

Anjuman Islam Janjira Degree College of Science

Lokmanya Tilak Road, Murud-Janjira dist. Raigad. Maharashtra 402401

Academic Calendar

PRACTICAL Plan for Semester-I Year: 2024-2025

Course	F.Y.B.Sc. (NEP 2020) Skill Enhancement Courses (SEC)	Vertical	04	SEC	
Course Code	SEC				
Title	Basic statistical tools in chemistry				
Credits	2				
Name of the Faculty	Dr. Sajid F. Shaikh				
Month	Day	Topic	Batch	Lecture per Month	
Jul-24	Saturday	UNIT –I THEORY COMPONENT.	A		
		Introduction and importance.			
		Data meaning and types-primary data, secondary data, discrete data and continuous data.			
		UNIT –II PRACTICAL COMPONENT.			
		Determination of mean median and mode of titre values of acid base titration.			
		Determination of standard deviation and variance of titre value of any complexometric titrations.			
Aug-24	Saturday	UNIT –I THEORY COMPONENT.	A		
		Introduction of Variables .			
		Types of Variables -, discrete Variables and continuous Variables.			
		UNIT –II PRACTICAL COMPONENT.			
		Determination of acetic acid in vinegar by potentiometric and calculate absolute and relative error.			
		Determination of absolute deviation, average deviation, and relative average deviation.			
Sept-24	Saturday	UNIT –I THEORY COMPONENT.	A		
		Concept of precision and accuracy.			
Oct -24	Saturday	UNIT –II PRACTICAL COMPONENT.	A		
		Determination of absolute and relative error in standardization of Na ₂ S ₂ O ₃ by using 0.05N K ₂ Cr ₂ O ₇ .			
		UNIT –I THEORY COMPONENT.			
		Measurement of central tendency.			
		Measurement of dispersion.			
		Tot. Lec.		60	

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Academic Calendar				
Teaching Plan for Semester-I Year: 2024-2025				
Course	F.Y.B.Sc. (Chemistry)			
Course Code	M3-1			
Title	Basics in Physical, Inorganic and Organic Chemistry I			
Credits	2 Credits (30 lectures)			
Name of the Faculty	Asst. Prof. Nitin Shivaji Pawar			
Month	Date	Topic	Lectures	Lecture per Month
Jul-24	08/07/2024	Module II Inorganic Chemistry (10L) 2.1 Atomic Structure: (3L) Historical perspectives of the atomic structure; J.J. Thomson Model		08
	09/07/2024	Rutherford's Atomic Model- alpha particle scattering experiment, Bohr's theory,		
	15/07/2024	Aufbau principle, Hund's rule of maximum multiplicity and Pauli exclusion principle		
	16/07/2024	2.2 Periodic Table and Periodicity: (2L) Long form of Periodic Table: Classification for elements as main group		
	22/07/2024	transition and inner transition elements.		
	23/07/2024	Periodicity in the Following Properties (5L) Atomic and ionic size,		
	29/07/2024	electron gain enthalpy,		
	30/07/2024	ionization enthalpy,		
Aug-23	05/08/2024	effective nuclear charge (Slater's rule),		08
	06/08/2024	electronegativity, Pauling and Mulliken methods. (Numerical problems expected, wherever applicable.)		
	12/08/2024	Module III Organic Chemistry (10L) Organic Chemistry (10L) 3.1 Classification and Nomenclature of Organic Compounds: (5L)		
	13/08/2024	Nomenclature of mono and bi-functional		
	19/08/2024	aliphatic compounds on the basis of priority		
	20/08/2024	order of the following classes of compounds: Alkanes, alkenes, alkynes, haloalkanes,		
	26/08/2024	alcohols, ethers, aldehydes, ketones, carboxylic acids.		
	27/08/2024	Stereochemistry: (5L) Projection formulae: Flying Wedge projection,		
Sep-24	02/09/2024	Fischer Projection, Newman and Sawhorse		06
	03/09/2024	Projection formulae (erythro, threo isomers of tartaric acid and 2,3 - dichlorobutane) and their interconversions;		
	17/09/2024	Geometrical isomerism in alkene: cis- trans and syn-anti isomerism R/S nomenclature,		

	23/09/2024	E/Z notations with C.I.P rules. Conformational analysis of alkanes (ethane, and n-butane); Relative stability with energy profile diagrams		
	24/09/2024	Module I Physical Chemistry (10L) 1.1 Liquid State - I: (2L) Viscosity: Introduction, coefficient of viscosity, relative viscosity, specific viscosity, reduced viscosity,		
	30/09/2024	determination of viscosity by Ostwald viscometer		
Oct-24	01/10/2024	1.2 Chemical Calculations: (2L) Methods of expressing concentration of solutions: Normality, Molarity, Molality, Mole fractions, ppm, ppb.		08
	07/10/2024 4	Preparation of solutions (Dilution). (Numerical problems expected wherever necessary)		
	08/10/2024	1.3 Chemical Kinetics: (6L) Rate of reaction, rate constant		
	14/10/2024 4	measurement of reaction rates, order and molecularity of reaction,		
	15/10/2024	Integrated rate equation of first order and Second order reactions (with equal initial concentration of reactants).		
	21/10/2024	Determination of order of reaction by a) Integration method		
	22/10/2024	b) Graphical method c) Ostwald's isolation method		
	28/10/2024	d) Half time method (Numerical problems expected wherever necessary).		
		Total Lectures = 30		

