/Dougherty, University Science Books, 2005 (on reserve in the library). <i>Lecture notes will be available for each topic.</i>
<b>Recommended Texts</b>	Advanced Organic Chemistry: Part A. Carey & Sundberg, 4th Ed.; Plenum, 2001. Advanced Organic Chemistry. March; 5 <sup>th</sup> Ed., Wiley, 2001. Mechanism and Theory in Organic Chemistry. Lowry & Richardson; 3 <sup>rd</sup> Ed., Harper & Row, 1987. Physical Organic Chemistry. Isaacs; 2 <sup>nd</sup> Ed., Wiley, 1990.
<b>Exams</b>	Two exams, 200 pts and 1 hour each, cover concepts in first and second 1/2 of material.
<b>Homework</b>	Six problem sets, each 75 pts, can be solved in teams. Will become available on Fri's, due the following Thu. Answer key will be available after solutions are turned in.
<b>Presentation</b>	Present a published phys. org. paper, 15 min during one of the discussions, 300 pts max (peer graded).
<b>Grading</b>	200x2(exams) + 450(homework) +150(presentation) = 1000. Anticipated average is B+.

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## CHEMISTRY 7240: Course Outline

<b>Part I: Molecular Structure and Thermodynamics</b>			
<i>Covalent bonds</i>			
1	Aug. 23 w	Models of chemical bonding, $\sigma$ , $\pi$ -bonding, cyclopropane	
	Aug. 24 h		No discussion
2	Aug. 25 f	Conformational analysis I: strain and stability of rings	No homework
3	Aug. 28 m	Conformational analysis II: torsional isomerism in acyclic systems	
4	Aug. 30 w	Stereoelectronic effects I: concept, conf. control, origins, anomeric effect	
	Aug. 31 h		Discussion #1
5	Sept. 1 f	Stereoelectronic effects II: ring closing reactions	Homework #1
	Sept. 4 m	No lecture, Labor Day	
6	Sept. 6 w	Resonance, aromaticity, annulenes	
	Sept. 7 h		Discussion #2
7	Sept. 8 f	Acid-Base chemistry	Homework #2
<i>Non-covalent bonds</i>			
8	Sept. 11 m	Binding forces, binding constant determination	
9	Sept. 13 w	Molecular recognition	
	Sept. 14 h		Discussion #3
10	Sept. 15 f	Supramolecular chemistry	Homework #3
	Sept. 18 m	<b>Exam 1</b>	
<b>Part II: Reactivity, Kinetics and Mechanisms</b>			
<i>Tools for Determining Organic Mechanisms</i>			
11	Sept. 20 w	Linear free energy relationships (LFER) I: Concept, Hammond postulate	
	Sept. 21 h		Discussion #4
12	Sept. 22 f	Linear free energy relationships (LFER) II: Hammett relationships	Homework #4
13	Sept. 25 m	Kinetics I: Rate determining steps, rate laws	
14	Sept. 27 w	Kinetics II: Intermediates, transition state theory, Curtin-Hammett principle	
	Sept. 28 h		Discussion #5
15	Sept. 29 f	Kinetics III: Isotope effects	Homework #5
16	Oct. 2 m	Solvation and Solvent Effects	
<i>Some Organic Mechanisms</i>			
17	Oct. 4 w	Eliminations and Additions to Carbonyl	Discussion #6
	Oct. 5 h	No discussion, Fall break	
	Oct. 6 f	No lecture, Fall break	
18	Oct. 9 m	Nucleophilic Substitutions	Homework #6
19	Oct. 11 w	Organic Materials: polymerization mechanisms, novel architectures	
	Oct. 12 h		Discussion #7
20	Oct. 13 f	Organic Materials: carbon nanotubes, photoresists	
	Oct. 16 m	<b>Exam 2</b>	

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