**CP Chemistry**

**Course Syllabus**

Unit I. Introduction to chemistry

 1. Matter

 - Classification of matter

 - Properties of matter

 - Physical and chemical change

 2. Measurements and calculations

 - Scientific notation

 - Units of measurement

 - Uncertainty in measurement

 - Precision and accuracy

 - Significant figures

 - Problem solving

Unit II. Organization of matter

 1. Atomic structure

 - Foundations of atomic theory

 - Early atomic models

 - Modern atomic theory

 - Atomic number, Mass number and Isotopes

 2. Arrangement of electrons in atoms

 - Electromagnetic radiation

 - Quantum theory

 3. The Periodic table

 - The Periodic law

 - Development of the Periodic table

 - Periodic properties and trends

Unit III. Interactions of matter

 1. Chemical bonding

 - Types of bonds (Ionic, covalent and metallic)

 - Formulae and nomenclature

 - Structural formula

 - VSEPR theory and Molecular shapes

 - Polarity

 - Covalent and non-covalent interactions

 - Physical properties explained by the interactions

 2. Stoichiometry

 - Mole and Avogadro number

 - Percent composition

 3. Chemical Reactions

 - Writing chemical equations

 - Balancing chemical equations

 - Stoichiometry/ Problem solving

 -Limiting reactants and percent yield

 - Types of chemical reactions

 - Predicting products

 - Activity series

Unit IV. Phases of matter

 1. Properties of gases

 - Gas laws

 - Ideal gas equation

 - Stoichiometry of gases

 - Effusion and diffusion

 2. Liquids and Solids

 - Liquids

 - Solids

 3. Changes of state

UNIT V. Solutions

 1. Types of solutions

 2. Solubility

 3. Concentrations of solutions

 - Molarity, molality, parts-per-million, etc.

 4. Aqueous solutions

 - Colligative properties

 5. Chemical Equilibrium

 - Nature of chemical equilibrium

 - Le Chatelier’s principle

 - Solubility equilibrium

 6. Acids and bases

 - Definition of acids and bases

 - Strengths of acids and bases

 - Acid-base equilibrium

 - The auto-ionization of water

 - pH

 - Titrations

 - Buffers

7. Oxidation and Reduction reactions

 - Defining oxidation and reduction

 - Balancing redox equations

 - Electrochemistry

Unit VI. Reaction Energy and Reaction Kinetics

 1. Thermochemistry

 - Exothermic and endothermic reactions

 - Enthalpy changes

 - Hess’s law

 - Calorimetry

 2. Thermodynamics

 - Enthalpy, entropy and Gibbs free energy

 - Spontaneous reactions

 3. Reaction Kinetics

 - Collision theory

 - Activation energy

 - Factors affecting reaction rates