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Academic Calendar				
PRACTICAL Plan for Semester-I Year: 2024-2025				
Course	F.Y.B.Sc. (Chemistry)			Paper: I
Course Code	M3CHP1			
Title	PRACTICAL - Chemistry Practical 1			
Credits	2			
Name of the Faculty	Asst. Prof. Nitin Shivaji Pawar			
Month	Day	Topic	Batch	Lecture per Month
Jul-24	Friday	Lab Introduction	A	
	Saturday	Lab Introduction	B	
	Friday	To prepare 0.1 N succinic acid and standardize the NaOH solution of different concentrations.	A	
	Saturday	To prepare 0.1 N succinic acid and standardize the NaOH solution of different concentrations.	B	
	Friday	To standardize Sodium thiosulphate solution.	A	
	Saturday	To standardize Sodium thiosulphate solution.	B	
	Friday	To determine the rate constant for the hydrolysis of ester using HCl as catalyst.		
	Saturday	To determine the rate constant for the hydrolysis of ester using HCl as catalyst.		
Aug-24	Friday	Determination of viscosity of aqueous solutions of (i) polymer (ii) ethanol and (iii) sugar at room temperature (Any two solutions).	A	
	Saturday	Determination of viscosity of aqueous solutions of (i) polymer (ii) ethanol and (iii) sugar at room temperature (Any two solutions).	B	
	Friday	To determine the strength of commercial acid sample (HCl).	A	
	Saturday	To determine the strength of commercial acid sample (HCl).	B	
	Friday	To estimate the content of Na ₂ CO ₃ and NaHCO ₃ in the given sample using double indicator.	A	
	Saturday	To estimate the content of Na ₂ CO ₃ and NaHCO ₃ in the given sample using double indicator.	B	
Oct-24	Friday	Journal Checking	A	
	Saturday		B	
	Friday	Journal Certification	A	
	Saturday		B	
	Friday	Journal Certification	A	
	Saturday		B	
		Tot. Lec.		

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PRACTICAL Plan for Semester-I Year: 2024-2025

Course	F.Y.B.Sc. (NEP 2020) Chemistry Courses		Vertical 01 Major	Chemistry
Course Code	M3CHP1			
Title	Chemistry			
Credits	2			
Name of the Faculty	Mr. Khan Shoyeab Mutalib			
Month	Day	Topic	Batch	Lecture per Month
Jul-24	Friday	Lab Orientation	B	
	Saturday	Lab orientation	A	
	Friday	To determine the percent purity of sample of BaSO ₄ containing NH ₄ Cl	B	
	Saturday	To determine the percent purity of ZnO containing ZnCO ₃ .	A	
	Friday	Purification of organic compounds by recrystallization selecting suitable solvent		
	Saturday	Purification of organic compounds by recrystallization selecting suitable solvent		
Aug-24	Friday	Purification of organic compounds by recrystallization selecting suitable solvent	B	
	Saturday	Purification of organic compounds by recrystallization selecting suitable solvent	A	
	Friday	Basic principles involved in characterization of Organic compound	B	
	Saturday	Basic principles involved in characterization of Organic compound	A	
	Friday	Basic principles involved in characterization of Organic compound		
	Saturday	Basic principles involved in characterization of Organic compound		
Oct-24	Friday	Basic principles involved in characterization of Organic compound	B	
	Saturday	Basic principles involved in characterization of Organic compound	A	
	Friday	Basic principles involved in characterization of Organic compound	B	
	Saturday	Basic principles involved in characterization of Organic compound	A	
	Friday	Journal Certification	B	
	Saturday	Journal Certification		
			Tot. Lec.	60

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Practical Plan for Semester- I Year: 2024-2025

Course:	F.Y.B.Sc. (Chemistry) NEP - 2020			VSC
Course Code	VSCCH1			
Title	Calibration of Glassware and Instruments			
Credits	1 Credits (30 Lectures)			
Name of the Faculty	Mr. Tamseel Shakeel Shahjahan			
Month	Date	Topic	Lectures	Lecture per Month
		Calibration of Laboratory Glassware	15	15
July - 24	04-07-24	Introduction to Laboratory		
	11-07-24	Calibration of Burette		
	18-07-24	Calibration of Pipette		
	25-07-24	Calibration of Standard Measuring Flask		
Aug - 24	01-08-24	Calibration of Thermometer (Demonstration)		
	08-08-24	Calibration of Laboratory Instruments	15	15
	22-08-24	Calibration of pH meter		
	29-08-24	Calibration of Conductometer		
Sep - 24	05-09-24	Calibration of Colorimeter		
	12-09-24	Calibration of Potentiometer (Demonstration)		
	19-09-24	Revision of Practical		
	26-09-24	Revision of Practical		
Oct - 24	03-10-24	Journal Checking		
	10-10-24	Journal Checking		
	17-10-24	Journal Certification		
		Total Lecture	30	

