

Course Objectives/Course Outline
Spokane Community College

Course Title: Organic Chemistry Lab III

Prefix and Course Number: CHEM& 253

Course Learning Outcomes:

By the end of this course, a student should be able to:

- Draw structures showing the common functional groups
- Classify organic compounds based on the functional groups present
- Name organic compounds using IUPAC nomenclature
- Describe the types of intermolecular forces and identify which forces are present in any substance
- Predict the boiling point, melting point, vapor pressure and other physical properties based on chemical structures
- Describe the stereochemistry of the organic molecules involved in a reaction
- Predict the product(s) of a chemical reaction given reagents and reaction conditions
- Identify the necessary reagents and reaction conditions to synthesize a desired compound
- Classify chemical reactions based on their general properties
- Recognize biologically significant organic compounds or classes of compounds
- Use IR spectroscopy to characterize organic compounds
- Use NMR spectroscopy to characterize organic compounds
- Use mass spectrometry to characterize organic compounds
- Use chromatography to separate and characterize organic compounds
- Purify mixtures of organic compounds by distillation
- Utilize the melting point to help characterize organic compounds
- Efficiently and safely utilize laboratory materials to prepare and characterize organic compounds

Course Outline:

- I. Chemical Compounds and Reactions
 - A. Introduction to Organic Compounds
 - B. Functional Groups
 - i. Alkanes, Alkenes and Alkyenes
 - ii. Aromatics
 - iii. Haloalkanes
 - iv. Aldehydes and Ketones
 - v. Alcohols/Carboxylic Acids
 - vi. Ethers
 - vii. Esters
 - viii. Amines
 - ix. Amides
 - x. nitriles
 - C. IUPAC Nomenclature
 - D. Molecular Geometry and Conformational Analysis
 - E. Isomerism and Chirality
 - F. Intermolecular Forces
 - G. Predicting Physical Properties
 - H. Bonding and Chemical Reactions

- II. Characterization Techniques
 - A. Infrared Spectroscopy
 - B. Nuclear Magnetic Resonance Spectroscopy
 - C. Chromatography
 - D. Mass Spectrometry
- III. Organic Reaction Mechanisms:
 - A. Introduction to Synthesis/Synthesis Strategies
 - B. Addition Reactions
 - C. Nucleophilic Substitutions
 - D. Elimination Reactions
 - E. Oxidation-Reduction Reactions
 - F. Aromatic Reactions
 - G. Aldol Reactions
 - H. Radical Reactions