

CHEM 351: Organic Chemistry I

Instructor Information

Instructor	Email	Course Format	Number of Credits
Mark Perks	perks@umbc.edu	Lecture	3

General Information

Delivery Format

In-Person

Prerequisites:

CHEM 101, CHEM 102

Course Materials

Currently Used Materials

- Klein, David "Organic Chemistry" John Wiley and Sons, 2012

Course Objectives/Learning Outcomes:

Chapters 1 through 13 of the text will be covered in sequence. Overarching objectives are 1) acquiring concepts of structure, bonding, thermodynamics, kinetics, acid-base chemistry and stereochemistry; 2) mastery of the functional group reactions of each chapter; 3) understanding of the mechanisms of the reactions; 4) and creative use of the reactions in organic synthesis. By the end of this course, students will be able to predict and explain the steric, electronic, and mechanistic factors underlying the physical and chemical behavior of organic compound classes covered. Detailed lists of specific skills that should be mastered in order to succeed in this course are available on the course blackboard site. Students will gain a strong foundation for further studies in chemistry and biochemistry. We will emphasize the development of critical thinking skills that are important beyond the field of chemistry.

Potential Topics Covered:

Lewis structures, resonance line-angle formulas, isomers

Hybridization, physical properties, functional groups

Nomenclature, conformers, cyclohexane

Free-radicals and thermodynamics and kinetics, free-radical selectivity

Enantiomers and stereocenters

Optical activity, Fischer, diastereomers, meso, resolution

Alkyl halides, SN1 vs. SN2, kinetics, nucleophiles, solvents, leaving groups

Steric hindrance, inversion, rearrangement
E1 vs. E2, anti-coplanar, E1/SN1/E2/SN2
E/Z, E2/E1, dehydration, alkene additions
Hg(OAc)₂, hydroboration, hydrogenation, bromination
Rearrangements, anti-Markovnikov HBr epoxidation, ozonolysis
Alkynes, alkynide syntheses, alkyne additions
Alcohols, phenols, Grignard syntheses
Alcohol oxidations, tosyl, HX substitution, PBr₃, SOCl₂

Instructions for Visiting Students:

Visiting students must show evidence of completion of the equivalent of CHEM 101 and 102 with a grade of "C" or better.