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Academic Calendar

Teaching Plan for Semester-III Year: 2024-2025

Course	S.Y.B.Sc. (Chemistry)			Paper: I
Course Code	USCH301			
Title	Chemistry-I			
Credits	2 Credits (45 lectures)			
Name of the Faculty	Asst. Prof. Nitin Shivaji Pawar			
Month	Date	Topic	Lectures	Lecture per Month
		Unit III: Organic Chemistry		5
		3.1.1. Reactions and reactivity of halogenated hydrocarbons: [4L]		
Jun-24	15/06/2024	3.1.1. Alkyl halides: Nucleophilic substitution reactions: SN1, SN2 and SNi mechanism with stereochemical aspects		
	19/06/2024	factors affecting nucleophilic substitution reactions, nature of substrate, solvent, nucleophilic reagent and leaving group.		
	22/06/2024	3.1.2. Aryl halides: Reactivity of aryl halides towards nucleophilic substitution reactions.		
	24/06/2024	Nucleophilic aromatic substitution (SNAr) addition-elimination mechanism and benzyne mechanism		
	26/06/2024	3.1.2. Organomagnesium and organolithium compounds: [3L] Nomenclature, nature, type and reactivity of carbon-metal bond.		
Jul-24	29/06/2024	Preparation using alkyl / aryl halide.		12
	01/07/2024	Structure, stability and reactions with compounds containing acidic hydrogen, carbonyl compounds, CO ₂ , cyanides and epoxides.		
	03/07/2024	3.2 Alcohols, phenols and epoxides: [8L] 3.2.1. Alcohols: Nomenclature, Preparation: Hydration of alkenes, hydrolysis of alkyl halides,		
	08/07/2024	reduction of aldehydes and ketones, using Grignard reagent. Properties: Hydrogen bonding,		
	10/07/2024	types and effect of hydrogen bonding on different properties. Acidity of alcohols, Reactions of alcohols		
	13/07/2024	3.2.2. Phenols: Preparation, physical properties and acidic character. Comparative acidic strengths of alcohols and phenols,		
	15/07/2024	resonance stabilization of phenoxide ion. Reactions of phenols.		
	20/07/2024	3.2.3. Epoxides: Nomenclature, methods of preparation and reactions of epoxides:		
	22/07/2024	reactivity, ring opening reactions by nucleophiles (a) In acidic conditions: hydrolysis, reaction with halogen halide, alcohol, hydrogen cyanide.		
	24/07/2024	(b) In neutral or basic conditions: ammonia, amines, Grignard reagents, alkoxides.		
27/07/2024	UNIT-II Chemical Bonding 2.1 Non-Directional Bonding			

		2.1.1 Ionic Bond: Conditions for the Formation of Ionic Bond.		
	29/07/2024	2.1.2 Types of Ionic Crystals		
Aug-23	31/07/2024	2.1.3 Radius Ratio Rules		13
	03/08/2024	2.1.4 Born-Haber Cycle and its Application		
	05/08/2024	2.2. Directional Bonding: Orbital Approach. 2.2.1 Covalent Bonding The Valence Bond Theory- Introduction and basic tenets.		
	07/08/2024	2.2.2 Interaction between two hydrogen atoms and the Potential energy diagram of the resultant system.		
	10/08/2024	2.2.3 Corrections applied to the system of two hydrogen atoms- Formation of H ₂ 2.2.4 Definition, concept of Homonuclear diatomic molecules only for He ₂ & Ne ₂ molecules.		
	12/08/2024	2.2.5 Resonance and the concept of Formal Charge; Rules for Resonance or Canonical structures.		
	14/08/2024	2.2.5 Resonance and the concept of Formal Charge; Rules for Resonance or Canonical structures.		
	17/08/2024	2.2.6 Bonding in Polyatomic Species: The role of Hybridization. And types of hybrid orbitals-sp, sp ² , sp ³ , sp ³ d, sp ² d ² and sp ² d sp ³ d ² . 2.2.7 Equivalent and Non-Equivalent hybrid orbitals		
	19/08/2024	2.3 Molecular Orbital Theory (5L) 2.3.1. Comparing Atomic Orbitals and Molecular Orbitals.		
	21/08/2024	2.3.2. Linear combination of atomic orbitals. to give molecular orbitals LCAOMO approach for diatomic homonuclear molecules).		
	24/08/2024	2.3.4. Wave mechanical treatment for molecular orbitals (H ₂ + and H ₂)		
	26/08/2024	2.3.4 Molecular orbital Theory and Bond Order and magnetic property: with reference to O ₂ , O ₂ ⁺ O ₂ ⁻ , O ₂ ²⁻		
		28/08/2024	(Problems and numerical problems expected wherever possible)	
Sep-24	31/08/2024	Unit I: Physical Chemistry 1.1 Chemical Thermodynamics-II(8L) 1.1.1 Free Energy Functions: Helmholtz Free Energy, Gibb's Free Energy		09
	02/09/2024	Variation of Gibb's free energy with Pressure and Temperature.		
	04/09/2024	1.1.2 Gibbs-Helmholtz equation and Temperature, Gibb's Duhem equation.		
	14/09/2024	van't Hoff reaction isotherm		
	18/09/2024	van't Hoff reaction isochore. (Numericals expected)		
	21/09/2024	1.1.3 Thermodynamics of Open System: Partial Molal Properties		
	23/09/2024	Chemical Potential and its variation with Pressure		
	25/09/2024	1.1.4 Concept of Fugacity and Activity		
	28/09/2024	1.2 Electrochemistry: (7L) 1.2.1 Conductivity, equivalent and molar conductivity and their variation with dilution for weak and strong electrolytes		
	30/09/2024	1.2.2 Kohlrausch law of independent migration of ions.		
	05/10/2024	1.2.3 Applications of conductance measurements: determination of degree of ionization and ionization constant of weak		

