

I – Academic Planner

A. Teaching Plan (Year: 2021-2022 Semester: Odd)

Teacher's Name: Mr. Deepak Kumar

Department: Chemistry

Sl. No.	UPC	Paper Name	Core/AECC/GE/SEC	Topic/Unit	Start Date	End Date
1.	42177925	B.Sc (Prog.) Physical Science Sem V(Theory)	Chemistry of d-Block Elements, Quantum Chemistry and Spectroscopy (DSC-11)	Brief discussion with examples of types of ligands, denticity and concept of chelate.	15/09/2021	
		Same	Same	IUPAC system of nomenclature of coordination compounds (mononuclear and binuclear) involving simple monodentate and bidentate ligands.	16/09/2021	
		Same	Same	Structural and stereoisomerism in complexes with coordination numbers 4 and 6	29/09/2021	
		Same	Same	Valence Bond Theory (VBT): Salient features of theory, concept of inner and outer orbital complexes of Cr, Fe, Co and Ni. Drawbacks of VBT.	06/10/2021	
		Same	Same	Splitting of d orbitals in octahedral symmetry. Crystal field effects for weak and strong fields. Crystal field stabilization energy (CFSE), concept of pairing energy		
		Same	Same	Factors affecting the magnitude of Δ . Spectrochemical series. Splitting of d orbitals in tetrahedral symmetry. Comparison of CFSE for octahedral and tetrahedral fields.		
		Same	Same	tetragonal distortion of octahedral geometry, Jahn-Teller distortion, square planar coordination		
2.	42177915/16	B.Sc (Prog.) Analytical Chemistry Sem V(Theory)	Analytical Biochemistry DSC-1	Basic understanding of the structures and properties of carbohydrates, biological importance of carbohydrates,	16/09/2021	
		Same	Same	Monosaccharides: Constitution and absolute configuration of glucose and fructose, epimers	17/09/2021	
		Same	Same	anomers, mutarotation, Haworth projections and conformational structures; Structure elucidation of glucose and fructose (Fischer's proof) Interconversions of aldoses and ketoses	30/09/2021	
		Same	Same	Fischer synthesis and Ruff degradation	07/10/2021	
		Same	Same	Disaccharides – Structure elucidation of maltose, lactose and sucrose, Polysaccharides – Elementary treatment of starch, cellulose and glycogen	14/10/2021	
		Same	Same	α -Amino Acids - Classification and characterization, Zwitterions, pKa values, isoelectric point and electrophoresis;	21/10/2021	
		Same	Same	Proteins: Classification, Primary, secondary and tertiary structures of proteins, test for proteins, isolation, characterization, biological importance; denaturation of proteins.	28/10/2021	
		Same	Same	Enzymes: Nomenclature, classification, characterization, mechanism of enzyme action, factors	04/11/	11/11/

				affecting enzyme action, co-enzymes and co-factors and their role in biological reactions, specificity of enzyme action(Including stereo-specificity), effect of pH, temperature and ionic solution, on enzyme activity,	2021	2021
		Same	Same	Introduction to biocatalysis: importance in —green chemistry and chemical industry. Drug action-receptor theory. Structure – activity relationships of drug molecules, binding role of –OH group,-NH ₂ group, double bond and aromatic ring		
3.	42177925	B.Sc (Prog.) Physical Science Sem V(Practical)	Chemistry of d-Block Elements	Estimation of the amount of nickel present in a given solution as bis - (dimethylglyoximate) nickel(II)	20/09/ 2021	
		Same	Same	Estimation of (i) Mg ²⁺ by complexometric titrations using EDTA	27/09/ 2021	
		Same	Same	Estimation of total hardness of a given sample of water by complexometric titration	04/10/ 2021	
		Same	Same	Determination of the composition of the Fe ³⁺ - salicylic acid complex / Fe ²⁺ - phenanthroline complex in solution by Job's method	18/10/ 2021	
4.	32177901	B.Sc (Hon's) Chemistry Sem V(Practical)	Novel Inorganic Solids DSC-1	Synthesis of inorganic pigments (PbCrO ₄ , ZnCrO ₄)	14/09/ 2021	
		Same	Same	Synthesis of pure ZnO and Cu doped ZnO nanoparticles	28/09/ 2021	
		Same	Same	Synthesis of inorganic pigments (Malachite)	05/10/ 2021	
		same	Same	Synthesis of metal sulphide nanoparticles (MnS, CdS, ZnS, CuS, NiO) and characterization using UVvisible spectrophotomete	19/10/ 2021	26/10/ 2021
5.	32175901	Atomic Structure, Bonding, General Organic Chem. & Aliphatic Hydrocarbons	GE-1	Review of: Bohr's theory and its limitations, Heisenberg uncertainty principle, Dual behaviour of matter and radiation,	25/11/ 2021	
				De-Broglie's relation, Hydrogen atom spectra	02/12/ 2021	
				need of a new approach to atomic structure, What is Quantum mechanics?	09/12/ 2021	
				Time independent Schrodinger equation and meaning of various terms in it. Significance of ψ and ψ^2 ,	16/12/ 2021	
				Schrödinger equation for hydrogen atom, radial and angular parts of the hydrogenic wave functions (atomic orbitals) and their variations for 1s, 2s, 2p, 3s, 3p and 3d orbitals (Only graphical representation)	23/12/ 2021	
				radial and angular nodes and their significance, radial distribution functions and the concept of the most probable distance with special reference to 1s and 2s atomic orbitals.	30/12/ 2021	

