

B. Tech. Ist Semester

Engineering Chemistry- AS 103

CO 1- To study and understand about chemical methods of analysis and phase rule.

CO 2- To understand the fundamentals of instrumental methods of analysis.

CO 3- To develop an understanding of basics of electrochemistry and surfactants.

CO 4- To understand about the fundamentals of polymers.

CO 5- To study and understand about the fundamentals of nanomaterials and composites.

ENGINEERING CHEMISTRY – I

AS – 103

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UNIT – 1: CHEMICAL METHODS OF ANALYSIS AND PHASE RULE (Lectures- 7)

Gravimetric Analysis; Digestion and its Importance, Favorable Conditions for Precipitation, Volumetric Methods of Analysis; Expression of concentration of solutions, Acid-Base (pH metry and conductometry), Redox, Precipitation and Complexometric Titrations. Phase Rule; Phase Rule Applications to One and Multiple Component systems, Fe-C Phase Equilibrium Diagram.

UNIT – 2: INSTRUMENTAL METHODS OF ANALYSIS (Lectures- 7)

Chromatography; Definition and Different Types of Chromatography, Adsorption chromatography and its types, Partition chromatography and its type, High Pressure Liquid Chromatography, Fundamentals of Spectroscopy; Principles and Applications of UV-Visible, Infra-Red and Atomic Absorption Spectrometry.

UNIT – 3: ELECTROCHEMISTRY AND SURFACTANTS (Lectures- 8)

Electrolytic and Galvanic cell, Electrode Potential, Standard Electrode Potential, EMF series, Nernst Equation, Cell emf Measurement, Reversible and Irreversible cell, Thermodynamic Overview of Electrochemical Processes, Conductance, Cell Constant and its Determination. Surface Active Agents, Soaps, Types of detergents and their disadvantages, Micelle, Critical Micellar Concentration, Hydrophilic and Hydrophobic Interactions, HLB values of Surfactants.

UNIT – 4: POLYMERS (Lectures- 8)

Basics of polymer chemistry, Molecular weight, Glass transition temperature and Melting point, Methods of polymerization, Structure property relationship, Thermoplastics and Thermosets, Fabrication of polymers by Compression, Injection, Extrusion and Transfer Moulding. Synthesis, Properties and uses of Polyethylene, Polyvinyl Chloride, Poly Methyl Methacrylate, Urea formaldehyde resin and Melamine formaldehyde resin, Conducting polymers and their applications.

UNIT – 5: NANOMATERIALS AND COMPOSITES (Lectures- 8)

General Introduction, Fullerenes, Carbon nanotubes, Nanowires, Electronic and Mechanical properties of nanomaterials, Synthesis of nanomaterials, Top down and Bottom up approaches, Applications of nanomaterials.

Adhesives, their classification and uses, Composites; their Compositions, types and Characteristics.