

POLBA MAHAVIDYALAYA
Departmental Lesson Plan 2024-2025

Name of the Department : Department of Chemistry

Name of the Programme : B.Sc.(General)

Name of the Course (Subject) :CHEMISTRY.....

Period of the Lesson Plan : July'24 to Jan'25

Academic Period	Class	Paper	Topic to be covered	No. of lectures	Name of the Teacher	Date of Internal Assessment
July'24 to Jan.'25	SEM-I	Major CHEM101-I	THEORY	45		3 rd week of Dec, 2024
			1. Atomic Structure	06	Soumya Sinha Roy	
			2. Periodic Properties	06	Do	
			3. Acid and Bases	06	Dr. Leena Mandal	
			4. Fundamentals in organic chemistry	12	Do	
			5. Properties of Gases	04	Do	
			6. Chemical Kinetics I	05	Do	
			7. Thermodynamics I	06	Do	
			Question-Answer Discussion			
			PRACTICAL	30		
			(i) Separation, Purification and Melting Point Determination	12	Soumya Sinha Roy	

		(ii) Determination of Boiling Point	06	Dr. Leena Mandal	
		(iii) Identification of a pure organic compound by chemical test(s)	12	Do	
SEM-I	Minor CHEM102-I	THEORY	45		3 rd week of Dec, 2024
		1. Atomic Structure	06	Dr. Leena Mandal	
		2. Periodic Properties	06	Do	
		3. Acid and Bases	07	Do	
		4. Aliphatic Hydrocarbons	10	Do	
		5. Ideal and Real Gases	05	Do	
		6. Thermodynamics I	07	Soumya Sinha Roy	
		7. Chemical Kinetics I	04	Do	
		PRACTICAL	30		
		(i) Determination of Boiling Point	12	Soumya Sinha Roy	
		(ii) Identification of Pure and Organic Compounds	18	Dr. Leena Mandal	
SEM-I	Multi CHEM103-I	THEORY	45		3 rd week of Dec, 2024
		Chemistry for Household Importance			

			1. Food Chemistry	08	Dr. Leena Mandal	
			2. Drugs and Pharmaceuticals	08	Do	
			3. Vitamins	02	Do	
			4. Antibiotics	04	Soumya Sinha Roy	
			5. Glass and Ceramics	06	Do	
			6. Surface Chemistry	02	Do	
			7. Chemistry of Fuels	15	Dr. Leena Mandal	
	SEM-I	SEC CHEM105-I	THEORY	45		3 rd week of Dec, 2024
			Drugs and Pharmaceuticals			
			(i) Drug Discovery.....Antifungal Agent	27	Dr. Leena Mandal	
			(ii) Antiviral Agent.....HIV-AIDS Related Drug	18	Soumya Sinha Roy	
	SEM-III	MAJOR CHEM301-1	THEORY Inorganic Chemistry	75		2 nd week of Dec, 2024
			1. Chemical Bonding-II	20	Soumya Sinha Roy	
			2. Coordination Chemistry-I	12	Dr. Leena Mandal	

			3. Chemistry of s and p-block elements	35	Dr. Leena Mandal
			4. Noble Gases	08	Do
			PRACTICAL	75	
			1. Qualitative analysis of Acid and Basic radicals from an inorganic sample containing four Radicals----- should be introduced	45	Dr. Leena Mandal
			2. Inorganic preparations	30	Soumya Sinha Roy
			(a) $\text{Cu}(\text{CH}_3\text{CN})_4\text{PF}_6/\text{ClO}_4$		
			(b) Potassium dioxalatodiaquachromate(III)		
			(c) Tetraamminecarbonatocobalt(III) ion		
			(d) Potassium tris(oxalato)ferrate(III)		
			(e) Tris(ethylenediamine)nickel(II) chloride		
			(f) $[\text{Mn}(\text{acac})_3]$ and $[\text{Fe}(\text{acac})_3]$ (acacH = acetylacetone)		
Handling numeric data		SEC CHEM305-1	IT skills in Chemistry	45	
			1. Mathematical tools (I) Fundamentals: (II) Uncertainty in measurement: (III) Algebraic operations on real scalar variables (IV) Differential calculus: (V) Numerical integration	15	Soumya Sinha Roy
			2. Computer Programming	15	Dr. Leena Mandal

		3. Handling numeric data	15	Do	
	MULTI CHEM303-1	Chemistry of Soil, Fertilizer and detergent	45		
		1. Soil:	10	Dr. Leena Mandal	
		2. Fertilizer:	15	Do	
		3. Fungicide, pesticide, herbicide with examples, advantage and disadvantage.	10	Do	
		4. Soap & Detergents:	10	Soumya Sinha Roy	
SEM-V	DSE-1A	THEORY	64		1 st week of Dec, 2024
		Inorganic Chemistry	32	Dr. Leena Mandal	
		Transition Element	12		
		Coordination Chemistry	12		
		Crystal Field Theory	08		
		Analytical Chemistry:	16	Soumya Sinha Roy	
		Error Analysis	08		
		Computer Application	08		

