I – Academic Planner

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

Teacher's Name: Dr. Kamlesh Kumar Department: Chemistry

Sl. No.	Course	UPC	Paper Name	Core/AECC /GE/SEC	Topic/Unit	Start Date	End Date
1.	**B.Sc (Prog.) Physical Science Sem III (Practical)**	42174304	Solutions, Phase Equilibrium, Conductance, Electrochemistry & Functional Group Organic Chemistry-II	CORE	Systematic qualitative analysis of Organic compounds: Extra element Detection.	20.09.2021	20.09.2021
					Systematic qualitative analysis of Organic compounds: Functional Group test for Nitro group and Derivative preparation.	27.09.2021	27.09.2021
					Systematic qualitative analysis of Organic compounds: Functional Group test for amine & amide Group and derivative preparation.	04.10.2021	04.10.2021
					Systematic qualitative analysis of Organic compounds: Functional Group test for hydrocarbon and Derivative preparation.	11.10.2021	11.10.2021
					Systematic qualitative analysis of Organic compounds: Functional Group test for halo hydrocarbon and derivative preparation.	18.10.2021	18.10.2021
					Determination of the concentration Of Glycine solution by formylation method.	25.10.2021	25.10.2021
					Action of salivary amylase on starch	02.11.2021	02.11.2021
					Differentiation between a reducing and Non-reducing sugars.	09.11.2021	09.11.2021
2.	**BSc (Hons.)**	42174304	Solutions, Phase Equilibrium,	GE-III	Carboxylic acids and their derivatives (aliphatic and aromatic)	15.09.2021	

	Organic Chemistry-II (Theory)		Conductance, Electrochemistry & Functional Group Organic Chemistry-II		Preparation: Acidic and alkaline hydrolysis of esters. Reactions: Hell-Volhard Zelinsky reaction, acidity of carboxylic acids, effect of substitution on acid strength.		
					Carboxylic acid derivatives (aliphatic): Preparation: Acid chlorides, anhydrides, esters and amides from acids and their interconversion, Claisen condensation. Reactions: Relative reactivities of acid derivatives towards nucleophiles, Reformatsky reaction, Perkin condensation.	22.09.2021	
					Amines (aliphatic & aromatic) and Diazonium Salts: Preparation: from alkyl halides, Gabriel's Phthalimide synthesis, Hofmann Bromamide reaction.	29.09.2021	
					Reactions: Hofmann vs Saytzeff elimination, carbylamine test, Hinsberg test, reaction with HNO_2, Schotten-Baumann reaction. Electrophilic substitution (case aniline): nitration, bromination, sulphonation, basicity of amines.	06.10.2021	
					Diazonium salt Preparation: from aromatic amines Reactions: conversion to benzene, phenol and dyes	13.10.2021	
					Amino Acids, Peptides and Proteins Zwitterion, isoelectric point and electrophoresis Preparation of amino acids: Strecker synthesis and using Gabriel's phthalimide synthesis. Reactions of amino acids: ester of –COOH group, acetylation of $–NH_2$ group, complexation with Cu^{2+} ions, ninhydrin test.	20.10.2021	
					Overview of Primary, Secondary, Tertiary and Quaternary Structure of proteins.	27.10.2021	

					Determination of primary structure of peptides by degradation Edmann degradation (N-terminal) and C– terminal (thiohydantoin and with carboxypeptidase enzyme). Synthesis of simple peptides (upto dipeptides) by N-protection (t-butyloxycarbonyl and phthaloyl) & C-activating groups and Merrifield solidphase synthesis.		
					Carbohydrates: Classification, and general properties, glucose and fructose (open chain and cyclic structure), determination of configuration of monosaccharides, absolute configuration of glucose and fructose.		
					mutarotation, ascending and descending in monosaccharides. Structure of disaccharides (sucrose, cellobiose, maltose, lactose) and polysaccharides (starch and cellulose) excluding their structure elucidation.		
	BSc (Prog.) Physical Science Sem-III (Practical)		Solutions, Phase Equilibrium, Conductance, Electrochemistry and Functional Group Organic Chemistry-II		Systematic qualitative analysis of organic compounds possessing monofunctional group Alcohols and Phenols and derivative preparation	24.09.2021	
					Systematic qualitative analysis of organic compounds possessing monofunctional group aldehyde and ketone and derivative preparation	08.10.2021	
					Systematic qualitative analysis of organic compounds possessing monofunctional group Carboxylic acids and derivative preparation		

	BSc (Prog.) Analytical Chemistry Sem-III (Theory & Practical)		Green Methods in Chemistry	**SEC**	All Units	18..9.2021	04.12.2021

