Curriculum Plan (Odd Semester 2025-26)

Teacher Name: **Dr. Meenakshi Verma**

Course: **B.Sc. (H) Chemistry, NEP-UGCF, Semester III/ II year**

Paper Name: **Chemical equilibrium, Ionic equilibrium, conductance and solid state (DSC-9) (3 periods per week)**

UPC**: 2172012303**

S. No.	Contents	Allocation of Lectures	Monthwise schedule to be followed	Assignments/ Presentations etc
1.	**Ionic equilibrium** Strong, moderate and weak electrolytes, Arrhenius theory of electrolytic dissociation, degree of ionization, factors affecting degree of ionization, ionization constant and ionic product of water. Ionization of weak acids and bases, pH scale, common ion effect; dissociation constants of mono and diprotic acids. Salt hydrolysis−calculation of hydrolysis constant, degree of hydrolysis and pH for different salts. Buffer solutions; derivation of Henderson equation and its applications. Solubility and solubility product of sparingly soluble salts − applications of solubility product principle. Qualitative treatment of acid − base titration curves. Theory of acid−base indicators; selection of indicators and their limitations.	**12**	**First week August – Fourth week August**	**Syllabus overview** **Reference books suggestions** **Numerical Solving** **Doubt Session** **Class Test**
2.	**Conductance** Quantitative aspects of Faraday's laws of electrolysis, Conductivity, equivalent and molar conductivity and their variation with dilution for weak and strong electrolytes. Molar conductivity at infinite dilution. Kohlrausch's law of independent migration of ions. Debye−Huckel−Onsager equation, Wien effect, Debye−Falkenhagen effect, Walden's rule. Ionic velocity, mobility and their determination, transference number and its relation to ionic mobility, determination of	**12**	**First week September – Fourth week September**	**Numerical Solving** **Doubt Session** **University Papers Discussion**

	transference number using Moving Boundary methods. Applications of conductance measurement: (i) degree of dissociation of weak electrolytes, (ii) ionic product of water (iii) solubility and solubility product of sparingly soluble salts, (iv) conductometric titrations (v) hydrolysis constants of salts.			
3.	**Solid State:** Nature of the solid state, law of constancy of interfacial angles, law of rational indices, Miller indices, elementary idea of symmetry, seven crystal systems and fourteen Bravais lattices; X−ray diffraction, Bragg's law, a simple account of rotating crystal method and powder pattern method. Analysis of powder diffraction patterns of NaCl, CsCl and KCl.	**15**	**First week October – First week November**	**Numerical Solving** **Doubt Session** **University Papers Discussion** **Assignment Distribution**
4.	**Chemical Equilibrium** Criteria of thermodynamic equilibrium, degree of advancement of reaction, Chemical equilibria in ideal gases, Thermodynamic derivation of relation between Gibbs free energy of a reaction and reaction quotient, Equilibrium constants and their dependence on temperature, pressure and concentration, Le Chatelier's Principle (Quantitative treatment), Free energy of mixing and spontaneity (qualitative discussion).	**6**	**Second week November - Third week November**	**Numerical Solving** **Doubt Session** **University Papers Discussion**

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