Syllabus: Organic Chemistry I Chem 243 102 FALL 2016

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Textbook: Organic Chemistry, 11th edition by Graham-Solomons (Wiley Publishing Hard cover, Binder version or Electronic book)

Online Homework (in progress);

Solomons Organic Chemistry, 11E

Binder Ready edition bundled with WileyPLUS 9781118566893 (in progress)

Organic Chemistry 11e SSM/SG 9781118147900 Electronic text

All – Access Pack 9781118675052

Hard Cover edition: Organic Chemistry, 11th Edition by T. W. Graham Solomons, Craig B. Fryhle, Scott A. Snyder

ISBN 978-1-118-13357-6

Molecular Model Kit 7E 9780471362715

The Study Guide for the textbook may be useful and is highly recommended.

An inexpensive set of molecular models is highly recommended and models can be used during exams.

The powerpoint slides, old tests, and study materials will be posted on Moodle.

Material to be covered, learning outcomes and tentative exam dates:

Chapter 1: Carbon Compounds and Chemical Bonds
Draw Lewis structures of molecules and ions
Determine presence and location of formal charges
Draw structures of resonance forms and approximate structure of resonance hybrids
Use curved arrows to show relationship between resonance structures
Identify hybridization states of atoms in given molecular structures
Draw all isomers of a given formula

Chapter 2: Representative Compounds, and Functional Groups, Intermolecular Forces and Infrared Spectroscopy
Identify existence of dipole moments in molecules
Identify functional groups in molecules
Use IR data to determine functional groups in molecules and deduce molecular structure given empirical formula
Relate structural features to physical properties such as boiling point and solubility

Chapter 3: Organic Reactions, Acids and Bases
Identify hemolytic and heterolytic bond breaking in given reactions
Identify molecules as either acids or bases using the Lewis and Bronstead definitions
Use curved arrows to show electron movement in reactions
Determine relative acidity and basicity of a given set of molecules
Describe structures of carbanions and carbocations
Be able to interpret molecular structures given by condensed formulas, bond line formulas etc.
Know the characteristics of sigma and pi bonds.
Be able to identify reactions as one of the four fundamental types

Exam 1: _____ (25%)

Chapter 4: Alkanes, Nomenclature, Conformational Analysis and Synthesis
Draw molecular structure from IUPAC or common name
Give IUPAC or common name for given structure
Draw Newman projection for a given conformation
Draw cyclohexane ring structures with given substituents
Show how cyclohexane "ring flip" changes conformation of substituents

Chapter 5: Stereochemistry
Be able to identify chiral centers in a given structure
Given Fisher projections be able to determine the stereochemical relationship between two structures
Assign R and S configurations to chiral centers given Fisher projections

Chapter 6: Ionic Reactions
Identify species of a reaction as nucleophile, substrate or leaving group
Given reactants draw the structure of the major product of the reaction
Determine how a change in solvent affects the rate of a given reaction
Draw the mechanism for a given reaction
Know which mechanism will be favored by specific conditions
Identify relative stability of carbocations.

Exam 2: _____ (25%)

Chapter 7: Alkenes and Alkynes 1, Properties and Synthesis
Draw structures of reaction products for elimination reactions including stereochemical effects
Write mechanisms for elimination reactions
Give names for given structures and draw structures from names

Chapter 8: Alkenes and Alkynes 2, Addition Reactions
Draw structures of products of addition reactions to alkenes, including any stereochemical effects
Write mechanisms for addition reactions
Identify when rearrangements can occur and the products formed

Chapter 9: NMR Spectroscopy and Mass Spectrometry
Deduce structures of molecules given empirical formulas with NMR and IR data
Use Mass Spectroscopy to help identify structures
Recognize different magnetic environments in molecules
Interpret spin-spin coupling in spectra

Exam 3: _____ (25%)

Chapter 10: Radical Reactions
Write the products of radical substitution reactions
Write the mechanism of radical substitutions

Chapter 11: Alcohols and Ethers
Write the products of the reactions of alcohols and ethers
Write the mechanisms of reactions

Chapter 12: Alcohols from Carbonyl Compounds
Know oxidation and reduction reagents and the products of their reactions
Write the products of the organometallic reactions covered

Final Exam (25%)

All the power point presentations and sample tests are uploaded to Moodle.
YOU HAVE TO USE YOUR NJIT E-MAIL TO HAVE A RESPONSE FROM ME.

The NJIT Honor Code will be upheld, and any violations will not be tolerated and will be brought to the immediate attention of the Dean of Students.