

Lesson Plan for CBCS system: Department of Chemistry 2021-22

Semester	Programme	Course and Name of the Paper	Topic	Teacher	No. Of hours		
1	Hons	CC1-1-TH: INORGANIC CHEMISTRY-1, ORGANIC CHEMISTRY-1A	Extra nuclear Structure of atom	SB	14		
			Acid-Base reactions	SB+SG	6+6		
			Redox reactions	SG	14		
			Basics of Organic Chemistry: Bonding and Physical Properties	PR	18		
			General Treatment of Reaction Mechanism I	PR	2		
		CC1-1-P	INORGANIC CHEMISTRY: I (1) LAB: Acid and Base Titrations and Oxidation-Reduction Titrations	SB	30		
			ORGANIC CHEMISTRY: O (1A) LAB: Separation based upon solubility	PR	15		
		Total number of hours for CC 1-1 (Theory+Practical)					60T + 45P
		CC1-2-TH: PHYSICAL CHEMISTRY-1, ORGANIC CHEMISTRY-1B	Kinetic Theory and Gaseous state	IS	20		
			Transport processes	IS	8		
			Chemical kinetics	IS	12		
			Stereochemistry I	PR	17		
			General Treatment of Reaction Mechanism II	PR	3		
		CC1-1-P	PHYSICAL CHEMISTRY: P (1) LAB	IS	30		
			ORGANIC CHEMISTRY: O (1B) LAB: Determination of boiling point of common organic liquid compounds	PR	15		
	Total number of hours for CC 1-2 (Theory+Practical)					60T + 45P	
	Gen	CC1/GE1 TH	Kinetic Theory of Gases and Real gases	IS	7		
			Liquids	IS	6		
			Chemical Kinetics	IS	7		
			Atomic Structure	SB	7		
			Chemical Periodicity	SG	7		
			Acids and bases	SB+SG	3+3		
			Fundamentals of Organic Chemistry	PR	7		
			Stereochemistry	PR	7		
			Nucleophilic Substitution and Elimination Reactions	PR	6		
		CC1/GE1 P	1. Estimation of sodium carbonate and sodium hydrogen carbonate present in a mixture.	AS+IS+SG +MK	45		

			2. Estimation of oxalic acid by titrating it with KMnO_4 . 3. Estimation of water of crystallization in Mohr's salt by titrating with KMnO_4 . 4. Estimation of Fe (II) ions by titrating it with $\text{K}_2\text{Cr}_2\text{O}_7$ using internal indicator. 5. Estimation of Cu (II) ions iodometrically using $\text{Na}_2\text{S}_2\text{O}_3$. 6. Estimation of Fe(II) and Fe(III) in a given mixture using $\text{K}_2\text{Cr}_2\text{O}_7$ solution.			
		Total number of hours for CC-1/GE-1 (Theory+Practical)			60T + 45P	
2	Hons	CC-2-3-TH ORGANIC CHEMISTRY-2	Stereochemistry II	PR	20	
			General Treatment of Reaction Mechanism III	PR	20	
			Substitution and Elimination Reactions	PR	20	
		CC-2-3-P	Organic Preparations, Purification and Melting point of the purified product	PR	45	
		Total number of hours for CC 2-3 (Theory+Practical)				60T + 45P
		CC-2-4-TH INORGANIC CHEMISTRY-2	Chemical Bonding-I	SG	20	
	Chemical Bonding-II		SB	30		
	Radioactivity		SG	10		
	CC-2-4-P	Iodo-/ Iodimetric Titrations, Estimation of metal content in some selective samples	SB	45		
	Total number of hours for CC 2-4 (Theory+Practical)				60T + 45P	
	Gen	CC/GE 2 TH	Chemical Thermodynamics	IS	8	
			Chemical Equilibrium:	IS	7	
Solutions			IS	5		
Phase Equilibria			IS	5		
Solids			IS	5		
Aliphatic Hydrocarbons			PR	10		
Error Analysis and Computer Applications			SG	10		
Redox reactions			SG	10		
CC/GE 2 P		1. Study of kinetics of acid-catalyzed hydrolysis of methyl acetate 2. Study of kinetics of decomposition of H_2O_2 (Clock Reaction) 3. Study of viscosity of unknown liquid (glycerol, sugar) with respect to water.	AS+IS+S G +MK	45		