				Significance of quantum numbers, orbital angular momentum and quantum numbers ml and ms. Shapes of s, p and d atomic orbitals, nodal planes,	06/01/2022	
				discovery of spin, spin quantum number (s) and magnetic spin quantum number (ms).	13/01/2022	
				Rules for filling electrons in various orbitals, electronic configurations of the atoms,	20/01/2022	
				stability of half-filled and completely filled orbitals, concept of exchange energy, relative energies of atomic orbitals, anomalous electronic configurations	27/01/2022	
6.	42171103	Atomic Structure, Bonding, General Organic Chem. & Aliphatic Hydrocarbons	core	Estimation of oxalic acid by titrating it with KMnO ₄ .	17/12/2021	
				Estimation of Mohr's salt by titrating it with KMnO ₄	31/12/2021	
				Estimation of water of crystallization in Mohr's salt by titrating with KMnO ₄ .	14/01/2022	
				Estimation of Fe (II) ions by titrating it with K ₂ Cr ₂ O ₇ using internal indicator.	18/02/2022	
				Estimation of Cu (II) ions iodometrically using Na ₂ S ₂ O ₃ .	04/03/2022	

B. Outstation Field visits for students

Project Name / Paper Name			
Destination		Travel Mode	
Departure Month		Return	
Faculty-in-Charge		Number of Students going	

C. Internal Assessment: House Exam (Test/Presentation etc.) & Assignment*

Course Code	Course Name	Unique Paper Code	Topic Name	Day and Date	Date/s of Exhibiting the Assessment Sheet to students, Discussing the marks,
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Returning/Retaining

***Marks of the Internal Assessment to be submitted to the College 15 days before the last working day of every semester**

I – Academic Planner

A. Teaching Plan (Year: 2021-2022 Semester: Even)

Teacher's Name: Mr. Deepak Kumar

Department: Chemistry

Sl. No.	UPC	Paper Name	Core/AECC/GE/SEC	Topic/Unit	Start Date	End Date
1.	32171601	B.Sc (H) Chemistry VI(Theory)	ORGANOMETALLIC CHEMISTRY & BIO-INORGANIC CHEMISTRY	Basic principles involved in analysis of cations and anions.	10/01/2022	
		Same	Same	Solubility products, common ion effect.	13/01/2022	
		Same	Same	Principles involved in separation of cations into groups and choice of group reagents.	14/01/2022	
		Same	Same	Interfering anions, need to remove them after Group II and methods of removal.	14/01/2022	
		Same	Same	Analysis of insoluble substances.	18/01/2022	
		Same	Same	Definition and classification of organometallic compounds on the basis of bond type. Concept of hapticity of organic ligands.	20/01/2022	
		Same	Same	Metal carbonyls: 18 electron rule, electron count of mononuclear, polynuclear and substituted metal carbonyls of 3d series. General methods of preparation (direct combination, reductive carbonylation, thermal and photochemical decomposition) of mono and binuclear carbonyls of 3d series.	21/01/2022	
		Same	Same	Structures of mononuclear and binuclear carbonyls of Cr, Mn, Fe, Co and Ni using VBT. π -acceptor behaviour of CO (MO diagram of CO to be discussed), synergic effect and use of IR data to explain extent of back bonding.	21/01/2022	
		Same	Same	Zeise's salt: Preparation and structure	17/02/2022	
		Same	Same	evidences of synergic effect and comparison of synergic effect with that in carbonyls.	18/02/2022	
		Same	Same	Metal Alkyls: Important structural features of methyl lithium	22/02/2022	
		Same	Same	trialkyl aluminium, concept of multicentre bonding in these compounds.	24/02/2022	

		Same	Same	Ferrocene: Preparation, physical properties and reactions (acetylation, alkylation, metallation, Mannich Condensation).	25/02/2022	
		Same	Same	Structure and aromaticity.	25/02/2022	
		Same	Same	Comparison of aromaticity and reactivity with that of benzene.	03/03/2022	
		Same	Same	Metal ions present in biological systems, classification of elements according to their action in biological system	07/03/2022	
		Same	Same	Sodium / K-pump	10/03/2022	
3.		Same	Same	Estimation of the amount of nickel present in a given solution as bis - (dimethylglyoximate) nickel(II)	11/03/2022	
		Same	Same	carbonic anhydrase and carboxypeptidase.	21/03/2022	
		Same	Same	Excess and deficiency of some trace metals. Toxicity of metal ions (Hg, Pb, Cd and As), reasons for toxicity	24/03/2022	
		Same	Same	Use of chelating agents in medicine, Cisplatin as an anti-cancer drug.	25/03/2022	
		Same	Same	Storage and transfer of iron	25/03/2022	
4.		Same	Same	Iron and its application in bio-systems, Haemoglobin, Myoglobin	28/03/2022	
		Same	Same	General principles of catalysis, properties of catalysts, homogeneous and heterogeneous catalysis	31/03/2022	
		Same	Same	deactivation and regeneration of catalysts, catalytic poison, promoter.	01/04/2022	
		same	Same	Alkene hydrogenation, Synthetic gasoline, Polymerisation of ethene using Ziegler-Natta catalyst	04/04/2022	
2	42177926	B.Sc (Prog.) PS VI	Organometallic, Bioinorganic chemistry, Polynuclear hydrocarbon and UV, IR	A brief introduction to bio-inorganic chemistry	23/02/2022	
		same	same	Role of metal ions presents in biological systems with special reference to Na ⁺ , K ⁺ and Mg ²⁺ ions: Na/K pump	09/03/2022	
		same	same	Role of Mg ²⁺ ions in energy production and chlorophyll.	06/04/2022	
		same	same	Brief introduction to oxygen transport and storage (haemoglobin-myoglobin system)	20/04/2020	
		same	same	Brief introduction about toxicity of metal ions (Hg ²⁺ and Cd ²⁺).	11/04/2020	

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