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, Returning/Retaining

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

D. Organization of Department/College Society Meetings by Staff Advisor/Convener

Department/Society	Meeting Date	Purpose

E. College Functions

College Function	Function Date	Role to be played

I – Academic Planner

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

Teacher's Name: Dr. Kamlesh Kumar Department: Chemistry

S. No.	UPC	Paper Name	Core/AECC/GE/SEC	Topic/Unit	Start Date	End Date
1.	42174401	**B. Sc (Prog.) Analytical Chemistry Sem IV (Theory)**	**Separation Method-II (CORE)**	Radioisotopic Techniques: Nature of radioactivity	12/01/2022	1.
				Detection and measurement of radioactivity	19/01/2022	
				Biochemical assays (radioimmuno-assays) to detect the presence and absence of radioisotopes	02/02/2022	09/02/2022
				Applications of radioactive isotopes to label biological molecules	16/02/2022	23/02/2022
				Estimation of the concentration of different constituents of plasma, body fluids, urine, blood etc.	02/03/2022	16/03/2022
				Inherent advantages and restrictions of radiotracer experiments, safety aspects.	30/03/2022	06/04/2022
2.		**BSc (H) Chemistry, Sem-IV (Theory)**	**Chemistry of Cosmetics and Perfumes (SEC-10)**	Colored preparation: Nail preparation	11/01/2022	
				Structure of nail,	18/01/2022	
				Nail lacquers,	25/01/2022	01/02/2022
				Nail polish remover	08/02/2022	15/02/2022
				Lipsticks	22/02/2022	

				Personal hygiene products: Antiperspirants and deodorants	08/03/2022	
				Oral hygiene products	15/03/2022	22/03/2022
				Flavours and essential oils	29/03/2022	12/04/2022
3.		**BSc (H) Chemistry, Sem-II (Theory)**	**Basics and Hydrocarbons (Core)**	**Stereochemistry** Stereoisomerism: Optical activity and optical isomerism, asymmetry, chirality, enantiomers, diastereomers. specific rotation; Configuration and projection formulae: Newmann, Sawhorse, Fischer and their interconversion. Chirality in molecules with one and two stereocentres; meso configuration. Racemic mixture and their resolution. Relative and absolute configuration: D/L and R/S designations. Geometrical isomerism: cis-trans, syn-anti and E/Z notations using CIP rules.	06.04.2022	04.05.2022
				Carbon-Carbon sigma bonds (Alkanes and Cycloalkanes) General methods of preparation- Wurtz and Wurtz Fittig reaction, Corey House synthesis, physical and chemical properties of alkanes, Free radical substitutions; Halogenation, concept of relative reactivity v/s selectivity. Conformational analysis of alkanes (Conformations, relative stability and energy diagrams of Ethane, Propane and butane). General molecular formulae of cycloalkanes and relative stability, Baeyer strain theory, Cyclohexane conformations with energy diagram, Axial and equatorial positions. Conformations of monosubstituted cyclohexanes.	07.05.200	04.06.2022
				Carbon-Carbon pi Bonds (Alkenes and Alkynes) Structure and isomerism.General methods of preparation, physical and chemical properties. Mechanism, of E1, E2, E1cb reactions, Saytzeff and Hoffmann eliminations, Electrophilic Additions, mechanism with suitable examples, (Markownikoff/Antimarkownikoff addition), *syn* and *anti*-addition; addition of H_2, X_2, oxymercuration-demercuration, hydroboration-oxidation, ozonolysis,	08.06.2022	16.07.2022

				hydroxylation, Diels Alder reaction, 1,2-and 1,4-addition reactions in conjugated dienes. Mechanism of allylic and benzylic bromination in propene, 1-butene, toluene,ethyl benzene. Reactions of alkynes; acidity, electrophilic and nucleophilic additions, hydration to form carbonylcompounds, Alkylation of terminal alkynes.		
4.		**B. Sc (Prog.) Life science (Theory)**	**Chemical Energetics, Equilibria and Functional Group Organic Chemistry-I (Core)**	**Aromatic Hydrocarbons** Structure and aromatic character of benzene. Preparation**:** methods of preparation of benzene from phenol, benzoic acid, acetylene and benzene sulphonic acid. Reactions**:** electrophilic substitution reactions in benzene citing examples of nitration, halogenation, sulphonation and Friedel-Craft's alkylation and acylation with emphasis on carbocationic rearrangement, side chain oxidation of alkyl benzenes.	05.04.2022	26.04.022
				Alkyl and Aryl Halides **A) Alkyl halides (upto 5 carbons):** Structure of haloalkanes and their classification as 1º, 2º & 3º. Preparation: starting from alcohols (1º, 2º & 3º) and alkenes with mechanisms. Reactions: Nucleophilic substitution reactions with mechanism and their types (S_N1, S_N2 and S_Ni), competition with elimination reactions (elimination vs substitution) nucleophilic substitution reactions with specific examples from: hydrolysis, nitrite & nitro formation, nitrile & isonitrile formation and Williamson's ether synthesis.	03.05.2022	
				B) Haloarenes: Structure and resonance Preparation: Methods of preparation of chloro, bromo & iodobenzene from benzene (electrophilic substitution), from phenols (nucleophilic substitution reaction) and from aniline (Sandmeyer and Gattermann reactions). Reaction: Nucleophilic aromatic substitution by OH group (Bimolecular Displacement Mechanism), Effect of nitro substituent on reactivity of haloarenes, Reaction with strong bases $NaNH_2/NH_3$ (eliminationaddition mechanism involving benzyne intermediate), relative reactivity and strength of C-X bond in alkyl, allyl, benzyl, vinyl and aryl halides.		07.06.2022
				Alcohols, Phenols, Ethers, Aldehydes and Ketones (Aliphatic and Aromatic): A) Alcohols (upto 5 Carbon): Structure and classification of alcohols as 1º, 2º & 3º.	07.06.2022	

