

## CHEM 2451 ORGANIC CHEMISTRY I

### Syllabus

Instructor: Dr. Ronald Nohr

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Office Hours: One Half Hour Before Lecture and One Half Hour After Lecture (M – F)

Text: **Organic Chemistry**, 5<sup>th</sup> ed., Marc Loudon, Roberts and Company Publishers, 2009

Lecture Room: Olin 103

**OBJECTIVE:** During this first quarter of organic chemistry there will be an emphasis on the relationship between structure of organic compounds and their reactivity. This theme will continue through an organization that combines the most useful features of the traditional functional group approach with one based on reaction mechanisms. That is, emphasizing the structural aspects shows what organic chemistry is and the mechanistic aspects reveals how organic chemistry works. Whenever possible the course will review and integrate what you learned in your general chemistry class.

**HOMEWORK:** Problems at the end of the chapter are important for you to study. You do not have to turn in these problems; however, it is important that you do enough of them to understand the concepts presented in lecture.

**EXAMINATIONS:** There will be two take-home exams, two in-class exams and a comprehensive final exam. The take-home exams will be given on Thursday July 11 and Thursday July 18 and will be collected the following Friday. Part B (the in-class exam) will be given on the following Monday. You will be given at the time you turn in the take-home test on Friday a key to study the test concepts over the week-end. Take-home exams and in-class exams will cover the same lecture material.

## **FINAL LETTER GRADE:**

Your final letter grade will be based on the percentage of the points you earned. The four exams. (take-home and in class) will each count 100 points. Your lowest exam. grade will be dropped. **There will be no make-up exams.** If you miss an exam., for any reason, it will count as the dropped exam. The final exam. will count 200 points.

Points: 300 Points (take-home and in class) (400 pts -100 pts (lowest))  
200 Points (final required - comprehensive)  
500 Points Total

### **Final Point Percentage**

87 to 100% = A

84 to 86% = A<sup>-</sup>

81 to 83% = B<sup>+</sup>

77 to 80% = B

74 to 76% = B<sup>-</sup>

71 to 73% = C<sup>+</sup>

68 to 70% = C

65 to 67% = C<sup>-</sup>

Below 65% = D

Below 55% = F

#### **ADDITIONAL ITEMS**

- 1. No Cell Phones in Lecture**
- 2. No Talking During Lecture**
- 3. Please Respect the University Honor Code**
- 4. I reserve the right to modify the syllabus and lecture schedule as necessary**

# TENTATIVE LECTURE SCHEDULE

## DATE

## TOPIC

July 8

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
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July 9

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
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July 10

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
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July 11

Alkene Structure and Bonding Stereoisomerism Nomenclature Alkenes/Cycloalkenes Addition of H <sub>2</sub> Heats of Formation and Hydrogenation <b>TAKE-HOME EXAMINATION 1</b>	<b>Chapter 4</b> pp. 122 -177
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July 12

Continued	
Alkene Stability Order Addition HX and H <sub>2</sub> O/HA Markovnikov's Rule Carbocation Stability/Rearrangement Energy Diagrams/Hammond's Postulate	

July 15

## EXAMINATION 1

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
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July 16

Enantiomers/Asymmetric Carbons Plane of Symmetry Nomenclature Enantiomers Polarimetry/Optical Rotation Diastereomers/Meso Compounds	<b>Chapter 6</b> pp. 226 - 267
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July 17

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
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July 18

Continued
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## TAKE-HOME EXAMINATION 2

July 19

Nomenclature Alkyl Halides/Alcohols/ Thiols/Ethers/Sulfides Bronsted Acidity and Basicity Grignard and Organolithium Reagents Alkane Free Radical Halogenation
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<b>Chapter 8</b> pp. 323 – 376
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July 22

## EXAMINATION 2

Continued

July 23

<b>S<sub>N</sub>2</b> kinetics/mechanism Alkyl Halide $\alpha$ and $\beta$ substitution Nucleophilicity. Basicity/Size/Solvation <b>E2</b> Kinetics/Concerted Mechanism <b>E2</b> Stereoselectivity/Regioselectivity
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<b>Chapter 9</b> pp. 377 -
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July 24

Continued

July 25

Continued

July 26

**FINAL EXAMINATION**