			<p>4. Determination of solubility of sparingly soluble salt in water, in electrolyte with common ions and in neutral electrolyte (using common indicator)</p> <p>5. Preparation of buffer solutions and find the pH of an unknown buffer solution by colour matching method</p> <p>6. Determination of surface tension of a liquid using Stalagmometer</p>			
		Total number of hours for CC-2/GE-2 (Theory+Practical)			60T + 45P	
3	HONS	CC-3-5-TH PHYSICAL CHEMISTRY-2	Chemical Thermodynamics I	IS	10	
			Chemical Thermodynamics II	IS	20	
			Applications of Thermodynamics – I	Is	6	
			Electrochemistry	AS	24	
		CC-3-5-P	<p>1. Conductometric titration of an acid (strong, weak/ monobasic, dibasic, and acid mixture) against strong base.</p> <p>2. Study of saponification reaction conductometrically</p> <p>3. Verification of Ostwald's dilution law and determination of K_a of weak acid</p> <p>4. Potentiometric titration of Mohr's salt solution against standard $K_2Cr_2O_7$ and $KMnO_4$ solution</p> <p>5. Determination of K_{sp} for $AgCl$ by potentiometric titration of $AgNO_3$ solution against standard KCl solution</p> <p>6. Determination of heat of neutralization of a strong acid by a strong base</p>		45	
		Total number of hours for CC 3-5 (Theory+Practical)				60T + 45P
		CC-3-6-TH INORGANIC CHEMISTRY-3	Chemical periodicity	SG	15	
			Chemistry of s and p Block Elements	SG	15	
			Noble Gases, Inorganic Polymers	SB	15	
			Coordination Chemistry-I	SB	15	
		CC-3-6-P	Complexometric titration, Chromatography of metal ions, Gravimetry	SG	45	
Total number of hours for CC 3-6 (Theory+Practical)				60T + 45P		
CC-3-7-TH	Chemistry of alkenes and alkynes	PR	15			
	Aromatic Substitution	PR	10			

		ORGANIC CHEMISTRY-3	Carbonyl and Related Compounds	PR	30	
			Organometallics	PR	5	
		CC-3-7-P	A. Identification of a Pure Organic Compound Solid compounds: oxalic acid, tartaric acid, citric acid, succinic acid, resorcinol, urea, glucose, cane sugar, benzoic acid and salicylic acid Liquid Compounds: formic acid, acetic acid, methyl alcohol, ethyl alcohol, acetone, aniline, dimethylaniline, benzaldehyde, chloroform and nitrobenzene B. Quantitative Estimations of glycine, glucose, sucrose, aniline, acetic acid in vinegar, urea, saponification value of oil.	PR	45	
		Total number of hours for CC 3-7 (Theory+Practical)			60T + 45P	
		SEC(A)-3-2-TH ANALYTICAL CLINICAL BIOCHEMISTRY	Carbohydrates, Proteins, Enzymes	AS	10	
			Lipids, Lipoproteins	AS	10	
			Biochemistry of disease: A diagnostic approach by blood/ urine analysis	As	10	
		Total number of hours for SEC(A)-3-2-TH			30T	
	Gen	CC/GE 3 TH	Chemical Bonding : Ionic and covalent bonding	SG	10	
				Chemical Bonding : MO Approach	SB	5
				Comparative study of p-block elements	SG	5
				Transition Elements (3d series and Lanthanoids and actinoid)	SB	5
				Coordination Chemistry	SB	5
				Electrochemistry: Ionic Equilibria		5
				Conductance, Electromotive force		10
				Aromatic Hydrocarbons, Organometallic Compounds, Aryl Halides	PR	15
			CC 3/GE 3 P	Qualitative semimicro analysis of mixtures containing two inorganic radicals.	SB+AS+IS +MK	45
			Total number of hours for CC-3/GE-3 (Theory+Practical)			60T + 45P
		SEC(A)-3-1-TH Basic Analytical Chemistry	Introduction to Analytical Chemistry, Chromatography, Ion-exchange, Suggested Applications, Suggested Instrumental demonstrations	SG	15	

			Analysis of soil, Analysis of water, Analysis of food products, Analysis of cosmetics	IS	15	
		Total number of hours for SEC(A)-3-1-TH			30T	
4	HONS	CC-4-8-TH ORGANIC CHEMISTRY-4	Nitrogen compounds	PR	12	
			Rearrangements	PR	14	
			The Logic of Organic Synthesis	PR	14	
			Organic Spectroscopy	PR	20	
		CC-4-8-P	Qualitative Analysis of Single Solid Organic Compounds	PR	45	
		Total number of hours for CC 4-8 (Theory+Practical)				60T + 45P
		CC-4-9-TH PHYSICAL CHEMISTRY-3	Application of Thermodynamics – II: Colligative properties	IS	10	
			Phase Equilibrium	IS	10	
			Foundation of Quantum Mechanics	AS	25	
			Crystal Structure	AS	15	
		CC-4-9-P	1. Kinetic study of inversion of cane sugar using a Polarimeter (Preferably Digital) 2. Study of Phase diagram of Phenol-Water system. 3. Determination of partition coefficient for the distribution of I ₂ between water and CCl ₄ 4. Determination of pH of unknown solution (buffer), by colour matching method 5. pH-metric titration of acid (mono- and di-basic) against strong base 6. pH-metric titration of a tribasic acid against strong base.	IS	45	
		Total number of hours for CC 4-9 (Theory+Practical)				60T + 45P
		CC-4-10-TH INORGANIC CHEMISTRY-4	Coordination Chemistry-II	SB	22	
			d-d transitions; L-S coupling; qualitative Orgel diagrams... ..charge transfer spectra	SG	8	
			Chemistry of d- block elements	SB	8	
			Chemistry of f- block elements	SG	7	
			Inorganic Reaction Kinetics and Mechanism	SG	15	
CC-4-10-P	Inorganic preparations, Instrumental Techniques: 1. Measurement of 10Dq by spectrophotometric method. 2. Determination of λ_{max}	SG	45			

