Organic chemistry studies the structure, properties and reactions of organic compounds, which contain carbon in covalent bonding. Study of structure determines their structural formula. Study of properties includes physical and chemical properties, and evaluation of chemical reactivity to understand their behavior. The study of organic reactions includes the chemical synthesis of natural products, drugs, and polymers, and study of individual organic molecules in the laboratory and via theoretical (*in silico*) study.
4: Organic Compounds - Cycloalkanes and their Stereochemistry

5: Stereochemistry at Tetrahedral Centers

6: An Overview of Organic Reactions

7: Alkenes - Structure and Reactivity
8: Alkenes - Reactions and Synthesis

- 9: Alkynes - An Introduction to Organic Synthesis

- 10: Organohalides

- 11: Reactions of Alkyl Halides - Nucleophilic Substitutions and Eliminations
12: Structure Determination - Mass Spectrometry and Infrared Spectroscopy

\[ m_S = -\frac{1}{2}, \quad \Delta E = E_{-1/2} - E_{+1/2} \]

13: Structure Determination - Nuclear Magnetic Resonance Spectroscopy

- \( \sigma^*(\text{anti-bonding}) \)
- \( \pi^*(\text{anti-bonding}) \)
- \( \pi \) (non-bonding)
- \( \sigma \) (bonding)

14: Conjugated Compounds and Ultraviolet Spectroscopy

15: Benzene and Aromaticity
16: Chemistry of Benzene - Electrophilic Aromatic Substitution

17: Alcohols and Phenols

18: Ethers and Epoxides; Thiols and Sulfides

19: Aldehydes and Ketones- Nucleophilic Addition Reactions
20: Carboxylic Acids and Nitriles

21: Carboxylic Acid Derivatives - Nucleophilic Acyl Substitution Reactions

22: Carbonyl Alpha-Substitution Reactions

23: Carbonyl Condensation Reactions
24: Amines and Heterocycles

25: Biomolecules- Carbohydrates

26: Biomolecules- Amino Acids, Peptides, and Proteins

27: Biomolecules - Lipids
28: Biomolecules - Nucleic Acids

- Back Matter
  Back Matter