Syllabus, Chem 245
Organic Chemistry for Chemical Engineers Fall 2016
M: 10:45 AM to 12:55 PM, Kupferin Hall 211
T: 10:00 AM to 12:55 PM, Kupferin Hall 209
Instructor: Willis B. Hammond Office: Tiernan 323A
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Office Hours: Tiernan Hall 323A, Monday, Tuesday 1:30 pm-3:00 pm or by arrangement


The Study Guide for the textbook may be useful and is recommended. Any inexpensive set of molecular models is highly recommended and models can be used during exams.

Material to be covered and tentative exam dates:
Chapter 1: Carbon Compounds and Chemical Bonds
Chapter 2: Representative Compounds, and Functional Groups, Intermolecular Forces and Infrared Spectroscopy
Chapter 3: Organic Reactions, Acids and Bases
Chapter 4: Alkanes, Nomenclature, Conformational Analysis and Synthesis
Chapter 5: Stereochemistry
Exam 1: 9/27/2016
Chapter 6: Ionic Reactions
Chapter 7: Alkenes and Alkynes 1, Properties and Synthesis
Chapter 8: Alkenes and Alkynes 2, Addition Reactions
Chapter 9: NMR Spectroscopy and Mass Spectrometry
Chapter 10: Radical Reactions
Exam 2: 10/24/2016
Chapter 11: Alcohols and Ethers
Chapter 12: Alcohols from Carbonyl Compounds
Chapter 13: Conjugated Unsaturated Systems
Chapter 14: Aromatic Compounds
Chapter 15: Reactions of Aromatic Compounds
Exam 3: 11/15/2016
Chapter 16: Aldehydes and Ketones 1, Addition Reactions
Chapter 17: Carboxylic Acids and Derivatives
Chapter 18: Enols and Enolates, Reaction at the alpha Carbon
Chapter 19: Condensations and Conjugate Addition
Chapter 20: Amines
Chapter 21: Phenols and Aryl Halides (Time permitting)
Quizzes:
Short quizzes will be given each week when there is no exam. Quiz grade averages will be added to exam grade totals to calculate the final grade. The quizzes are therefore of significant value.

Exams:
Exams will be closed book and two hours long. Calculators will be allowed. Smart phones are not allowed during exams and may not be used as calculators.

Final Exam:
The final exam will cover mainly the material presented after exam 3, but the nature of the course is cumulative, so earlier concepts will be very important.

Grading:
The lowest grade of the first 3 exams will be dropped in calculating the final grade. Two exams and the final exam will each count 25% towards the final grade. The quizzes will also count 25%. Recommended problems will be listed on Moodle for each chapter and answers will be posted at a later date. Attendance is required at lectures and will be considered in determining the final grade. Exams and quizzes must have final answers written in ink or regrading will not be considered.

The NJIT Honor Code will be upheld, and any violations will be brought to the immediate attention of the Dean of Students.

Learning Outcomes:
Upon completion of the course you should have a facility in the following areas:
1. Interpret 2-dimensional representations of molecular structures in 3-dimensions
2. Understand the geometry resulting from atomic orbital hybridization
3. Know how electronegativity and resonance causes charge distribution on molecules
4. Relate geometry and charge distribution to chemical and physical properties
5. Understand how kinetics, thermodynamics and statistical mechanics describe chemical reactions
6. Draw the structures of the products given specific reactants
7. Write the mechanisms of the reactions covered
8. Understand how physical conditions influence rate and path of reactions
9. Use IR, NMR and UV spectroscopy and mass spectrometry to determine molecular structure