		electrolyte,		
	7/09/2024	solubility and solubility product of sparingly soluble salts,		
	09/10/2024	ionic product of water. (Numericals expected).		
	14/10/2024	1.2.4 Transference number and its experimental determination using Moving boundary method.		
	16/10/2024	(Numericals expected). Factors affecting transference number		
			Tot. Lec.	45

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Academic Calendar

PRACTICAL Plan for Semester-III Year: 2024-2025

Course	S.Y.B.Sc. (Chemistry)		Paper: I	
Course Code	M3CHP1			
Title	PRACTICAL - Chemistry Practical 1			
Credits	2			
Name of the Faculty	Asst. Prof. Nitin Shivaji Pawar			
Month	Day	Topic	Batch	Lecture per Month
Jun-24	Wednesday	To verify Ostwald's dilution law for weak acid conductometrically.	A	
July-24	Wednesday	To determine dissociation constant of weak acid conductometrically.	A	
	Wednesday	To determine the critical solution temperature (CST) of phenol - WaterSystem.	A	
	Wednesday	Determination of energy of activation of acid-catalyzed hydrolysis of methyl acetate.	A	
	Wednesday	To investigate the reaction between K ₂ S ₂ O ₈ and KI with equal initial concentrations of the reactants	A	
Aug-24	Wednesday	To determine solubility of sparingly soluble salts (any two) conductometrically.	A	
	Wednesday	Identification of cations in a given mixture and Analytically separating them [From a mixture containing not more than two of the following: Pb(II), Ba(II), Ca(II), Sr (II), Cu(II), Cd(II), Mg(II), Zn(II), Fe(II), Fe(III), Ni(II), Co(II) Al(III), Cr(III)]	A	
	Wednesday	Identification of cations in a given mixture and Analytically separating them [From a mixture containing not more than two of the following: Pb(II), Ba(II), Ca(II), Sr (II), Cu(II), Cd(II), Mg(II), Zn(II), Fe(II), Fe(III), Ni(II), Co(II) Al(III), Cr(III)]	A	
	Wednesday	Identification of cations in a given mixture and	A	

		Analytically separating them [From a mixture containing not more than two of the following: Pb(II), Ba(II), Ca(II), Sr(II), Cu(II), Cd(II), Mg(II), Zn(II), Fe(II), Fe(III), Ni(II), Co(II) Al(III), Cr(III)]		
Oct-24	Wednesday	Journal Checking	A	
	Wednesday	Journal Certification	A	
		Tot. Lec.		30

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Academic Calendar				
Teaching Plan for Semester-III Year: 2024-2025				
Course	S.Y.B.Sc. (Chemistry)		Paper: II	
Course Code	USCHO302			
Title	Chemistry-II			
Credits	2 Credits (45 lectures)			
Name of the Faculty	Mr. Khan Shoyeab Mutalib			
Month	Date	Topic	Lectures	Lecture per Month
	Unit 1: 1.1 Chemical Kinetics-II, 1.2 Solutions:			7
Jun-24	15/06/2024	1.1 Chemical Kinetics-II (7L) 1.1.1 Types of Complex Chemical reactions:		
	18/06/2024	Reversible or opposing, consecutive and parallel reactions (No derivations, only examples expected),		
	20/06/2024	Thermal chain reactions: H. and Br. reaction. (only steps involved, no kinetic expression expected).		
	22/06/2024	1.1.2 Effect of temperature on the rate of reaction,		
	25/06/2024	Arrhenius equation, Concept of energy of activation (Ea). (Numericals expected).		
	27/06/2024	1.1.3 Theories of reaction rates: Collision theory and activated complex theory of bimolecular reactions.		
	29/06/2024	Comparison between the two theories (Qualitative treatment only		
Jul-24	1/7/2024	1.2 Solutions: (8 L) 1.2.1 Thermodynamics of ideal solutions: Ideal solutions and Raoult's law,		13
	3/7/2024	deviations from Raoult's law–non-ideal solutions. Vapour pressure-composition and		
	5/7/2024	temperature -composition curves of ideal and non-ideal solutions.		
	8/7/2024	Distillation of solutions.Lever rule.Azeotropes.		
	10/7/2024	1.2.2 Partial miscibility of liquids: Critical solution temperature; effect of impurity on partial miscibility of liquids with respect to Phenol-Water , Triethanolamine – Water and Nicotine – Water systems		
	12/7/2024			
	17/07/2024	1.2.3 Immiscibility of liquids- Principle of steam distillation.		