				Preparation: Methods of preparation of 1º, 2º & 3º by using Grignard reagent, ester hydrolysis and reduction of aldehydes, ketones, carboxylic acids and esters. Reactions: Acidic character of alcohols and reaction with sodium, with HX (Lucas Test), esterification, oxidation (with PCC, alkaline $KMnO_4$, acidic $K_2Cr_2O_7$ and conc. HNO_3), Oppeneauer Oxidation.		
				B) Diols (upto 6 Carbons): Oxidation and Pinacol-Pinacolone rearrangement.		
				C) Phenols: acidity of phenols and factors affecting their acidity. Preparation: Methods of preparation from cumene, diazonium salts and benzene sulphonic acid. Reactions: Directive influence of OH group and Electrophilic substitution reactions, viz. nitration, halogenation, sulphonation, Reimer-Tiemann reaction, Gattermann–Koch reaction, Houben-Hoesch condensation, reaction due to OH group: Schotten-Baumann reaction.		28.06.2022
				D) Ethers (Aliphatic & Aromatic): Williamson's ether synthesis, Cleavage of ethers with HI	05.07.2022	
				E) Aldehydes and ketones (Aliphatic and Aromatic): Preparation: from acid chlorides and from nitriles. Reactions: Nucleophilic addition, nucleophilic addition – elimination reaction including reaction with HCN, ROH, $NaHSO_3$, NH_2-G derivatives. Iodoform test, Aldol Condensation, Cannizzaro's reaction, Wittig reaction, Benzoin condensation. Clemmensen reduction, Wolff Kishner reduction, Meerwein-Pondorff Verley reduction.		26.07.2022
5.		**BSc. (Prog) PS, Sem-VI (Practical)**	**Organometallics, Bioinorganic Chemistry, Polynuclear Hydrocarbons and UV, IR Spectroscopy (DSE-12)**	1. Detection of extra elements 2. Systematic qualitative analysis of organic compounds possessing monofunctional groups: amide, amines, halo-hydrocarbons and carbohydrates (Including Derivative preparation) 3. Identification of simple organic compounds containing the above functional groups by IR spectroscopy through examination of spectra (spectra to be provided).	13.01.2022	07.04.2022
6.		**BSc(H), Sem-VI (Practical)**	**Molecules of Life (GE-VII)**	1. Separation of amino acids by paper chromatography 2. Study of titration curve of glycine and determination of its isoelectric point. 3. Estimation of proteins by Lowry's method	14.01.2022	08.04.2022

				4. Action of salivary amylase on starch 5. Effect of temperature on the action of salivary amylaseon starch. 6. To determine the saponification value of an oil/fat. 7. To determine the iodine value of an oil/fat 8. Qualitative tests for carbohydrates- Molisch test Barfoed's reagent test, rapid furfural test, Tollen's test and Fehling solution test (Only these tests are to be done in class) 9. Qualitative tests for proteins 10. Extraction of DNA from onion/cauliflower		
7.		**BSc(H), Sem-II (Practical)**		1. Calibration of a thermometer. 2. Organic Preparation (any one of the following): a. Bromination of acetanilide/aniline/phenol b. Nitration of nitrobenzene/toluene 3. Purification of organic compounds by crystallization using the following solvents: a. Water b. Alcohol c. Alcohol-Water 4. Determination of the melting points of prepared organic compounds (Kjeldahl method and electrically heated melting point apparatus) 5. Effect of impurities on the melting point – mixed melting point of two unknown organic compounds. 6. Determination of boiling point of liquid compounds. (Boiling point lower than and more than 100 °C by distillation and capillary method) 7. Chromatography a. Separation of a mixture of two amino acids by ascending and radial paper chromatography b. Separation of a mixture of two sugars by ascending paper chromatography. c. Separation of a mixture of o-and p-nitrophenol or o-and p-aminophenol by thin layer chromatography (TLC). 8. Detection of extra elements.	07.04.2022	07.07.2022

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For Departments

A. Department activities for students – Election/Freshers/Welcome/Farewell/Department Seminars/Society functions

Event	Date	Timing	Venue	Event In-charge / Supervisor
Department Election				

Fresher's Welcome				
Farewell				
Department Society functions				
Department Seminars				
Any Other ( )				

B. FDP/Seminar/Workshops/Lectures to be attended and/or to be conducted

Event Topic					
Type / Nature (FDP/Webinar/Workshop etc.)					
Organizing In-charge					
Details regarding invited Resource Person					
Nature of Participation (e.g. Invited Speaker, Participant etc.)					
Date/s		Timing/s		Mode	

For Departments

B. Department activities for students – Election/Freshers/Welcome/Farewell/Department Seminars/Society functions

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Fresher's Welcome				
Farewell				
Department Society functions				
Department Seminars				
Any Other ( )				

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