		Total number of hours for CC 4-10 (Theory+Practical)			60T + 45P
		SEC(B)-4-1-TH PHARMA- CEUTICALS CHEMISTRY	Drugs & Pharmaceuticals, Drug discovery, design and development; Basic Retrosynthetic approach.	PR	10
			Synthesis of the representative drugs of the following classes: analgesics agents, antipyretic agents, antiinflammatory agents; antibiotics; antibacterial and antifungal agents; antiviral agents, Central Nervous System agents, Cardiovascular, antilaprosy, HIV-AIDS related drugs.	PR	10
			Fermentation		10
		Total number of hours for SEC(B)-4-1-TH			30T
	GEN	CC 4/GE 4 TH	Alcohols, Phenols and Ethers, Carbonyl Compounds, Carboxylic Acids and Their Derivatives, Amines and Diazonium Salts, Amino Acids and Carbohydrates	PR	20
			Crystal Field Theory	SB	20
			Quantum Chemistry & Spectroscopy		20
		CC 4/GE 4 P	1. Qualitative Analysis of Single Solid Organic Compound 2. Identification of a pure organic compound	SB+AS+IS +MK	45
		Total number of hours for CC-4/GE-4 (Theory+Practical)			60T + 45P
		SEC(B)-4-3-TH PHARMA- CEUTICALS CHEMISTRY	Drugs & Pharmaceuticals Drug discovery, design and development; Basic Retrosynthetic approach.	PR	10
			Synthesis of the representative drugs	PR	10
			Fermentation	SG	10
		Total number of hours for SEC(B)-4-1-TH			30T
5	HONS	CC-5-11-TH PHYSICAL CHEMISTRY-4	Quantum Chemistry II	AS	30
			Statistical Thermodynamics	AS	20
			Numerical Analysis	IS	10
		CC-5-11-P	Computer programs(Using FORTRAN or C or C++) based on numerical methods	AS	45
		Total number of hours for CC-5-11 (Theory+Practical)			60T + 45P
		CC-5-12-TH	Carbocycles and Heterocycles	PR	16

	ORGANIC CHEMISTRY-5	Cyclic Stereochemistry	PR	10		
		Pericyclic reactions	PR	8		
		Carbohydrates	PR	14		
		Biomolecules	PR	12		
	CEMA-CC-5-12-P	A. Chromatographic Separations B. Spectroscopic Analysis of Organic Compounds	Pr	45		
	Total number of hours for CC-5-12 (Theory+Practical)			60T + 45P		
	DSE(A)-5-2-TH APPLICATIONS OF COMPUTERS IN CHEMISTRY	Computer Programming Basics (FORTRAN)	AS	20		
		Introduction to Spreadsheet Software(MS Excel)	AS	25		
		Statistical Analysis	IS	15		
	DSE(A)-5-2-P	Applications of computers in chemistry	AS	45		
	Total number of hours for DSE(A)-5-2 (Theory+Practical)			60T + 45P		
	DSE(B)-5-1-TH INORGANIC MATERIALS OF INDUSTRIAL IMPORTANCE	Silicate Industries	SB	16		
		Fertilizers	SB	8		
		Surface Coatings	SG	10		
		Batteries	SB	6		
		Alloys	SG	10		
		Catalysis	SG	6		
	DSE(B)-5-1-P	Chemical explosives	SG	4		
		1 . Determination of free acidity in ammonium sulphate fertilizer. 2. Estimation of phosphoric acid in superphosphate fertilizer. 3. Determination of composition of dolomite (by complexometric titration). 4. Analysis of (Cu, Ni); (Cu, Zn) in alloy or synthetic samples. 5. Analysis of Cement.	SB	45		
		Total number of hours for DSE(B)-5-1 (Theory+Practical)			60T + 45P	
		GEN	DSE(A)-5-2-TH INORGANIC MATERIALS OF INDUSTRIAL IMPORTANCE	Silicate Industries	SB	16
				Fertilizers	SB	8
				Surface Coatings	SG	10
Batteries	SB			6		
Alloys	SG			10		
Catalysis	SG			6		
Chemical explosives	SG		4			
DSE(A)-5-2-P	1 . Determination of free acidity in ammonium sulphate fertilizer. 2. Estimation of phosphoric acid in superphosphate fertilizer.	SG+MK	45			