Unit 2 Selected topics on p block elements				
	19/07/2024	Selected topics on p block elements (15L) 2.1 Chemistry of Boron compounds		
	22/07/2024	2.1.1 Electron deficient compounds – BH ₃ , BF ₃ , BCl ₃ with respect to Lewis acidity and applications.		
	24/07/2024	2.1.2 Preparation of simple boranes like diborane and tetraborane.		
	26/07/2024	2.1.3 Structure and bonding in diborane and tetraborane (2e-3c bonds)		
	29/07/2024	2.1.4 Synthesis of Borax.		
	31/07/2024	2.2 Chemistry of Silicon and Germanium		
Aug-23	2/8/2024	2.2.1 Silicon compounds: Occurrence , Structure and inertness of SiO ₂	11	
	5/8/2024	2.2.2 Preparation of structure of SiCl ₄		
	9/8/2024	2.2.3 Occurrence and extraction of Germanium		
	12/8/2024	2.2.4 Preparation of extra pure Silicon and Germanium		
	14/8/2024	2.3 Chemistry of Nitrogen family		
	19/8/2024	2.3.1 Trends in chemical reactivity - Formation of hydrides, halides, oxides with special reference to oxides of nitrogen.		
	21/8/2024	2.3.2 Oxides of nitrogen with respect to preparation and structure of NO, NO ₂ , N ₂ O and N ₂ O ₄ .		
	23/8/2024	2.3.3 Synthesis of ammonia by Bosch – Haber process.		
	Unit III: Organic Chemistry Carbonyl Compounds:			
	28/8/2024	3.1 Nomenclature of aliphatic, alicyclic and aromatic carbonyl compounds.		
30/8/2024	Structure, reactivity of aldehydes and ketones and methods of preparation			
Sep-24	2/9/2024	Oxidation of primary and secondary alcohols using PCC, hydration of alkynes, action of Grignard reagent on esters	08	
	5/9/2024	Rosenmund reduction, Gattermann – Koch formylation and Friedel Craft acylation of arenes		
	19/9/2024	3.2 General mechanism of nucleophilic addition, and acid catalyzed nucleophilic addition reactions		
	21/9/2024	3.3 Reactions of aldehydes and ketones with NaHSO ₃ , HCN, RMgX, alcohol, amine, phenyl hydrazine, 2,4-Dinitrophenyl hydrazine, LiAlH ₄ and NaBH ₄		
	23/9/2024	3.4 Mechanisms of following reactions: Benzoin condensation, Knoevenagel condensation		
	26/9/2024	Claisen-Schmidt and Cannizzaro reaction		
	28/9/2024			
	30/9/2024			
Oct-24	3/10/2024	3.5 Keto-enol tautomerism: Mechanism of acid base catalysed enolization	6	
	5/10/2024	Reactions of Acetylacetone and ethyl acetoacetate (alkylation, conversion to ketone, mono- and dicarboxylic acid)		
	7/10/2024	Revision 1		
	10/10/2024	Test and Assessment		
	14/10/2024	Exam Preparation and Revisions		
	17/10/24			
		Tot. Lec.	45	

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PRACTICAL Plan for Semester-III Year: 2024-2025

Course	S.Y.B.Sc. (Chemistry)		Paper: II	
Course Code	USCHO302			
Title	PRACTICAL - Paper II Chemistry-II			
Credits	2			
Name of the Faculty	Mr. Khan Shoyeab Mutalib			
Month	Day	Topic	Batch	Lecture per Month
Jun-24	Monday	Crystallisation of potassium iodate and to estimate its purity before and after the separation.	A	
	Tuesday	Crystallisation of potassium iodate and to estimate its purity before and after the separation.	B	
	Monday	Estimation of total hardness	A	
	Tuesday	Estimation of total hardness	B	
Jul-24	Monday	Investigation of the reaction between Copper sulphate and Sodium Hydroxide	A	
	Tuesday	Investigation of the reaction between Copper sulphate and Sodium Hydroxide	B	
	Monday	Short organic preparation and their purification Cyclohexanone oxime from cyclohexanone.		
	Tuesday	Short organic preparation and their purification Cyclohexanone oxime from cyclohexanone.	A	
	Monday	Short organic preparation and their purification Glucosazone from dextrose or fructose		
	Tuesday	Short organic preparation and their purification Glucosazone from dextrose or fructose	B	
	Monday	Short organic preparation and their purification Tribromoaniline from aniline.	A	
	Tuesday	Short organic preparation and their purification Tribromoaniline from aniline.	B	
Aug-24	Monday	Short organic preparation and their purification β -Naphthylbenzoate	A	
	Tuesday	Short organic preparation and their purification β -Naphthylbenzoate	B	
	Monday	Short organic preparation and their purification . m-Dinitrobenzene from nitrobenzene		
	Tuesday	Short organic preparation and their purification Phthalic anhydride from phthalic acid by sublimation		
	Monday	Short organic preparation and their purification Acetanilide from aniline		
	Tuesday	Short organic preparation and their purification Acetanilide from aniline		
	Monday	Short organic preparation and their purification p-Bromoacetanilide from acetanilide	A	

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	Tuesday	Short organic preparation and their purification p-Bromoacetanilide from acetanilide	B	
Oct-24	Monday	Short organic preparation and their purification Iodoform from acetone	A	
	Tuesday	Short organic preparation and their purification Iodoform from acetone	B	
	Monday	Journal Certification	A	
	Friday	Journal Certification	A	
			Tot. Lec.	

