

University of Calcutta under Graduate Curriculum under Choice Based Credit System (CBCS)

Lesson Plan with Syllabus for Chemistry (G) Semester-I

Total Marks-100 (Credits: Theory-04, Practical-02)

(Theory: 50; Practical: 30; Internal Assessment: 10; Attendance: 10)

[Marks obtained in this course will be taken to calculate SGPA & CGPA]

Tentative may subject to change: Theory Class					
Months	Week	Unit	Topic	No. of Lectures	Teacher
September (2021)	3 rd	1	<i>Kinetic Theory of Gases and Real gases</i> <ul style="list-style-type: none"> • Concept of pressure and temperature • Collision of gas molecules • Collision number and mean free path 	1	SM
		4	<i>Atomic Structure</i> <ul style="list-style-type: none"> • Bohr's theory for hydrogen atom (simple mathematical treatment) 	1	PKD
		7	<i>Fundamentals of Organic Chemistry</i> <ul style="list-style-type: none"> ▪ Electronic displacements: inductive effect 	1	TKL
	4 th	1	<i>Kinetic Theory of Gases and Real gases</i> <ul style="list-style-type: none"> ▪ Nature of distribution of velocities ▪ Maxwell's distribution of speed and kinetic energy 	1	SM
		4	<i>Atomic Structure</i> <ul style="list-style-type: none"> • atomic spectra of hydrogen and Bohr's model 	1	PKD
		7	<i>Fundamentals of Organic Chemistry</i> <ul style="list-style-type: none"> ▪ Electronic displacements: resonance and hyper conjugation 	1	TKL
	5 th	1	<i>Kinetic Theory of Gases and Real gases</i> <ul style="list-style-type: none"> ▪ Average velocity, ▪ root mean square velocity and ▪ most probable velocity 	1	SM
		4	<i>Atomic Structure</i> <ul style="list-style-type: none"> • Somerfield's model 	1	PKD
		7	<i>Fundamentals of Organic Chemistry</i> <ul style="list-style-type: none"> • Electronic displacements: nucleophiles and electrophiles 	1	TKL
October	1 st	1	<i>Kinetic Theory of Gases and Real gases</i> <ul style="list-style-type: none"> • Principle of equipartition of energy Deviation of real gases from ideal behavior • Compressibility factor 	1	SM
		4	<i>Atomic Structure</i> <ul style="list-style-type: none"> • Quantum numbers and their significance • Pauli's exclusion principle • Hund's rule 	1	PKD
		7	<i>Fundamentals of Organic Chemistry</i> <ul style="list-style-type: none"> • Reactive intermediates: Carbocation 	1	TKL
	2 nd	1	<i>Kinetic Theory of Gases and Real gases</i> <ul style="list-style-type: none"> • Boyle temperature; Andrew's and Amagat's plots • van der Waals equation and its features 	1	SM
		4	<i>Atomic Structure</i> <ul style="list-style-type: none"> • Electronic configuration of many-electron atoms • <i>Aufbau</i> principle and its limitations 	1	PKD

		7	Fundamentals of Organic Chemistry <ul style="list-style-type: none"> Reactive intermediates: Carbanions and free radicals 	1	TKL
			11/10 – 30/10 Puja Vacation		

Months	Week	Unit	Topic	No. of Lectures	Teacher	
November	1 st	1	Kinetic Theory of Gases and Real gases <ul style="list-style-type: none"> Existence of critical state Critical constants in terms of van der Waals constants Law of corresponding states 	1	SM	
		5	Chemical Periodicity <ul style="list-style-type: none"> Classification of elements on the basis of electronic configuration: general characteristics of s-, p-, d- and f-block elements 	1	PKD	
		8	Stereochemistry <ul style="list-style-type: none"> Different types of isomerism; geometrical and optical isomerism; concept of chirality and optical activity (upto two carbon atoms) 	1	TKL	
	2 nd	2	Liquids <ul style="list-style-type: none"> Definition of Surface tension, its dimension and principle of its determination using Stalagmometer 	1	SM	
		5	Chemical Periodicity <ul style="list-style-type: none"> Positions of hydrogen and noble gases 	1	PKD	
		8	Stereochemistry <ul style="list-style-type: none"> Asymmetric carbon atom; interconversion of Fischer and Newman representations 	1	TKL	
			McQ based Assessment for all 3-section on Unit-1, 4 and 7	1	PKD, SM, TKL	
	November	3 rd	2	Liquids <ul style="list-style-type: none"> Viscosity of a liquid and principle of determination of coefficient of viscosity using Ostwald viscometer 	1	SM
			5	Chemical Periodicity <ul style="list-style-type: none"> Atomic and ionic radii ionization potential 	1	PKD
			8	Stereochemistry <ul style="list-style-type: none"> enantiomerism and diastereomerism <i>meso</i> compounds 	1	TKL
4 th		2	Liquids <ul style="list-style-type: none"> Effect of temperature on surface tension and coefficient of viscosity of a liquid (qualitative treatment only) 	1	SM	
		5	Chemical Periodicity <ul style="list-style-type: none"> electron affinity electronegativity 	1	PKD	
		8	Stereochemistry	1	TKL	

