Teaching Plan for the Acdemic Session 2022-2023

DEPARTMENT OF CHEMISTRY

2nd SEMESTER(Core & Generaal)

NAME OF THE TEACHER	TOPIC (Core)	NO.OF CLASSES (Theory)	Practical Topic	No. of Practical Classes
Dr. Manoj Majumder	**Chemistry of Aliphatic Hydrocarbons**			
	Carbon-Carbon sigma bonds	5		
	Carbon-Carbon pi bonds	5		
Dr. Santanu Charavorty	Chemistry of Halogenated Hydrocarbons	5		
	Alcohols, Phenols, Ethers and Epoxides	5	Lassaigne's test	2
	Aromatic Hydrocarbons	5	Detection of the functional groups	4
	Stereochemistry-II		Melting point determination	2
	Chirality arising out of stereoaxis	5		
	Concept of prostereoisomerism	5		
	Conformation	5	Solubility and classification	4
Dr. Chanchal Mondal	**Periodicity of Elements**			
	Effective nuclear charge, Atomic radii, covalent and ionic radii	7	Estimation of Fe(II) and oxalic acid using standardized KMnO4 solution	4
	Ionisation energy, electronegativity,	7		
	Electron affinity, scales of electrnegativity	6	Estimation of Fe(II) with K2Cr2O7	4
	Oxidation and reduction			
	Redox equations, Standard Electrode Potential	5		
	Principles involved in volumetric analysis	5		
Dr Manoj Majumder	**Atomic structure**		Estimation of carbonate and hydroxide present together in mixture. (ii) Estimation of carbonate and bicarbonate present together in a mixture	8
	Bohr's and sommerfeld's theory and Schrödinger's wave equation	10		
	Chemical bonding			
	Ionic bond, covalent bond, metallic bond, H-bond, Weak Chemical Forces	10		
		90		28
	TOPIC (DSC/Programme Course)			
Dr. Manoj Majumder	Chemical equilibrium	10		
Dr. Chanchal Mondal	Ionic equilibrium and chemical energetics	10	pH measurements	3
Dr. Santanu Chakravorty	Organic Chemisry-II	5	Preparation of organic compounds	3
	Alkyl and Aryl Halides	5		
	Total Classes	120		34

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4th SEMESTER (Core, PROGRAMME & SEC COURSE)

NAME OF THE TEACHER	TOPIC	NO.OF CLASSES (Theory)	Practical Topic	Practical Classes
Dr. Santanu Chakravorty	**Cycloalkanes and Conformational Analysis**			
	Types of cycloalkanes and their relative stability, Baeyer strain theory	4		
	Energy diagrams of cyclohexane, Dynamic stereochemistry involving cyclohexane ring	7	Estimation of phenol by bromination (Bromate-Bromide) method	3
	Nucleic Acids			
	Components of nucleic acids, Nucleosides and nucleotides	7	Preparation of urea formaldehyde	3
	Amino Acids, Peptides and Proteins			
	α-Amino Acids	7	Extraction of caffeine from tea leaves	3
	Study of peptides	3		
	Heterocyclic Compounds			
	Classification and nomenclature, Structure, aromaticity in 5-numbered and 6-membered rings containing one heteroatom; Synthesis, reactions and mechanism of substitution reactions of heterocyclic compounds	5	Preparation of methyl orange	1
	Different name reactions	5		
	Carbohydrates			
	Occurrence, classification and their biological importance	5		
	Monosaccharides: Haworth projections and conformational structures; Interconversions of aldoses and ketoses; Killiani- Fischer synthesis and Ruff degradation			
	Disaccharides – Structure elucidation of maltose, lactose and sucrose	3		
Dr. Chanchal Mondal	**Phase Equilibria**			
	concepts of phases, components and degree of freedom	3		
	Binary solutions	3		
	Nernst distribution law	2		
	Solid state			
	Nature of the solid state, law of constancy of interfacial angles, law of rational indices, Bravais lattices; X-ray diffraction, Bragg's law	7	Verification of the Freundlich isotherms	5
	Chemical Kinetics			
	Order and molecularity of a reaction, Arrhenius equation; activation energy. Collision theory, differential rate equations for various reactions	13	kinetics of hydrolysis of methyl acetate	5
	Catalysis and surface chemistry			

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	Types of catalyst, specificity and selectivity, Physical adsorption, chemisorption, adsorption isotherms (Freundlich and Langmuir), Electrical double layer, Zeta potential, mechanism of coagulation, Schulze-Hardy rule	10		
Dr. Manoj Majumdar	**Coordination Chemistry**			
	Werner's theory, valence bond theory, IUPAC nomenclature of coordination compounds,	6		
	CFSE in weak and strong fields, pairing energies, factors affecting the magnitude of 10 Dq (Δo, Δt). Octahedral vs. tetrahedral coordination, tetragonal distortions	12	Estimation of nickel (II) using Dimethylglyoxime (DMG)	10
	Transition Elements			
	General group trends with special reference to electronic configuration, colour, variable valency, magnetic and catalytic properties	8		
	Bioinorganic Chemistry			
	Metal ions present in biological systems, classification of elements and toxicity	8		
	Lanthanoids and Actinoids			
	Electronic configuration, oxidation states, colour, spectral and magnetic properties	4		
		122		30
	PHARMACEUTICAL CHEMISTRY (SEC-2)			
	Drugs & Pharmaceuticals			
Dr. Manoj Majumdar	Drug discovery, design and development	4		
Dr. Manoj Majumdar	Synthesis of the representative drugs of the following classes: analgesics agents, antipyretic agents, anti-inflammatory agents	4		
Dr. Chanchal Mondal	antibacterial and antifungal agents	4		
	Fermentation			
Dr. Chanchal Mondal	Aerobic and anaerobic fermentation	4		
Dr. Santanu Chakravorty			Preparation of Aspirin and its analysis	4
	DSC/GE Chemistry			
Dr. Chanchal Mondal	Properties of liquid	5	Determination of viscosity efficient and surface tension	5
Dr. Chanchal Mondal	Properties of solid	5		