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Teaching Plan for Semester-III Year: 2024-2025

Course:	S.Y.B.Sc. (Chemistry)		Paper: III	
Course Code	USCHT303			
Title	CHEMISTRY – III			
Credits	2 Credits (45 Lectures)			
Name of the Faculty	Mr. Tamseel Shakeel Shahjahan			
Month	Date	Topic	Lectures	Lecture per Month
Jun – 24	Unit I-Introduction to Analytical Chemistry and Statistical Treatment of analytical data		15	05
	19-06-24	Language of analytical chemistry: important terms and their significance in Analytical Chemistry.		
	21-06-24	Purpose of Chemical Analysis; Analysis Based on (i) the nature of information required Proximate, Partial, Trace, Complete Analysis)		
	25-06-24	Purpose of Chemical Analysis; Analysis Based on (ii) On the size of the sample used (Macro, semi-micro and microanalysis)		
	26-06-24	Classical and Non-Classical Methods of Analysis; their types and Importance.		
	28-06-24	Terms involved in Sampling		
Jul – 24	02-07-24	Purpose of Sampling	15	13
	03-07-24	Difficulties encountered in sampling		
	05-07-24	Types of Sampling		
	09-07-24	Theories of Sampling		
	10-07-24	Errors in Analysis and their types		
	12-07-24	Methods of minimizing Determinate errors in analysis i) Calibration of apparatus		
	16-07-24	ii) Carrying out Control determination		
	19-07-24	iii) Carrying out Blank determination		
	23-07-24	Concept of Precision and Accuracy in Analysis and evaluation involved in the study of Precision and accuracy		
	24-07-24	i) Mean, Median, Mode, Absolute deviation, Average deviation, Relative average deviation, standard deviation, variance and coefficient of variation ii) Absolute error and Relative error		
	Unit II- Classical Methods of Analysis			
	26-07-24	Terms involved in Titrimetric methods of analysis. Comparing volumetry and Titrimetry		
	30-07-24	The Conditions suitable for titrimetry		
	31-07-24	Types of titrimetry		

Aug – 24	02-08-24	Tools of Titrimetry: Graduated glassware and Calibration		13
	06-08-24	Primary and Secondary standards in Titrimetry		
	07-08-24	Concept of pH and its importance in Neutralization Titrations		
	09-08-24	Endpoint and Equivalence point of Neutralization titrations		
	13-08-24	Determination of End point by using Indicators causing colour change Selection of indicators		
	14-08-24	Introduction and Principle of Gravimetric analysis		
	16-08-24	Types of Gravimetric Methods		
	20-08-24	Precipitation Gravimetry		
	21-08-24	Digestion and its importance		
	23-08-24	Filtration, Washing, Drying and Ignition of Precipitate		
	27-08-24	Applications of Gravimetric Analysis:		
Unit III: Instrumental Methods-I		15		
28-08-24	Relation between the Analyte, Stimulus and measurement of change in the observable property.		10	
30-08-24	Block Diagram of an Analytical Instrument.			
Sep – 24	03-09-24			Types of Analytical Instrumental Methods
	04-09-24			Interaction of electromagnetic radiation with matter: Absorption and Emission spectroscopy
	06-09-24			Basic Terms: Radiant Power, Absorbance, Transmittance,
	13-09-24			Monochromatic light, Polychromatic light, Wavelength of maximum absorbance
	17-09-24			Statement and Derivation of Beer Lambert's Law
	18-09-24			Validity and Deviations
	20-09-24			Numerical Problems
	24-09-24			Block Diagrams for Single beam Colorimeter
	25-09-24			Block Diagrams for Double beam Colorimeter
	27-09-24	Principle, Construction and working (Details of Components expected, i.e., source, Sample holder, Filter, Detectors)		
	01-10-24	Block Diagrams for Single beam Spectrophotometer	04	
	02-10-24	Block Diagrams for Double beam Spectrophotometer		
	04-10-24	Details of Components expected i.e, source, Sample holder, Monochromator, Detectors		
	07-10-24	Revision Session		
Total Lecture			45	45

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Academic Calendar

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Course:	S.Y.B.Sc. (Chemistry)			Paper: III
Course Code	USCHP303			
Title	CHEMISTRY - III			
Credits	2 Credits			
Name of the Faculty	Mr. Tamseel Shakeel Shahjahan			
Month	Date	Topic	Batch	Lecture per Month
Jun – 24	Tuesday	Introduction to Laboratory	A	
	Wednesday	Introduction to Laboratory	B	
	Tuesday	Tools of Analytical Chemistry-I	A	
	Wednesday	Tools of Analytical Chemistry-I	B	
Jul – 24	Tuesday	Gravimetric estimation of Nickel (II) as Ni-DMG and calculation of % error.	A	
	Wednesday	Gravimetric estimation of Nickel (II) as Ni-DMG and calculation of % error.	B	
	Tuesday	Colorimetric Determination of Copper Ions in a given Solution by using calibration curve	A	
	Wednesday	Colorimetric Determination of Copper Ions in a given Solution by using calibration curve	B	
	Tuesday	Determination of buffer capacity of acid buffer and basic buffer.	A	
	Wednesday	Determination of buffer capacity of acid buffer and basic buffer.	B	
Aug – 24	Tuesday	Estimation of Aspirin	A	
	Wednesday	Estimation of Aspirin	B	
	Tuesday	Gravimetric estimation of barium ions using K ₂ CrO ₄ as precipitant. Calculation of % error.	A	
	Wednesday	Gravimetric estimation of barium ions using K ₂ CrO ₄ as precipitant. Calculation of % error.	B	
Oct – 24	Tuesday	Journal Checking	A	
	Wednesday		B	
	Tuesday	Journal Certification	A	
	Wednesday		B	
	Tuesday	Journal Certification	A	
	Wednesday		B	
			Total Lectures:	45

