**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