Yogoda Satsanga Palpara Mahavidyalaya

DEPARTMENT OF CHEMISTRY

TEACHING PLANE CHEMISTRY (Honours) (Session- 2022-2023)

Semester	Paper	Unit/Module		Teacher	No. of lectures	To be completed by
Semester-1	CC-1 :ORGANIC CHEMISTRY-I	Basics of Organic Chemistry		Sudip Maity	20	1st Month and 2nd month
		Bonding and Physical Properties	Valence Bond Theory			
			Electronic Displacements			
			MO theory			
			Physical properties			
		General Treatment of Reaction Mechanism I	Mechanistic classification: ionic, radical and pericyclic	Sudip Maity	20	3rd , 4th and 5th Month
			Reactive Intermediates			
		Stereochemistry I	Bonding geometries of carbon compounds and representation of molecules			
			Concept of chirality and symmetry			
			Relative and absolute configuration			
			Optical activity of chiral compounds			
	CC1P1 - CHEMISTRY LAB- I		Separation	Dr. Sanjib Dey	20	1st , 2nd , 3rd and 4th month
			Determination of boiling point			
			Identification of a Pure Organic Compound			
	CC-2: PHYSICAL CHEMISTRY-I	Kinetic Theory and Gaseous state	Kinetic Theory of gases	Dr. Sanjib Dey	18	1st month

			Maxwell's distribution of speed and energy			2nd month
			Real gas and virial equation			3rd month
		Chemical Thermodynamics	Zeroth and 1st law of Thermodynamics	Dr.Sabyasachi Khatua	29	1st month, 2nd month, 3rd and 4thmonth
			Thermochemistry			
			Second Law Thermodynamic relations			
		Chemical kinetics	Rate law, order and molecularity Role of T and theories of reaction rate	Dr. Sanjib Dey	8	4th & 5th month
			Homogeneous catalysis	Dr. Sanjib Dey	4	5th month
			Autocatalysis; periodic reactions			
	C 2P2 : CHEMISTRY LAB-II		Experiment 1: Determination of pH of unknown solution (buffer), by color matching method	Dr.Sabyasachi Khatua	2	1st month
			Experiment 2: Determination of heat of neutralization of a strong acid by a strong base	Dr.Sabyasachi Khatua	2	1st month
			Experiment 3: Study of kinetics of acid-catalyzed hydrolysis of methyl acetate	Dr.Sabyasachi Khatua	2	2nd month
			Experiment 4: Study of kinetics of decomposition of H2O2	Dr.Sabyasachi Khatua	2	2nd month

			Experiment 5: Determination of heat of solution of oxalic acid from solubility measurement	Dr.Sabyasachi Khatua	2	3rd month
	GE-1	Inorganic Chemistry-I	Atomic Structure	Dr. Sanjib Dey	06	1st month
			Chemical Periodicity	Subhajit Das	05	2nd month
			Acids and bases	Subhajit Das	04	3rd month
			Redox reactions	Subhajit Das	03	4th month
		Organic Chemistry-I	Fundamentals of Organic Chemistry	Sudip Maity	03	1st month
			Stereochemistry		06	2nd month
			Nucleophilic Substitution and Elimination Reactions	Sudip Maity	05	3rd month
			Aliphatic Hydrocarbons Alcohol, Phenol, Ethers	Sudip Maity	08	4th and 5th month
	GE1 P1: LAB	Inorganic Chemistry –LAB	Estimation of sodium carbonate and sodium hydrogen carbonate present in a mixture.	Dr. Sanjib Dey	2	1st month
			Estimation of oxalic acid by titrating it with KMnO4	Dr. Sanjib Dey	2	1st month
			Estimation of water of crystallization in Mohr's salt by titrating with KMnO4	Dr. Sanjib Dey	2	2nd month
			Estimation of Fe (II) ions by titrating it with K2Cr2O7 using internal indicator	Dr. Sanjib Dey	2	2nd month
			Estimation of Cu (II) ions iodometrically using Na2S2O3	Dr. Sanjib Dey	2	3rd month
		Organic Chemistry- LAB	Experiment A: Detection of special elements (N, Cl, and S) in organic			