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Teaching Plan for Semester-V Year: 2024-2025

Course	T.Y.B.Sc (chemistry)			Physical
Course Code	USCH501			
Title	Physical chemistry			
Credits	2.0 Credits (60 Lectures)			
Name of the Faculty	Dr. Sajid F. Shaikh			
Month	Date	Topic	Lectures	Lecture per Month
	UNIT I: MOLECULAR SPECTROSCOPY			15
Jun-24	18/06/2024	Rotational Spectrum: Introduction to dipole moment, polarization of a bond, bond moment, molecular structure, Rotational spectrum of a diatomic molecule.		
	21/06/2024	Rigid rotor, moment of inertia, energy levels, conditions for obtaining pure rotational spectrum, selection rule, nature of spectrum, determination of internuclear distance and isotopic shift.		
	21/06/2024	Vibrational spectrum: Vibrational motion, degrees of freedom, modes of vibration, vibrational spectrum of a diatomic molecule.		
	22/06/2024	simple harmonic oscillator, energy levels, zero point energy, conditions for obtaining vibrational spectrum, selection rule, nature of spectrum.		
	25/06/2024	Vibrational-Rotational spectrum of diatomic molecule: energy levels, selection rule, nature of spectrum, P and R branch lines.		
	28/06/2024	Anharmonic oscillator - energy levels, selection rule, fundamental band, overtones. Application of vibrational-rotational spectrum in determination of force constant and its significance. Infrared spectra of simple molecules like H ₂ O and CO ₂ .		
		Infrared spectra of simple molecules like H ₂ O and CO ₂ .		
	28/06/2024	Raman Spectroscopy : Scattering of electromagnetic radiation, Rayleigh scattering,		
	29/06/2024	Raman scattering, nature of Raman spectrum, Stoke's lines, anti-Stoke's lines, Raman shift, quantum theory of Raman spectrum, comparative study of IR and Raman spectra, rule of mutual exclusion- CO ₂ molecule.		
Jul-24	Unit II: CHEMICAL THERMODYNAMICS			
	02/07/2024	Introduction to colligative properties.		
	05/07/2024	Measurement of lowering of vapour pressure -		15

		Static and Dynamic method.	
	05/07/2024	Solutions of Solid in Liquid	
	06/07/2024	Elevation in boiling point of a solution, thermodynamic derivation relating elevation in boiling point of the solution and molar mass of non-volatile solute.	
	12/07/2024	Depression in freezing point of a solution, thermodynamic derivation relating the depression in the freezing point of a solution and the molar mass of the non-volatile solute.	
	13/07/2024	Beckmann Method and Rast Method.	
	16/07/2024	Osmotic Pressure : Introduction, thermodynamic derivation of Van't Hoff equation, Van't Hoff Factor.	
	19/07/2024	Measurement of Osmotic Pressure - Berkeley and Hartley's Method, Reverse Osmosis.	
	19/07/2024	Collision theory of reaction rates.	
	20/07/2024	1. Unimolecular reaction Lindemann theory and 2. Bimolecular reaction.	
	23/07/2024	Classification of reactions as slow, fast and ultra - fast.	
	26/07/2024	Study of kinetics of fast reactions by Stop flow method	
	27/07/2024	Flash photolysis method.	
	UNIT : III NUCLEAR CHEMISTRY		
Aug-24	02/08/2024	Introduction to nuclear chemistry.	15
	03/08/2024	Introduction: Basic terms-radioactive constants.	
	06/08/2024	Decay constant, half life and average life and units of radioactivity.	
	09/08/2024	Detection and Measurement of Radioactivity: Types and characteristics of nuclear radiations, behavior of ion pairs in electric field, detection	
	10/08/2024	measurement of nuclear radiations using G. M. Counter and Scintillation Counter.	
	13/08/2024	Application of use of radioisotopes as Tracers.	
	16/08/2024	Chemical reaction mechanism, age determination - dating by C^{14} .	
	17/08/2024	Nuclear reactions: nuclear transmutation (one example for each projectile)	
	1/08/2024	Relationship of fluorescent intensity with concentration.	
	17/08/2024	Instrumentation and applications.	
	20/08/2024	artificial radioactivity, Q - value of nuclear reaction, threshold energy.	
	23/08/2024	Fission Process : Fissile and fertile material.	
	24/08/2024	nuclear fission, chain reaction, factor controlling fission process.	
	27/08/2024	multiplication factor and critical size or mass of fissionable material, nuclear power reactor and	