			3. Determination of composition of dolomite (by complexometric titration). 4. Analysis of (Cu, Ni); (Cu, Zn) in alloy or synthetic samples. 5. Analysis of Cement.			
		Total number of hours for DSE(A)-5-2 (Theory+Practical)			60T + 45P	
		SEC(A)-5-2-TH ANALYTICAL CLINICAL BIOCHEMISTRY	Carbohydrates, Proteins, Enzymes	AS	10	
			Lipids, Lipoproteins	PR	10	
			Biochemistry of disease: A diagnostic approach by blood/ urine analysis	SG	10	
		Total number of hours for SEC(A)-5-2-TH			30T	
6	HONS	CC-6-13-TH INORGANIC CHEMISTRY-5	Theoretical Principles in Qualitative Analysis of cations	SB	5	
			Theoretical Principles in Qualitative Analysis of anions	SG	5	
			Bioinorganic Chemistry	SB	25	
			Organometallic Chemistry	SG	25	
		CC-6-13-P	Qualitative semimicro analysis of mixtures containing not more than three radicals.	SB	45	
		Total number of hours for CC-6-13 (Theory+Practical)				60T + 45P
		CC-6-14-TH PHYSICAL CHEMISTRY-5	Molecular Spectroscopy	IS	25	
			Photochemistry and Theory of reaction rate	IS	15	
			Surface phenomenon	IS	15	
			Dipole moment and polarizability	IS	5	
		CC-6-14-P	1. Determination of surface tension of a liquid using Stalagmometer 2. Determination of the indicator constant of an acid base indicator spectrophotometrically 3. Verification of Beer and Lambert's Law for KMnO_4 and $\text{K}_2\text{Cr}_2\text{O}_7$ solution 4. Study of kinetics of $\text{K}_2\text{S}_2\text{O}_8 + \text{KI}$ reaction, spectrophotometrically 5. Determination of pH of unknown buffer, spectrophotometrically 6. Determination of CMC of a micelle from Surface Tension Measurement.	AS	45	
		Total number of hours for CC-6-14 (Theory+Practical)				60T + 45P
		DSE(A)-6-3-TH	Introduction to Green Chemistry	PR	4	

		GREEN CHEMISTRY AND CHEMISTRY OF NATURAL PRODUCTS	Principles of Green Chemistry and Designing a Chemical synthesis	PR	16	
			Examples of Green Synthesis/ Reactions and some real world cases	PR	20	
			Future Trends in Green Chemistry	PR	12	
			Alkaloids	PR	5	
			Terpenes	PR	3	
		DSE(A)-6-3-P	Some green synthesis	PR	45	
		Total number of hours for DSE(A)-6-3 (Theory+Practical)			60T + 45P	
		DSE(B)-6-4-TH DISSERTATION	1.	AS	105	
			2.			
			3.	IS	105	
			4.			
			5. A brief overview on energy profile diagram of metal carbonyl catalysts	SG	105	
			6. An overview on Schiff bases and its complexes: Synthesis, types and biological applications			
		Total number of hours for DSE(B)-6-4 (DISSERTATION)			105	
	GEN	DSE(B)-6-1-TH GREEN CHEMISTRY AND CHEMISTRY OF NATURAL PRODUCT	Introduction to Green Chemistry	PR	4	
				Principles of Green Chemistry and Designing a Chemical synthesis	PR	16
				Examples of Green Synthesis/ Reactions and some real world cases	PR	20
				Future Trends in Green Chemistry	PR	12
				Alkaloids	PR	5
				Terpenes	PR	3
			DSE(B)-6-1-P	Some green synthesis	PR+MK	45
			Total number of hours for DSE(B)-6-1 (Theory+Practical)			60T + 45P
			SEC(B)-6-4-TH PESTICIDE CHEMISTRY	General introduction to pesticides (natural and synthetic), benefits and adverse effects, changing concepts of pesticides,	SG	15
				structure activity relationship synthesis and technical manufacture and uses of representative pesticides	IS	15
			Total number of hours for SEC(B)-6-4-TH			30T

PR: Dr. Priyabrata Roy

AS: Dr. Anuva Samanta

IS: Dr. Ishita Saha

MK: Smt. Malati Kundu

SG: Dr. Soumavo Ghosh