			compounds.	Dr. Sanjib Dey	6	4th and 5th month
			Experiment B: Solubility and Classification (solvents: H2O, dil. HCl, dil. NaOH)			
			Experiment C: Detection of functional groups: Aromatic-NO2, Aromatic -NH2, -COOH, carbonyl (no distinction of –CHO and >C=O needed), -OH (phenolic) in solid organic compounds.			
			Experiments A - C with unknown (at least 6) solid samples containing not more than two of the above type of functional groups should be done.	Dr. Sanjib Dey	2	4th and 5th month
Semester-II	CC-3: INORGANIC CHEMISTRY-I	INORGANIC CHEMISTRY-I	Extra nuclear Structure of atom	Dr. Sanjib Dey	6	1st and 2nd month
			Chemical periodicity	Subhajit Das	4	3rd month
			Acid-Base reactions	Subhajit Das	5	3rd and 4th month
			Redox Reactions and precipitation reactions	Subhajit Das	6	4th month
	C3P: CHEMISTRY (LAB)		Acid and Base Titrations	Dr.Sabyasachi Khatua	7	1st, 2nd and 3rd month
			Oxidation-Reduction Titrimetric	Dr.Sabyasachi Khatua	6	1st, 2nd and 3rd month
	C4T ORGANIC CHEMISTRY-II	Stereochemistry II	Chirality arising out of stereoaxis	Sudip Maity	13	1st month
			Concept of prostereoisomerism: prostereogenic centre			2nd and 3rd month

			Conformation:			4th month
			conformational analysis			
		General Treatment ofReaction Mechanism II	Reaction thermodynamics	Sudip Maity	3	3rd month
			Concept of organic acids and bases	Sudip Maity	4	1st month
			Tautomerism	Sudip Maity	5	2nd and 3rd month
			Reaction kinetics			
		Substitution and Elimination Reactions	Free-radical substitution reaction	Sudip Maity	18	1st month
			Nucleophilic substitution reactions			2nd and 3rd month
			Elimination reactions			4th and 5th month
	C4P: CHEMISTRY (LAB)		Organic Preparations, Purification of the crude product & Melting point	Dr. Sanjib Dey	24	1st, 2nd ,3rd 4th month
	GE-2	Physical Chemistry -I	Kinetic Theory of Gases and Real gases	Dr. Sabyasachi Khatua	20	1st, 2nd ,3rd and 4th month
			Liquids			
			Solids			
			Chemical Kinetics			
		Inorganic Chemistry-II	Ionic Bonding	Subhajit Das	15	1st,2nd 3rd 4th and 5th month
			Covalent bonding			
			Concept of resonance and resonating structures in various inorganic and organic compounds. MO Approach			
			Comparative study of p-block elements:			
	GE2 P-LAB	Physical Chemistry-LAB	Surface tension measurement	Dr. Sabyasachi Khatua	4	1st and 2nd

			Viscosity measurement			month
			Study the kinetics of the following reactions	Dr.Sabyasachi Khatua	2	1st month
		Inorganic Chemistry-LAB	Qualitative semimicro analysis of mixtures containing three radicals	Dr.Sabyasachi Khatua	6	2nd ,3rd and 4th month
Semester-III	CC-5: Physical Chemistry-II	Transport processes	Fick's law	Dr.Sabyasachi Khatua	02	1st and 2nd month
			Viscosity	Dr.Sabyasachi Khatua	03	
			Conductance and transport number	Dr. Sanjib Dey	04	
		Applications of Thermodynamics – I	Partial properties and Chemical potential	Dr.Sabyasachi Khatua	04	3rd, 4th and 5th month
			Chemical Equilibrium	Dr. Sanjib Dey	05	
			Nernst's distribution law;	Dr.Sabyasachi Khatua	02	
			Chemical potential and other properties of ideal substances-pure and mixtures	Dr.Sabyasachi Khatua	04	
			Condensed Phase	Dr.Sabyasachi Khatua	03	
		Foundation of Quantum Mechanics	Beginning of Quantum Mechanics	Dr. Sanjib Dey	5	1st and 2nd month
			Wave function			
			Concept of Operators	Dr. Sanjib Dey	7	2nd, 3rd and 4th month
			Particle in a box			
			Simple Harmonic Oscillator			
	C5P: Physical Chemistry-II Lab		Experiment 1: Study of viscosity of unknown liquid (glycerol, sugar) with respect to water			1st month