			<ul style="list-style-type: none"> <i>threo</i> and <i>erythro</i>, D and L, <i>cis</i> and <i>trans</i> nomenclature 			
November	5 th		**** <i>Library work assignment</i>		PKD, TKL, SM	
December	1 st	3	<p style="text-align: center;"><i>Chemical Kinetics</i></p> <ul style="list-style-type: none"> Introduction of rate law Order and molecularity 	1	SM	
		5	<p style="text-align: center;"><i>Chemical Periodicity</i></p> <ul style="list-style-type: none"> Periodic and group-wise variation of above properties in respect of s- and p-block elements. 	1	PKD	
		8	<p style="text-align: center;"><i>Stereochemistry</i></p> <ul style="list-style-type: none"> CIP Rules: <i>R/S</i> (only one chiral carbon atoms) and <i>E/Z</i> nomenclature 	1	TKL	
	2 nd	3	<p style="text-align: center;"><i>Chemical Kinetics</i></p> <ul style="list-style-type: none"> Extent of reaction; rate constants 	1	SM	
		6	<p style="text-align: center;"><i>Acids and bases</i></p> <ul style="list-style-type: none"> Brönsted–Lowry concept, conjugate acids and bases 	1	PKD	
		9	<p style="text-align: center;"><i>Nucleophilic Substitution and Elimination Reactions</i></p> <ul style="list-style-type: none"> Nucleophilic substitutions: SN1 and SN2 reactions 	1	TKL	
	3 rd	3	<p style="text-align: center;"><i>Chemical Kinetics</i></p> <ul style="list-style-type: none"> Rates of First, second and nth order reactions and their Differential and integrated forms (with derivation) 	1	SM	
		6	<p style="text-align: center;"><i>Acids and bases</i></p> <ul style="list-style-type: none"> effects of substituent and solvent, differentiating and leveling solvents 	1	PKD	
		9	<p style="text-align: center;"><i>Nucleophilic Substitution and Elimination Reactions</i></p> <ul style="list-style-type: none"> eliminations: E1 (elementary mechanistic aspects) 	1	TKL	
		4 th		** <i>Guest Lecture</i>		
		5 th		<i>Christmas Holiday</i>		
	January	1 st	3	<p style="text-align: center;"><i>Chemical Kinetics</i></p> <ul style="list-style-type: none"> Pseudo first order reactions 	1	SM
6			<p style="text-align: center;"><i>Acids and bases</i></p> <ul style="list-style-type: none"> Lewis acid-base concept, classification of Lewis acids and bases 	1	PKD	
		9	<p style="text-align: center;"><i>Nucleophilic Substitution and Elimination Reactions</i></p> <ul style="list-style-type: none"> eliminations: E2 reactions (elementary mechanistic aspects) 	1	TKL	
	2 nd	3	<p style="text-align: center;"><i>Chemical Kinetics</i></p> <ul style="list-style-type: none"> Determination of order of a reaction by half-life and differential method 	1	SM	
		6	<p style="text-align: center;"><i>Acids and bases</i></p>	1	PKD	

			<ul style="list-style-type: none"> Lux-Flood concept and solvent system concept 		
		9	<p><i>Nucleophilic Substitution and Elimination Reactions</i></p> <ul style="list-style-type: none"> Saytzeff eliminations 	1	TKL
	3 rd	3	<p><i>Chemical Kinetics</i></p> <ul style="list-style-type: none"> Temperature dependence of rate constant 	1	SM
		6	<p><i>Acids and bases</i></p> <ul style="list-style-type: none"> Hard and soft acids and bases (HSAB concept) 	1	PKD
		9	<p><i>Nucleophilic Substitution and Elimination Reactions</i></p> <ul style="list-style-type: none"> Hofmann eliminations 	1	TKL
	4 th	3	<p><i>Chemical Kinetics</i></p> <ul style="list-style-type: none"> Arrhenius equation, energy of activation 	1	SM
		6	<p><i>Acids and bases</i></p> <ul style="list-style-type: none"> Applications of HSAB process 	1	PKD
		9	Question answers discussion	1	TKL
February (2022)	1 st		<ul style="list-style-type: none"> Homework given for slow learners Question answers discussion 	1	PKD
			<ul style="list-style-type: none"> Homework assignment Question answers discussion 	1	SM
	2 nd	Internal Assessment	McQ based Internal Assessment for all sections		PKD, SM, TKL

<u>Tentative, may subject to change: Practical Class</u>				
Months	Weeks	Topic	Teacher	
September	3 rd	<ul style="list-style-type: none"> Laboratory work discussion 	TKL	
	4 th to 5 th	<ul style="list-style-type: none"> Estimation of sodium carbonate and sodium hydrogen carbonate present in a mixture 		
October	1 st to 2 nd	<ul style="list-style-type: none"> Estimation of oxalic acid by titrating it with KMnO_4 		
November	1 st to 2 nd	<ul style="list-style-type: none"> Estimation of water of crystallization in Mohr's salt by titrating with KMnO_4 		

	3 rd to 4 th	<ul style="list-style-type: none"> • Estimation of Fe (II) ions by titrating it with $K_2Cr_2O_7$ using internal indicator 	
December	1 st to 2 nd	<ul style="list-style-type: none"> ▪ Estimation of Cu (II) ions iodometrically using $Na_2S_2O_3$ 	
	3 rd to 4 th	<ul style="list-style-type: none"> • Estimation of Fe(II) and Fe(III) in a given mixture using $K_2Cr_2O_7$ solution 	
January	1 st to 4 th	All the experiments are repeating	