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Dr. Manoj Majumdar	Chemical kinetics	6	Semi-micro qualitative analysis of radicals	5
Dr. Manoj Majumdar	Transition metals	4		
Dr. Santanu Chakravorty	Co-ordination compounds	3		
Dr. Santanu Chakravorty	Crystal field theory	3		
Dr. Santanu Chakravorty	Kinetic Theory of Gases	4		
Dr. Chanchal Mondal	SEC-2 (General introduction to pesticides (natural and synthetic), benefits and adverse effects, changing concepts of pesticides, structure activity relationship	15	Preparation of simple organophosphates, phosphonates and thiophosphates	5
	Total Classes	168		49

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6th SEMESTER (Core and Programm course)

NAME OF THE TEACHER	TOPIC	NO.OF CLASSES	Practical Topic	Practical Classes
	Organometallic Compounds			
Dr. Manoj majumder	Definition and classification of organometallic compounds, Metal carbonyls, metal alkyls, ferrocene	20	Qualitative semi micro analysis of mixtures containing 3 anions and 3 cations	10
	Reaction Kinetics and Mechanism			
	Introduction to inorganic reaction mechanisms. Substitution reactions, ligand field theory	10		
	Catalysis by Organometallic Compounds			
	Study of the following industrial processes and their mechanism	10		
Dr. Chanchal Mondal	**Quantum Chemistry**			
	Black body radiation, Planck's quantum theory, Photoelectric and Compton effects; Wave-particle duality, de-Broglie hypothesis	10	determination of unknown concentration by spectrophotomet	10
	hydrogen atom and hydrogen-like ions, angular momentum, rigid rotator	10		
	Molecular Spectroscopy			
	Interaction of electromagnetic radiation with molecules and various types of spectra; Born-Oppenheimer approximation,	4		
	Rtational, raman, vibrational and electronic spectroscopy	6		
	Photochemistry			
	Characteristics of electromagnetic radiation, Lambert-Beer's law and its limitations, physical significance of absorption coefficients. Laws, of photochemistry	10		
	Polymer chemistry (DSE-3)			

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Dr. Chaycha Mondal	Introduction and history of polymeric materialsaspects of analysis, Functionality and its importance, Kinetics of Polymerization	10	Preparation of urea-formaldehyde resin	10
Dr. Santanu Chakravorty	Crystallization and crystallinity, Nature and structure of polymers, Determination of molecular weight of polymers, Glass transition temperature (Tg) and determination of Tg	10		
Dr. Manoj Majummdar	Polymer Solution, Properties of Polymers,	10		
Green Chemistry (DSE-4)				
Dr. Santanu Chakravrty	**Introduction to Green Chemistry**			
	Need for Green Chemistry	5		
	Principles of Green Chemistry and Designing a Chemical synthesis			
	Designing, Twelve principles, prevention and minimizing of hazards	10		
	Energy requirements for reactions, green solvents, Selection of starting materials, Use of catalytic reagents, Prevention of chemical accidents designing greener processes	10	Alternative Green solvents	10
	Examples of Green Synthesis			
	Microwave, ultrasound assisted reactions, Surfactants for carbon dioxide, Development of Fully Recyclable Carpet	10		
	Future Trends in Green Chemistry			
	Oxidation reagents and catalysts	5		
		150		40
	Polymer Chemisrty (DSC)			
Dr. Manoj Majumdar	**Introduction and history of polymeric materials**	14		
	Functionality and its importance	5		

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Dr. Chanchal Mondal	Kinetics of Polymerization	4	Preparation of urea-formaldehyde resin	5
Dr. Santanu Chakravorty	Crystallization and crystallinity	2		
	Determination of molecular weight of polymers	2		
	Glass transition temperature	2		
	Polymer Solution	2		
	Properties of Polymers	2		
	CHEMISTRY OF COSMETICS & PERFUMES (DSC)			
Dr. Chanchal Mondal	A general study including preparation and uses of the following: Hair dye, hair spray, shampoo, suntan lotions, face powder, lipsticks, talcum powder, nail enamel etc	6		
Dr. Santanu Chakravorty			Preparation of shampoo	5
Dr. Manoj Majumdar	Essential oils and their importance in cosmetic industries with reference to Eugenol, Geraniol, sandalwood oil, eucalyptus, rose oil, 2-phenyl ethyl alcohol, Jasmone, Civetone, Muscone	6		
	Tota Classes	195		50

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