Lesson Plan (Odd Semester) Session 2025-26

Name of the Assistant Professor: Dr. Virender Kumar

Subject:-Chemistry

Class:- B.Sc Physical Science (IIIrd Semester)

Period	Topics to be covered	Topic of Assignments
24/07/2025 to 15/08/2025	**Unit-I p-block elements:** Electronic configuration, atomic and ionic size, metallic character, melting point, ionization energy, electron affinity, oxidation states, electronegativity, inert pair effect and diagonal relationship of 13, 14, 15, 16 & 17 group; **Boron family (13th group):**Diborane: Preparation, properties, and structure (as an example of electron deficient compound and multicentre bonding), Borazine- chemical properties and structure, relative strength of Trihalides of Boron as Lewis acids, structure of aluminium (III) chloride; **Practical; Exp 1-2** Preparation of Cuprous chloride and tetra ammine cupric sulphate,	
16/08/2025 to 31/08/2025	**Carbon family (14th):** Catenation, Carbides, silicates (structural aspects); **Nitrogen family (15th group):** Oxides: Structure of oxides of nitrogen and phosphorus, Oxyacid: Structure and relative acidic strength of oxyacids of nitrogen and phosphorus, structure of white, black and red phosphorus; **Oxygen family (16th group):**Oxy acids of sulphur – structure and acidic strength, Hydrogen Peroxide – properties and uses; **Halogen family (17th group):**Interhalogen compounds (their properties and structures), oxy acids of chlorine – structure and comparison of acidic strength **Practical; Exp-3-4.** Preparation of chrome alum, potassium trioxalatochromate (III) and Nickel Hexammine chloride.	
01/09/2025 to 15/09/2025	**Electrochemistry-I:** Electrolytic conduction, factors affecting electrolytic conduction, specific conductance, molar conductance, equivalent conductance and relation among them, their variation with concentration, Arrhenious theory of ionization, Ostwald's dilution law, Kohlrausch's law and its applications in calculation of conductance of weak electrolytes at infinite dilution (numerical), Applications of conductivity measurements : determination of degree of dissociation, determination	**Assignments:** **Thermodynamics-I** **Chapter**

	of solubility product of sparingly soluble salts. Definition of pH and pK_a. Buffer solution, Buffer action, Handerson-Hazel equation, Buffer mechanism of buffer action **Practical; Exp-5.** To determine the Critical Solution Temperature of phenol – water system	
16/09/2025 to 30/09/2025	**Thermodynamics-I;** Definition of thermodynamic terms: system, surroundings. Types of system, intensive and extensive properties, state and path functions and their differentials. Thermodynamic process, concept of heat and work, Zeroth law of thermodynamics, First law of thermodynamics, concepts of internal energy and enthalpy, heat capacity, heat capacities at constant volume and pressure and their relationship. Calculation of w, q, dU and dH for the expansion of ideal gases under isothermal and adiabatic conditions for reversible process. Temperature dependence of enthalpy, Bond energies and applications of bond energies, Carnot cycle and its efficiency, Carnot's theorem **Practical; Exp-6.** To determine the solubility of benzoic acid at various temperatures and to determine the ΔH of the dissolution process.	
01/10/2025 to 15/10/2025	**Alkenes:** Structure and bonding in akenes, Methods of preparation – 1. dehydration of alcohols (with mechanism), Regioselectivity in dehydration: Saytzeff's rule and Hoffmann rule 2. dehydrohalogenation of alkyl halides. Physical properties and relative stabilities of alkenes, Chemical Reactions: hydrogenation (without mechanism), electrophilic addition reactions with examples (with mechanism), Markownikoff's rule, oxymercuration-demercuration, hydroboration oxidation, ozonolysis, hydration, hydroxylation and oxidation with $KMnO_4$ **Practical; Exp-7.** To determine the enthalpy of neutralisation of a weak acid/weak base vs. strong base/strong acid and determine the enthalpy of ionisation of the weak acid/weak base.	
16/10/2025 to 30/11/2025	**Arenes & Aromaticity:** Aromaticity: Huckel's rule, concept of Aromatic, non-aromatic and antiaromatic compounds, Applications of Huckel's rule in Aromatic	

	ions and compounds. Structure of Benzene, Aromatic electrophilic substitution- general pattern of the mechanism, Mechanism of nitration, sulphonation, Friedel-Crafts reaction, Activating and deactivating substituents and orientation. **Alkyl Halides:** Methods of preparation- from alkenes and alcohols, physical properties, nucleophilic substitution reactions of alkyl halides, SN_1 and SN_2 reactions (mechanism) with energy profile diagrams. Concept of racemisation, inversion and retention **Practical; Exp-8.** To determine the enthalpy of solution of solid calcium chloride. Revision as per demand of students	

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