

Teaching Plan for the Academic Session 2022-2023

DEPARTMENT OF CHEMISTRY

2nd SEMESTER(Core & General)

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 KMnO ₄ solution	4
	Ionisation energy, electronegativity,	7		
	Electron affinity, scales of electronegativity	6	Estimation of Fe(II) with K ₂ Cr ₂ O ₇	4
	Oxidation and reduction			
Redox equations, Standard Electrode Potential	5			
	Principles involved in volumetric analysis	5		
Dr Manoj Majumder	Atomic structure			
	Bohr's and sommerfeld's theory and Schrödinger's wave equation	10	Estimation of carbonate and hydroxide present together in mixture.	8
	Chemical bonding		(ii) Estimation of carbonate and bicarbonate present together in a mixture	
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

Teaching Plan for the Academic Session 2022-2023

DEPARTMENT OF CHEMISTRY
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	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				

Dr. Chanchal Mondal	Order and molecularity of a reaction, Arrhenius equation; activation energy. Collision theory, differential rate equations for various reactions Catalysis and surface chemistry 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	13 10	kinetics of hydrolysis of methyl acetate	5
Dr. Manoj Majumdar	Coordination Chemistry Werner's theory, valence bond theory, IUPAC nomenclature of coordination compounds, isomerism in coordination compounds CFSE in weak and strong fields, pairing energies, factors affecting the magnitude of $10 Dq$ (Δ_o , Δ_t). Octahedral vs. tetrahedral coordination, tetragonal distortions Transition Elements General group trends with special reference to electronic configuration, colour, variable valency, magnetic and catalytic properties Bioinorganic Chemistry Metal ions present in biological systems, classification of elements and toxicity Lanthanoids and Actinoids Electronic configuration, oxidation states, colour, spectral and magnetic properties	6 8 4	Estimation of nickel (II) using Dimethylglyoxime (DMG)	10
		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		
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		Preparation of simple organophosphates, phosphonates and 15 thiophosphates	5
Total Classes		168		49

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DEPARTMENT OF CHEMISTRY

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	unknown concentration by spectrophotometry	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)

Dr. Chancha Mondal	Introduction and history of polymeric materials aspects 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 Majumdar	Polymer Solution, Properties of Polymers,	10		
Green Chemistry (DSE-4)				
Dr. Santanu Chakravorty	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 Chemistry (DSC)			
Dr. Manoj Majumdar	Introduction and history of polymeric materials	14		
	Functionality and its importance	5		

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		
Dr. Chanchal Mondal	CHEMISTRY OF COSMETICS & PERFUMES (DSC) 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