		Industrial Chemistry	16	Dr. Leena Mandal
		Fuels	04	
		Fertilizers	04	
		Glass & Ceramics	04	
		Cement	04	
		PRACTICAL	32 x 2 =64	
		Titration of Na ₂ CO ₃ and NaHCO ₃ mixture vs HCl using phenolphthalein and methyl orange indicators.	10	Soumya Sinha Roy
		Practice	06	Do
		Titration of HCl and CH ₃ COOH mixture vs NaOH using two different indicators to find the composition	10	Dr. Leena Mandal
		Practice	06	Do
		Estimation of Total hardness of water sample by EDTA titration.	10	Do
		Practice	06	Soumya Sinha Roy

			Estimation of available oxygen in pyrolusite.	10	Dr. Leena Mandal	
			Practice	06	Do	
		SEC-3	Basic & Application of Computer in Chemistry i. Mathematics ii. Computer Programming	32 16 16	Soumya Sinha Roy Dr. Leena Mandal	1 st week of Dec, 2024

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Period of the Lesson Plan : Feb'25 to Jun'25

Academic Period	Class	Paper	Topic to be covered	No. of lectures	Name of the Teacher	Date of Internal Assessment
Feb'24 to Jun.'24	SEM-II	Major CHEM201-I	THEORY	45		3 rd week, May,2025
			1. Chemical Bonding-I	06	Dr. Leena Mandal	
			2. Redox Reactions and Precipitation Reactions	04	Do	
			3. Stereochemistry-I	06	Soumya Sinha Roy	
			4. General Treatment of Reaction Mechanism	06	Dr. Leena Mandal	
			5. Substitution and Elimination Reaction	06	Soumya Sinha Roy	
			6. Kinetic Theory of Gases	05	Dr. Leena Mandal	
			7. Liquid State	06	Do	
			8. Thermodynamics-II	06	Do	
			PRACTICAL	30		
			1. Study of kinetics of acid-catalyzed hydrolysis of methyl acetate	05	Soumya Sinha Roy	

			2. Study of kinetics of decomposition of H ₂ O ₂ by KI	05	Dr. Leena Mandal	
			3. Determination of pH of unknown strong alkali and acid solution by colour matching method	05	Do	
			4. Determination of pH of unknown buffer solution by colour matching method	05	Soumya Sinha Roy	
			5. Study of viscosity of unknown liquid (glycerol, sugar) with respect to water	05	Dr. Leena Mandal	
			6. Determination of surface tension of a liquid using Stalagmometer	05	Do	
SEM-II	Minor CHEM202-I	THEORY		45		3 rd week, May,2025
			1. Thermodynamics-II	05	Dr. Leena Mandal	
			2. Ideal Gas	05	Do	
			3. Chemical Kinetics II	05	Do	
			4. Fundamentals of Organic Chemistry	06	Do	
			5. Stereochemistry	06	Soumya Sinha Roy	
			6. Nucleophilic Substitution and Elimination Reactions	06	Do	
			7. Chemical Bonding and Molecular Structure	12	Dr. Leena Mandal	
		PRACTICAL		30		
			1. Determination of pH of unknown strong alkali and acid by colour matching method	07	Dr. Leena Mandal	

		2. Study of kinetics of acid-catalyzed hydrolysis of methyl acetate	08	Do	
		3. Estimation of Mohr's salt by titrating with KMnO_4 / $\text{K}_2\text{Cr}_2\text{O}_7$	08	Do	
		4. Estimation of sodium carbonate and sodium hydrogen carbonate in a mixture	07	Do	
SEM-II	Multi CHEM203-I	THEORY			3 rd week, May,2025
		Chemistry of Dyes, Pigments, Cosmetics and Perfumes	45		
		(i) Dyes	13	Soumya Sinha Roy	
		(ii) Pigments	12	Dr. Leena Mandal	
		(iii) Cosmetics	10	Do	
		(iv) Perfumes	10	Do	
SEM-II	SEC CHEM205-I	Basic Analytical Chemistry	45		3 rd week, May,2025
		1. General principle	08	Dr. Leena Mandal	
		2. Analysis of soil	06	Do	
		3. Analysis of water	06	Soumya Sinha Roy	
		4. Analysis of food products	06	Do	

