

CHEM 245 (SYLLABUS)

Organic Chemistry for Chemical Engineers Fall 2017

M: 10:00 AM - 12:10 PM

F: 2:30PM - 4:40 PM, Kupferin Hall 209

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Textbook: Organic Chemistry, 12th edition by T. W. Graham Solomons, Craig B. Fryhle, Scott A. Snyder (Wiley Publishing)

Hard cover: ISBN 978-1-118-87576-6

Binder ready version: ISBN 978-1-119-07725-1

Electronic book: ISBN 978-1-119-23364-0

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: 9/29/2017

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: 10/27/2017

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: 11/17/2017

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. 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.

**Grading: Exams + Quiz + Attendance
(Exams: 60%, Quiz: 30%, Attendance 10%)**

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

THE NJIT HONOR CODE WILL BE UPHELD, AND THAT ANY VIOLATIONS WILL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE DEAN OF STUDENTS. STUDENTS WILL BE CONSULTED WITH BY THE INSTRUCTOR AND MUST AGREE TO ANY MODIFICATIONS OR DEVIATIONS FROM THE SYLLABUS THROUGHOUT THE COURSE OF THE SEMESTER.