			Experiment 2: Determination of partition coefficient for the distribution of I2 between water and CCl4	Dr.Sabyasachi Khatua	12	1st month
			Experiment 3: Determination of Keq for KI + I2 = KI3, using partition coefficient between water and CCl4			2nd month
			Experiment 4: Conductometric titration of an acid (strong, weak/ monobasic, dibasic) against base strong			2nd month
			Experiment 5: Study of saponification reaction conductometrically			3rd month
			Experiment 6: Verification of Ostwald's dilution law and determination of Ka of weak acid			3rd month
	C6T: Inorganic Chemistry-II	Chemical Bonding-I	Ionic bond	Dr. Sanjib Dey	4	1st and 2nd month
			Covalent bond	Subhajit Das	4	2nd and 3rd month
		Chemical Bonding-II	Molecular orbital concept of bonding	Subhajit Das	12	2nd and 3rd month
			Metallic Bond			4th month
			Weak Chemical Forces			4th month
			Radioactivity	Dr.Sabyasachi Khatua	6	3rd month
	C6P: Inorganic Chemistry-II - Lab		Iodo-/ Iodimetric Titrations	Dr. Sanjib Dey	10	1st and 2nd and 3rd month
			Estimation of metal content in some selective samples	Dr. Sanjib Dey	6	2nd month
	C7T: Organic Chemistry-III	Chemistry of alkenes and alkynes	Addition to C=C	Sudip Maity	14	1st, 2nd and 3rd month
			Addition to C≡C (in comparison to C=C)			
		Aromatic Substitution	Electrophilic aromatic substitution	Sudip Maity	8	4th and 5th month

			Nucleophilic aromatic substitution			
		Carbonyl and Related Compounds	Addition to C=O:	Sudip Maity	18	1st month
			Exploitation of acidity of α-H of C=O:			2nd month
			Elementary ideas of Green Chemistry			3rd month
			Nucleophilic addition to α,β-unsaturated carbonyl system			4th month
			Substitution at sp2 carbon (C=O system)			5th month
			Organometallics	Subhajit Das	4	5th month
	C7P: Organic Chemistry-III – Lab		Qualitative Analysis of Single Solid Organic Compounds	Dr. Sanjib Dey	24	1st, 2nd,3rd and 4th month
	SEC-1: Pharmaceutical Chemistry		Drugs & Pharmaceuticals	Sudip Maity	15	1st, 2nd and 3rd month
			Fermentation			4th month
	SEC1P: Pharmaceutical Chemistry		Preparation of Aspirin and its analysis	Dr. Sanjib Dey	4	1st month
			Preparation of magnesium bisilicate (Antacid).			2nd month
	GE3T: Chemical Energetics,	Physical Chemistry-II	Chemical Energetics	Dr. Sabyasachi Khatua	6	1st & 2nd Month
		Equilibria	Chemical Equilibrium	Dr. Sabyasachi Khatua	5	3rd & 4th month
			Ionic Equilibria			
		Organic Chemistry-II	Aromatic Hydrocarbons	Sudip Maity	4	3rd month
			Organometallic Compounds	Sudip Maity	4	3rd month
			Aryl Halides	Sudip Maity	6	4th and 5th month
			Alcohols, Phenols and Ethers			
			Carbonyl Compounds	Sudip Maity	4	3rd and 4th month
	GE-3P	Physical Chemistry-LAB	Thermochemistry	Dr. Sanjib Dey	6	1st, 2nd and 3rd month
			Ionic Equilibria			

		Organic Chemistry-LAB	Identification of a pure organic compound	Dr. Sanjib Dey	10	1st, 2nd and 3rd month
Sem-IV	C8T: PHYSICAL CHEMISTRY-III	Application of Thermodynamics – II	Colligative properties	Dr. Sanjib Dey	10	1st month
			Phase rule			2nd month
			Binary solutions			3rd month
		Electrical Properties of molecules	Ionic equilibria	Dr. Sanjib Dey	04	4th and 5th month
			Electromotive Force & Dipole moment and polarizability	Dr. Sabyasachi Khatua	08	1st & 2nd month
					02	3rd month
		Quantum Chemistry	Angular momentum	Dr. Sabyasachi Khatua	12	3rd, 4th. and 5 th month
			Qualitative treatment of hydrogen atom and hydrogen-like ions			
			LCAO and HF-SCF			
	C8P : Lab		Experiment 1: Determination of solubility of sparingly soluble salt in water, in electrolyte with common ions and in neutral electrolyte (using common indicator)	Dr. Sabyasachi Khatua	12	1st month
			Experiment 2: Potentiometric titration of Mohr's salt solution against standard K2Cr2O7 solution			1st month
			Experiment 3: Determination of Ksp for AgCl by potentiometric titration of AgNO3 solution against standard KCl solution			2nd month
			Experiment 4: Effect of ionic strength on the rate of Persulphate – Iodide			2nd month