		5. Chromatography	10	Do	
		6. Analysis of cosmetics	09	Dr. Leena Mandal	
SEM-IV	MAJOR CHEM401-I	THEORY			2 nd week, May,2025
		Organic Chemistry	75		
		1. Stereochemistry II	18	Dr. Leena Mandal	
		2. Chemistry of alkenes and alkynes	15	Soumya Sinha Roy	
		3. Aromatic Substitution	10	Do	
		4. Carbonyl and Related Compounds	24	Dr. Leena Mandal	
		5. Organometallics	08	Do	
		Physical Chemistry	75		
		1. Chemical Kinetics-II and Catalysis	12	Soumya Sinha Roy	
		2. Electrochemistry-I	15	Do	
		3. Partial molar properties and Chemical potential	12	Dr. Leena Mandal	
		4. Chemical Equilibrium	14	Do	
		5. Specific heats of solid	05	Do	
		6. Thermodynamics-III	03	Do	
		7. Quantum Mechanics-I	14	Do	
PRACTICAL	75				
A. Qualitative Analysis of single solid organic compound 1) Detection of special elements (N, S, Cl, Br) by Lassaigne's test 2) Solubility and classification (solvents: H ₂ O, 5% HCl, 5% NaOH and 5% NaHCO ₃) 3) Detection of the following functional groups by systematic chemical tests:	45	Dr. Leena Mandal			

		<p>4) Aromatic amino (-NH₂), aromatic nitro (-NO₂), amido (-CONH₂), anilide (-CONHAr), phenolic - OH, carboxylic acid (-COOH), ester (-COOR), carbonyl (-CHO and >C=O)</p> <p>5) Melting point of the given compound</p> <p>6) Preparation of one suitable derivative of the given sample, crystallization and determination of melting point.</p>			
		<p>B. Organic Preparations</p> <p>1) Nitration of acetanilide</p> <p>2) Condensation reactions: Synthesis of 7-hydroxy-4-methylcoumarin</p> <p>3) Hydrolysis of amides/imides/esters</p> <p>4) Acetylation of phenols/aromatic amines (using Zn-dust/Acetic Acid)</p> <p>5) Benzoylation of phenols/aromatic amines</p> <p>6) Side chain oxidation of toluene and p-nitrotoluene</p> <p>7) Diazo coupling reactions of aromatic amines</p> <p>8) Bromination of acetanilide using green approach (Bromate-Bromide method)</p> <p>9) Selective reduction of m-dinitrobenzene to m-nitroaniline</p> <p>10) Students must also calculate percentage yield, based upon isolated yield (crude) and theoretical yield.</p>	30	Soumya Sinha Roy	
	MINOR CHEM402-I	THEORY General Chemistry-II	45		2 nd week, May,2025
		1. Liquid state	06	Dr. Leena Mandal	
		2. Colligative properties	06	Do	
		3. Solutions	08	Do	
		4. Aromatic hydrocarbons	06	Do	
		5. Synthetic uses of Grignard reagent & Active methylene compounds	06	Do	
		6. Coordination chemistry	10	Soumya Sinha Roy	

		7. Radioactivity	03	Do	
		PRACTICAL	15		
		A. Inorganic preparations 1) Tetraamminecarbonatocobalt(III) ion 2) Potassium tris(oxalato)ferrate(III) 3) Tris(ethylenediamine) nickel (II) chloride	10	Dr. Leena Mandal	
		B. Complexometric titration Determination of total hardness of water by using standard EDTA solution	05	Soumya Sinha Roy	
SEM-VI	DSE-1B	THEORY	64		1 st week of May, 2025
		1. Carboxylic Acids and Their Derivatives			
		a. Carboxylic acids (aliphatic and aromatic):	04	Dr. Leena Mandal	
		b. Carboxylic acid derivatives(aliphatic):	04	Do	
		2. Amines and Diazonium Salts:			
		(a) Amines (aliphatic and aromatic);	03	Do	
		(b) Diazonium salts	02	Do	
		(c) Nitro compounds (aromatic)	03	Do	
		3. Amino Acids and Carbohydrates:			
		(i) Amino Acids	06	Soumya Sinha Roy	
		(ii) Carbohydrates	08	Do	
		Polymers	06	Dr. Leena Mandal	
		Varnishes	02	Do	
		Paints	04	Do	

		Synthetic dyes	04	Do
		Drugs and pharmaceuticals	05	Do
		Food additives	03	Soumya Sinha Roy
		Fats and oils	02	Dr. Leena Mandal
		Soaps and detergents	03	Do
		Pesticides	03	Do
		Question-Answer Discussion	02	Do
		PRACTICAL	64	
		Organic Chemistry(Practical)	16	Dr. Leena Mandal
		Functional Group Organic Chemistry	16	Soumya Sinha Roy
		Estimation of saponification value of oil/fat.	12	Dr. Leena Mandal
		Practice	04	Do
		Estimation of acetic acid in commercial vinegar.	12	Do
		Practice	04	Do
	SEC-4	Polymer Chemistry	32	
		Introduction and history of polymeric materials	08	Soumya Sinha Roy
		Functionality and its importance	08	Dr. Leena Mandal
		Kinetics of Polymerisation	06	Do
		Determination of molecular weights	06	Dr. Leena Mandal
		Properties of Polymers	04	Do