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| **Lesson Plan 2021-2022 (EVEN SEMESTER)**  Sub:- Physical Chemistry CLASS: B.Sc. First Year  Name:- Ms Bhavana Arora Department:- Chemistry | |
| **APRIL** |  |
| 1ST WEEK | KINETICS –I  Rate of reaction, rate equation, factors influencing the rate of a reaction – concentration, temperature, pressure, solvent, light, catalyst. |
| 2ND WEEK | Order of a reaction, integrated rate expression for zero order, first order, second and third order reaction. Half life period of a reaction. |
| 3RD WEEK | Methods of determination of order of reaction.  Kinetics-II  Effect of temperature on the rate of reaction – Arrhenius equation. Theories of reaction rate – Simple collision theory for unimolecular and bimolecular collision. Transition state theory of Bimolecular reactions. |
| 4TH WEEK | Electrochemistry-I  Electrolytic conduction, factors affecting electrolytic conduction, specific, conductance, molar conductance,equivalent conductance and relation among them, their variation with concentration. |
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| **MAY** |  |
| 1ST WEEK | Ostwald’s Dilution Law. Debye- Huckel – Onsager’s equation for strong electrolytes (elementary treatment only) |
| 2ND WEEK | Arrhenius theory of ionization. Transport number, definition and determination by Hittorfs methods, (numerical included) |
| 3RD WEEK | Electrochemistry-II  Kohlarausch’s Law, calculation of molar ionic conductance and effect of viscosity temperature & pressure on it. Application of Kohlarausch’s Law in calculation of conductance of weak electrolytes at infinite dilution. |
| 4TH WEEK | Applications of conductivity measurements: determination of degree of dissociation, determination of Ka of acids determination of solubility product of sparingly soluble salts. |
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| **JUNE** |  |
| 1ST WEEK | Conductometric titrations. Definition of pH and pKa, Buffer solution,  conductometric titrations. Definition of pH and pKa, Buffer solution, |
| 2ND WEEK | Buffer action, Henderson – Hazel equation, Buffer mechanism of buffer action. |
| 3RD WEEK | Revision |
| 4TH WEEK | - |

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| **Lesson Plan 2021-2022 (EVEN SEMESTER)**  Sub:- Physical and Organic Chemistry CLASS: B.Sc. Second Year  Name:- Ms Bhavana Arora Department:- Chemistry | |
| **APRIL** |  |
| 1ST WEEK | THERMODYNAMICS -III  Second law of thermodynamics, Carnot’s cycles and its efficiency, Carnot’s theorm, Concept of entropy, entropy as a function of V & T, and P & T, entropy change in physica l change |
| 2ND WEEK | Entropy change in ideal gases and mixing of gases.  Thermodynamics-IV –  Third law of thermodynamics: Nernst heat theorem, residual entropy, evaluation of absolute entropy from heat capacity data. A & G as criteria for thermodynamic equilibrium and spontaneity. |
| 3RD WEEK | Variation of G and A with P, V and T.  AMINES-  Structure, nomenclature ,physical properties of amines. Separation of a mixture of primary, secondary and tertiary amines. basicity of amines. Preparation of alkyl amines. |
| 4TH WEEK | Preparation of aryl amines.  Diazonium Salts  Mechanism , structure of benzene diazonium chloride, Replacement of diazo group by H, OH, F, Cl, Br, I, NO2 and CN groups, reduction reaction, coupling reaction.  Nitro Compounds  Preparation, Mechanism of electrophilic substitution reactions in nitro arenes and their reduction reaction. |
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| **MAY** |  |
| 1ST WEEK | Aldehydes and Ketones  Synthesis of aldehydes and ketones, Mechanism of nucleophilic additions to carbonyl group with particular emphasis on benzoin, aldol, Perkin and Knoevenagel condensations. Condensation with ammonia and its derivatives. Wittig reaction |
| 2ND WEEK | Mannich reaction.Oxidation of aldehydes, Baeyer–Villiger oxidation of ketones, Cannizzaro reaction. MPV, Clemmensen, Wolff-Kishner, LiAlH4 and NaBH4 reductions. |
| 3RD WEEK | Electrochemistry-III  Electrolytic and Galvanic cells, Wes ton standard cell, activity and activity coefficients. Types of reversible electrodes, Nernst equations, derivation of cell EMF |
| 4TH WEEK | Electrochemistry-IV  Concentration cells with and without transference, liquid junction potential, application of EMF measurement. potentiometric titration (acid- base and redox). Determination of pH using Hydrogen electrode, Quinhydrone electrode and glass electrode by potentiometric methods. |
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| **JUNE** |  |
| 1ST WEEK | Chemistry of f – block elements - Lanthanides |
| 2ND WEEK | Chemistry of f – block elements - Actinides |
| 3RD WEEK | Revision |
| 4TH WEEK | - |

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| **Lesson Plan 2021-2022 (EVEN SEMESTER)**  Sub:- Physical Chemistry CLASS: B.Sc. Third Year  Name:- Ms Bhavana Arora Department:- Chemistry | |
| **APRIL** |  |
| 1ST WEEK | Electronic Spectrum  Concept of potential energy curves for bonding and antibonding molecular orbitals, selection rules and Franck- Condon principle. Qualitative description of sigma and pie and n molecular orbital (MO) |
| 2ND WEEK | Photochemistry  Laws of photochemistry: Grotthus-Drapper law, Stark- Einstein law (law of photochemical equivalence) |
| 3RD WEEK | Jablonski diagram depiciting various processes occurring in the excited state, qualitative description of fluorescence, phosphorescence, non-radiative processes |
| 4TH WEEK | Solutions: Dilute Solutions and Colligative Properties  Ideal and non-ideal solutions, methods of expressing concentrations of solutions, activity and activity coefficient.Colligative properties, Raolut’s law. |
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| **MAY** |  |
| 1ST WEEK | osmotic pressure , determination of molecular weight from osmotic pressure. Elevation of boiling point and depression of freezing point. |
| 2ND WEEK | Experimental methods for determining various colligative properties. Abnormal molar mass, degree of dissociation and association of solutes. |
| 3RD WEEK | Numericals |
| 4TH WEEK | Phase Equillibrium  Statement and meaning of the terms – phase component and degree of freedom |
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| **JUNE** |  |
| 1ST WEEK | Thermodynamic derivation of Gibbs phase rule, phase equilibria of one component system . Phase equilibria of two component systems solid-liquid equilibria. |
| 2ND WEEK | Pb-Ag system, desilerisation of lead |
| 3RD WEEK | Revision |
| 4TH WEEK | - |