			reaction			
			Experiment 5: Study of phenol-water phase diagram			3rd month
			Experiment 6: pH-metric titration of acid (mono- and di-basic) against strong base			3rd month
	C9T: INORGANIC CHEMISTRY-III		General Principles of Metallurgy	Subhajit Das	4	1st month
			Chemistry of s and p Block Elements	Subhajit Das	16	1st and 2nd month
			Noble Gases			3rd month
			Inorganic Polymers	Subhajit Das	4	1st month
			Coordination Chemistry-I	Subhajit Das	12	34d,4th and 5th month
	C9P: LAB		Complexometric titration	Dr. Sanjib Dey	10	1st, 2nd and 3rd month
			Inorganic preparations	Dr. Sanjib Dey	10	1st, 2nd and 3rd month
	C10T: ORGANIC CHEMISTRY-IV	Nitrogen compounds	Amines: Aliphatic & Aromatic	Sudip Maity	8	1st month
			Nitro compounds (aliphatic and aromatic)			1st month
			Alkylnitrile and isonitrile			2nd month
			Diazonium salts and their related compounds			2nd month
		Rearrangements	Rearrangement to electron-deficient carbon	Sudip Maity	10	3rd month
			Rearrangement to electron-deficient nitrogen			3rd month
			Rearrangement to electron-deficient oxygen			4th month
			Aromatic rearrangements			4th month

			Rearrangement reactions by green approach			5th month
		The Logic of Organic Synthesis	Retrosynthetic analysis	Sudip Maity	10	1st month
			Strategy of ring synthesis			2nd month
			Asymmetric synthesis			3rd month
		Organic Spectroscopy	UV Spectroscopy	Sudip Maity	14	4th month
			IR Spectroscopy			4th month
			NMR Spectroscopy			5th month
	C10P : LAB		1. Estimation of glycine by Sörensen's formol method	Dr. Sanjib Dey	6	1st month
			2. Estimation of glucose by titration using Fehling's solution			1st month
			3. Estimation of sucrose by titration using Fehling's solution			2nd month
			4. Estimation of vitamin-C (reduced)			2nd month
			5. Estimation of aromatic amine (aniline) by bromination (Bromate-Bromide) method			3rd month
			6. Estimation of phenol by bromination (Bromate-Bromide) method			3rd month
			7. Estimation of formaldehyde (Formalin)	Dr. Sanjib Dey	4	1st month
			8. Estimation of acetic acid in commercial vinegar			1st month
			9. Estimation of urea (hypobromite method)			2nd month

			10. Estimation of saponification value of oil/fat/ester			3rd month
	SEC-2T CHEMISTRY OF COSMETICS & PERFUMES		All	Sudip Maity	12	1st, 2nd, 3rd and 4th month
	SEC-2P: CHEMISTRY OF COSMETICS & PERFUMES Practical		Practical (ALL)	Dr. Sanjib Dey	8	1st, 2nd and 3rd month
	GE4T	Physical Chemistry-III	Solutions	Dr. Sabyasachi Khatua	18	1st, 2nd, 3rd and 4th month
			Phase Equilibria			
			Conductance			
			Electromotive force			
		Analytical and Environmental Chemistry	Chemical Analysis			
			Environmental Chemistry	Sudip Maity	8	1st,2nd , 3rd month
	GE4P: Practical		Distribution Law	Dr. Sanjib Dey	16	1st. 2nd . 3rd , and 4th month
			Phase equilibria			
			Conductance			
			Potentiometry			
			Analytic and Environmental Chemistry-LAB			
Semester-V	C11T: Inorganic Chemistry - IV		Coordination Chemistry-II	Subhajit Das	20	1st, 2nd and 3rd month
			Transition Elements:	Subhajit Das	10	3rd and 4th month
			Lanthanoids and Actinoids:	Subhajit Das		
	C11P : LAB		Chromatography of metal ions	Dr. Sanjib Dey	10	1st month
			Gravimetry			2nd month

