

CURRICULUM PLAN

(Even Semester, 2022-2023)

B.Sc. (H) Chemistry, II Year (Semester-IV)

Name of the teacher: Dr. Upasana Issar

Name of Paper: Physical Chemistry IV- Conductance and Chemical Kinetics (CBCS)

UPC: 32171403

Contents	Allocation of Lectures	Month wise schedule to be followed	Tutorial/Assignments/Presentation etc
Unit 1: Conductance <ul style="list-style-type: none">Quantitative aspects of Faraday's laws of electrolysis,Arrhenius theory of electrolytic dissociation.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 equationWien effectDebye-Falkenhagen effectWalden's rule.Ionic velocity, mobility and their determination	16	1 st week of January – 4 th week of January	<ul style="list-style-type: none">Syllabus OverviewBooks SuggestionsRelated Examples and Problem-solving sessionOnline Assignment 1
Unit 1: Conductance (Continued) <ul style="list-style-type: none">transference number and its relation to ionic mobilitydetermination of transference number using Hittorf and Moving Boundary methods.Applications of conductance measurement: (i) degree of dissociation of weak electrolytes, (ii) ionic product of water (iii)	08	1 st week of February - 2 nd week of February	<ul style="list-style-type: none">Online Numerical SolvingDoubt SessionQuestions solving

<p>solubility and solubility product of sparingly soluble salts, (iv) conductometric titrations, (v) hydrolysis constants of salts.</p> <p>Unit 2: Chemical Kinetics</p> <ul style="list-style-type: none"> • Order and molecularity of a reaction • rate laws in terms of the advancement of a reaction • differential and integrated form of rate expressions up to second order reactions 			
<p>Unit 2: Chemical Kinetics (Continued)</p> <ul style="list-style-type: none"> • experimental methods for determination of rate laws • kinetics of complex reactions (integrated rate expressions up to first order only): (i) Opposing reactions (ii) parallel reactions and (iii) consecutive reactions and their differential rate equations (steady-state approximation in reaction mechanisms) (iv) chain reactions. • Temperature dependence of reaction rates; Arrhenius equation; activation energy. • Collision theory of reaction rates • Lindemann mechanism • qualitative treatment of the theory of absolute reaction rates. 	16	3 rd week of February – 2 nd week of March	<ul style="list-style-type: none"> • Numerical Solving • Doubt Session • Previous university papers discussion
<p>Unit 4: Photochemistry</p> <ul style="list-style-type: none"> • Characteristics of electromagnetic radiation, Jablonski Diagram 	14	4 th week of March -2 nd week of April	<ul style="list-style-type: none"> • Numerical Solving • Doubt Session • Assignment Collection • Result discussion

<ul style="list-style-type: none"> • Lambert-Beer's law and its limitations • physical significance of absorption coefficients • Laws of photochemistry • quantum yield • actinometry • examples of low and high quantum yields • photochemical equilibrium and the differential rate of photochemical reactions • photosensitized reactions, quenching. • Role of photochemical reactions in biochemical processes • photostationary states • chemiluminescence. • Jablonsky diagram. 			
<p>Unit 3: Catalysis</p> <ul style="list-style-type: none"> • Types of catalyst • specificity and selectivity mechanisms of catalyzed reactions at solid surfaces • Enzyme catalysis • Michaelis-Menten mechanism • acid-base catalysis. 	06	3 rd week of April - 4 th week of April	<ul style="list-style-type: none"> • Numerical Solving • Doubt Session • Test and Assignment return • Previous years University question paper solving

Dr. Upasana Issar

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