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| Date | Topics to be Covered  | Teaching Method  |
| 25-07-24To11-08-24 | **201TH** Solutions Thermodynamics of ideal solutions: Ideal solutions and Raoult’s law, deviations from Raoult’s law – non-ideal solutions. Vapour pressure-composition and temperature composition curves of ideal and non-ideal solutions. Distillation of solutions. Lever rule. Azeotropes. Partial miscibility of liquids: Critical solution temperature; effect of impurity on partial miscibility of liquids. Nernst distribution law and its applications, solvent extraction **201PR**Distribution Law Determination of distribution coefficient of i) iodine between CCl4 and Water ii) benzoic acid between benzene and water | * Lecture based instruction
* Inquiry based learning
* Laboratory Experiments
* Flipped Classroom
* Interactive simulations
* Problem based learning
* Blended learning
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| 13-08-24To26-08-24 | **201TH**Phase Equilibrium Phases, components and degrees of freedom of a system, criteria of phase equilibrium. Gibbs Phase Rule and its thermodynamic derivation. Derivation of Clausius – Clapeyron equation and its importance in phase equilibria. Phase diagrams of one-component systems (water and sulphur) and two component systems involving eutectics, congruent and incongruent melting points (lead-silver, NaCl-H2O and Mg-Zn only). **201PR**Distribution Law Determination of distribution coefficient of i) iodine between CCl4 and Water ii) benzoic acid between benzene and water | * Lecture based instruction
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| 28-08-24To16-09-24 | Ionic Bonding: General characteristics of ionic bonding. Energy considerations in ionic bonding, lattice energy andsolvation energy and their importance in the context of stability and solubility of ionic compounds. Statement ofBorn-Landé equation for calculation of lattice energy, Born-Haber cycle and its applications, polarizing power and polarizability. Fajan’s rules, ionic character in covalent compounds, bond moment, dipole moment and percentage ionic character. | * Lecture based instruction
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| 18-09-24To30-09-24 | **201TH** Conductance Conductivity, equivalent and molar conductivity and their variation with dilution for weak and strong electrolytes. Kohlrausch law of independent migration of ions. Transference number and its experimental determination using Hittorf and Moving boundary methods. Ionic mobility. Applications of conductance measurements: determination of degree of ionization of weak electrolyte, solubility and solubility products of sparingly soluble salts, ionic product of water, hydrolysis constant of a salt. Conductometric titrations (only acid base). **101PR**Conductance 1. Determination of cell constant 2. Determination of equivalent conductance, degree of dissociation and dissociation constant of a weak acid. 3. Perform the following conductometric titrations: i) Strong acid vs. strong base ii) Weak acid vs. strong base | * Lecture based instruction
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| 3-10-24To14-10-24 | **201TH** Fundamentals of Organic ChemistryPhysical Effects, Electronic Displacements: Inductive Effect, Electromeric Effect, Resonance and Hyperconjugation. Cleavage of Bonds: Homolysis and Heterolysis. Structure, shape and reactivity of organic molecules: Nucleophiles and electrophiles. Reactive Intermediates: Carbocations, Carbanions and free radicals.**101PR**Conductance 1. Determination of cell constant 2. Determination of equivalent conductance, degree of dissociation and dissociation constant of a weak acid. 3. Perform the following conductometric titrations: i) Strong acid vs. strong base ii) Weak acid vs. strong base | * Lecture based instruction
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| 16-10-24To28-10-24 | Stereochemistry Conformations with respect to ethane, butane and cyclohexane. Interconversion of Wedge Formula, Newman, Sawhorse and Fischer projections. Concept of chirality (upto two carbon atoms). Configuration: Geometrical and Optical isomerism; Enantiomerism, Diastereomerism and Meso compounds). Threo and erythro; D and L; cis – trans nomenclature; CIP Rules: R/ S (for upto 2 chiral carbon atoms) and E / Z Nomenclature (for upto two C=C systems). | * Lecture based instruction
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| 30-10-24To9-11-24 | Electrochemistry Reversible and irreversible cells. Concept of EMF of a cell. Measurement of EMF of a cell. Nernst equation and its importance. Types of electrodes. Standard electrode potential. Electrochemical series. Thermodynamics of a reversible cell, calculation of thermodynamic properties: ΔG, ΔH and ΔS from EMF data. Calculation of equilibrium constant from EMF data. Concentration cells with transference and without transference. Liquid junction potential and salt bridge. pH determination using hydrogen electrode and quinhydrone electrode. | * Lecture based instruction
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| 15-11-24 Onwards  | Revision for MMTMMT Tentative | Class Test, Student Presentation, Problem Solving |
| 15-12-24To31-12-24 | **Functional group approach for the following reactions (preparations & reactions) to be studied in context to their structure. Carboxylic acids (aliphatic and aromatic) -** Preparation: Acidic and Alkaline hydrolysis of esters. Reactions: Hell – Vohlard - Zelinsky Reaction. Carboxylic acid derivatives (aliphatic): (Upto 5 carbons) - Preparation: Acid chlorides, Anhydrides, Esters and Amides from acids and their inter conversion. Reactions: Comparative study of nucleophilicity of acyl derivatives. Reformatsky Reaction, Perkin condensation.**Amines and Diazonium Salts Amines (Aliphatic and Aromatic):** (Upto 5 carbons - Preparation: from alkyl halides, Gabriel’s Phthalimide synthesis, Hofmann Bromamide reaction. Reactions: Hofmann vs. Saytzeff elimination, Carbylamine test, Hinsberg test, reaction with HNO2, Schotten – Baumann Reaction. Electrophilic substitution (case aniline): nitration, bromination, sulphonation. Diazonium salts: Preparation: from aromatic amines. Reactions: conversion to benzene, phenol, dyes. | * Lecture based instruction
* Inquiry based learning
* Laboratory Experiments
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* Interactive simulations
* Problem based learning
* Blended learning
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| 4-02-24 To17-02-24 | **Carbohydrates:** Classification, and General Properties, Glucose and Fructose (open chain and cyclic structure), Determination of configuration of monosaccharides, absolute configuration of Glucose and Fructose, Mutarotation, ascending and descending in monosaccharide. Structure of disaccharides (sucrose, maltose, lactose) and polysaccharides (starch and cellulose) excluding their structure elucidation.**201PR****1**. Preparations of organic compounds – Iodoform and Glucosazone 2. Any Two of the following: i) Separation of amino acids by paper chromatography ii) Determination of the concentration of glycine solutionby formylation method. iii) Titration curve of glycine iv) Action of salivary amylase on starch v) Effect of temperature on the action of salivary amylase on starch. vi) Differentiation between a reducing and a non-reducing sugar. | Class Test, Student Presentation, Problem Solving |
| 18-02-24To29-02-24 | Revision and hands on experience of practicals | Class Test, Student Presentation, Problem Solving |
| March 2024 | Final Practicals |  |