			Spectrophotometry			3rd month
	C12T: Organic Chemistry - V		Carbocycles and Heterocycles	Sudip Maity	16	1st and 2nd month
			Cyclic Stereochemistry			3rd month
			Pericyclic reactions	Sudip Maity	10	1st, 2nd and 3rd month
			Carbohydrates	Sudip Maity	8	4th and 5th month
			Bio-molecules	Sudip Maity	8	4th month
	C12P : LAB		Chromatographic Separations	Sudip Maity	6	1st and 2nd month
			Spectroscopic Analysis of Organic Compounds	Sudip Maity	6	1st and 2nd month
	DSE1T: Advanced Physical Chemistry		Crystal Structure	Dr. Sanjib Dey	6	1st, 2nd and 3rd month
			Statistical Thermodynamics	Dr. Sabyasachi Khatua	6	1st, 2nd and 3rd month
			Special selected topics	Dr. Sabyasachi Khatua	8	4th and 5th month
	DSE1P: Advanced Physical Chemistry		Programming	Dr. Sabyasachi Khatua	10	1st, 2nd and 3rd month
	DSE2T: Analytical Methods in Chemistry		Qualitative and quantitative aspects of analysis	Dr. Sabyasachi Khatua	4	1st month
			Optical methods of analysis	Subhajit Das	6	2nd month
			Thermal methods of analysis	Subhajit Das	6	3rd month
			Electroanalytical methods	Dr. Sanjib Dey	4	4th month
			Separation techniques	Sudip Maity	10	3rd , 4th and 5th month
	DSE2P: Analytical Methods in Chemistry (lab)		Separation Techniques	Sudip Maity	08	1st and 2nd month

			Solvent Extractions:	Dr. Sanjib Dey	04	3rd month
			Spectrophotometry	Dr. Sabyasachi Khatua	06	4th and 5th month
Sem-VI	C13T: Inorganic Chemistry-V		Organometallic Chemistry	Subhajit Das	12	1st and 2nd month
			Bioinorganic Chemistry	Subhajit Das	12	1st and 2nd month
			Catalysis by Organometallic Compounds	Subhajit Das	4	3rd month
			Reaction Kinetics and Mechanism	Subhajit Das	4	3rd month
	C13P: LAB		Qualitative semimicro analysis of mixtures containing four radicals. Emphasis should be given to the understanding of the chemistry of different reactions and to assign the most probable composition	Dr. Sanjib Dey	20	1st-5th month
	C14T: Physical Chemistry-V		Molecular Spectroscopy	Dr. Sabyasachi Khatua	12	1st and 2nd month
			Photochemistry	Dr. Sanjib Dey	14	1st month
			Surface phenomenon			2nd and 3rd month
	C14P : LAB		Practical	Dr. Sabyasachi Khatua	12	1st, 2nd and 3rd month
	DSE- 3: Inorganic Materials of Industrial Importance		Silicate Industries	Dr. Sanjib Dey	8	1st month
			Fertilizer	Dr. Sanjib Dey	14	2nd, 3rd and 4th month
			Surface Coatings	Subhajit Das		
			Batteries	Subhajit Das		
			Alloys	Subhajit Das		
			Catalysis	Dr. Sanjib Dey		
			Chemical explosives	Subhajit Das		

	DSE3P: LAB Inorganic Materials of Industrial Importance		Practical	Dr. Sanjib Dey	12	1st, 2nd and 3rd month
	DSE4T: Polymer Chemistry		Introduction and history of polymeric materials	Sudip Maity	3	1st month
			Functionality and its importance	Sudip Maity	3	1st month
			Kinetics of Polymerization	Dr. Sabyasach Khatua	3	2nd month
			Crystallization and crystallinity	Dr. Sabyasach Khatua	3	2nd month
			Nature and structure of polymers:	Dr. Sabyasach Khatua	3	2nd month
			Determination of molecular weight of polymers	Dr. Sabyasach Khatua	3	3rd month
			Glass transition temperature (Tg) and determination of Tg	Dr. Sabyasach Khatua	3	3rd month
			Polymer Solution	Dr. Sabyasach Khatua	3	4th month
			Properties of Polymer	Sudip Maity	3	4th month
	DSE4P: LAB		Polymer synthesis	Sudip Maity	16	1st month
			Polymer characterization			2nd month
			Polymer analysis			3rd month