General Instructional Objectives

Materials That you should be familier by taking CHEM 120 or 100, 101 &102

- Be able to write Lewis symbols of elements and predict the number covalent bonds and ionic charge
- Be able to tell polarity (non-polar/polar/ionic) based on electronegativity of a covalent bond
- Be able to draw Lewis structures of organic molecules
- Be able to label the hybridization of carbon, oxygen and nitrogen in compounds
- Be able to identify functional groups and types of organic compounds

Chapter 12. Saturated Hydrocarbons.

12. 1 Organic and Inorganic Compounds.

- Know the difference between organic and inorganic compounds

12. 2 Bonding Characteristics of the Carbon Atom.

- Describe the bonding characteristics of the carbon atom

12. 3 Hydrocarbons and Hydrocarbon Derivatives.

- Describe and select hydrocarbons and hydrocarbon derivatives

12. 4 Alkanes: Acyclic Saturated Hydrocarbons.

- Know the types of alkanes: acyclic saturated hydrocarbons: normal and branched

12. 5 Structural Formulas.

- Draw and interpret the structural formula of alkanes: acyclic saturated hydrocarbons: normal and branched.
- Be able to determine molecular formula from, condensed, structural, a line-angle formula of alkanes.

12. 6 Alkane Isomerism.

- Describe the types of isomerism found in hydrocarbons, hydrocarbon derivatives and organic compounds: constitutional isomerism.
- Be able to draw constitutional isomers (Lewis structures or condensed formulas as specified) given the molecular formula.

12. 7 Conformations of Alkanes.

- Describe the types of conformation found in hydrocarbons, hydrocarbon derivatives and organic compounds: conformational stereoisomerism.
- Know what a Newman projection (staggered/ecliped) is and what it represents along with the most and least stable conformers

12. 8 IUPAC Nomenclature for Alkanes.

- Know IUPAC nomenclature for simple (unbranched) alkanes.
- Know the names of common alkyl groups found on branched alkanes
- Describe the ways alkanes are named using IUPAC rules.

12. 9 Line-Angle Structural Formulas for Alkanes.

- Draw and interpret the line anglel formula of alkanes: acyclic saturated hydrocarbons: normal and branched.

CHEMISTRY AT A GLANCE:
Structural Representations for Alkane Molecules.
12. 10 Classification of Carbon Atoms.

- Describe the ways carbon atoms are classified in alkanes: acyclic saturated hydrocarbons: normal and branched.
- Be able to identify primary, secondary and tertiary carbons on a organic compound

12. 11 Branched-Chain Alkyl Groups.

- Describe the ways alkyl groups are made by removing hydrogen from alkanes and use of alkyl group names in IUPAC nomenclature to name branched chain alkanes.
- Know IUPAC nomenclature for complex (branched) alkanes

12. 12 Cycloalkanes.

- Know the types of cycloalkanes: cyclic saturated hydrocarbons: cyclo-propane, -butane, -pentane and –hexane etc.
- Know the naming of simple and substituted cycloalknes.

12. 13 IUPAC Nomenclature for Cycloalkanes.

- Describe the ways cycloalkanes are named using IUPAC rules.

12. 14 Isomerism in Cycloalkanes.

- Describe the types of isomerism found in cycloalkanes, and their derivatives: Geometrical Isomerism-Cis- and Trans- Geometrical Isomerism.
- Know cis/trans geometric isomerism in cycloalakne compounds
- Know cyclepentane and cyclohexane conformations (most stable and least stable)

12. 15 Sources of Alkanes and Cycloalkanes.

12. 16 Physical Properties of Alkanes and Cycloalkanes.

- Know structure and physical property trends (you do not need to know the exact melting point or boiling point for a specific alkanes and cycloalkanes).

12. 17 Chemical Properties of Alkanes and Cycloalkanes.

- Know chemical properties of alkanes and cycloalkanes.
- Know combustion and substation reactions of alkanes and cycloalkanes.
- Know the substitution reactions of alkanes and cycloalkanes.

CHEMISTRY AT A GLANCE: Properties of Alkanes and Cycloalkanes.
12. 18 Nomenclature and Properties of Halogenated Alkanes.

- Know the substitution reactions of alkanes and cycloalkanes with halogens to produce CFCs.
- Know the effect of CFCs on the ozone depletion.

CHEMICAL CONNECTIONS:
The Occurrence of Methane; The Physiological Effects of Alkanes; Chlorofluorocarbons and the Ozone Layer.