		breeder reactor.	
	30/08/2024	Fusion Process : Thermonuclear reactions occurring on stellar bodies.	
	31/08/2024	Fusion Process : Thermonuclear reactions occurring on earth.	
	UNIT: IV SURFACE CHEMISTRY		
Sep-24	03/09/2024	Introduction to surface chemistry.	15
	06/09/2024	Adsorption: Physical and Chemical Adsorption.	
	06/09/2024	Types of adsorption isotherms . Langmuir's adsorption isotherm.	
	13/09/2024	B.E.T. equation for multilayer adsorption.	
	14/09/2024	Determination of surface area of an adsorbent using B.E.T. equation.	
	17/09/2024	Introduction to colloids.	
	20/09/2024	Emulsions, Gels and Sols.	
	21/09/2024	Introduction to Electrical Properties.	
	24/09/2024	Origin of charges on colloidal particles.	
	27/09/2024	Concept of electrical double layer, zeta potential, Helmholtz and Stern model.	
	27/09/2024	Electro-kinetic phenomena.	
	28/09/2024	Electrophoresis, Electro-osmosis, Streaming potential, Sedimentation potential; Donnan Membrane.	
Oct-24		Revision 1	
		Revision 2	
		Exam Preparation and Revisions	
		Tot. Lec.	60

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Practical Plan for Semester-V Year: 2024-2025

Course	T.Y.B.Sc. (chemistry)	sub	physical
CourseCode	USCHP501		
Title	PRACTICAL –physical chemistry USBOP501(For 6 Units)		
Credits	2.0		
Name of The Faculty	Dr. Sajid F. Shaikh		
Month	Day	Topic	Lectureper Month
		17/06/24, 24/06/24	12
Jun-24	Monday	Introduction to the laboratory.	
		Introduction on lab safety.	
		Detail information about MSDS sheet.	
Jul-24		15/07/2024, 22/07/2024	08
	Monday	Aim – To determine the molecular weight of compound by Rast Method.	
		Aim –To interpret the order of reaction graphically from the given experimental data and calculate the rate constant.	
Aug-24		05/08/2024, 19/08/2024	08
	Monday	Aim – To investigate the adsorption of acetic acid on activated charcoal and test the validity of Freundlich Adsorption Isotherm.	
	Monday	Aim - To determine the number of electrons in the redox reaction between ferrous ammonium sulphate and ceric sulphate potentiometrically.	
Sep-24		17/09/2024, 24/09/24	08
	Monday	Aim – To determine the velocity constant of alkaline hydrolysis of ethyl acetate by conductometric method.	
	Monday	Aim – To determine acidic and basic dissociation constant of amino acid and henceto isoelectric point.	
Oct-24		01/10/24, 08/10/24, 15/10/24	12
		Journal Checking	
		Journal Certification	
		Journal Certification	
		Tot. Lec.	48

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Academic Calendar

Teaching Plan for Semester-V Year: 2024-2025

Course	T.Y.B.Sc. (Chemistry)			Paper: II
Course Code	USCH502			
Title	Inorganic Chemistry			
Credits	2 Credits (60 Lectures)			
Name of the Faculty	Asst. Prof. Nitin Shivaji Pawar			
Month	Date	Topic	Lectures	Lecture per Month
	UNIT I:			4
Jun-24	24/06/2024	UNIT-III 3.1 Introduction:		
	24/06/2024	Lanthanides and actinides Position in periodic table		
	25/06/2024	Electronic configuration of lanthanides and actinides		
	27/06/2024	Electronic configuration of actinides		
Jul-24	01/07/2024	3.2 Chemistry of Lanthanides with reference to		19
	01/07/2024	(i) lanthanide contraction and its consequences		
	02/07/2024	(ii) Oxidation states (iii) Ability to form complexes		
	04/07/2024	(iv) Magnetic and spectral properties		
	08/07/2024	Introduction Concept of Biotech		
	08/07/2024	3.3: Occurrence, extraction and		
	09/07/2024	separation of lanthanides		
	11/07/2024	(i) Ion Exchange method		
	15/07/2024	(ii) Solvent extraction method (Principles and technique)		
	15/07/2024	(ii) Solvent extraction method (Principles and technique)		
	16/07/2024	3.4 Applications of lanthanides		
	18/07/2024	UNIT-I 1.1 Molecular Symmetry 1.1.1 Introduction		
	22/07/2024	Importance of Symmetry in Chemistry.		
	22/07/2024	1.1.2 Symmetry elements and Symmetry operations.		
	23/07/2024	1.1.3 Concept of a Point Group with illustrations using the following point groups :(i) $C_{\infty V}$ (ii) $D_{\infty h}$		
	25/07/2024	(iii) C_{2V} (iv) C_{3v}		
	29/07/2024	(v) C_{2h} and (vi) D_{3h}		
	29/07/2024	1.2 Molecular Orbital Theory for heteronuclear diatomic molecules and polyatomic species		
	30/07/2024	1.2.1 Comparison between homonuclear and heteronuclear		

		diatomic molecules.		
Aug-24	01/08/2024	1.2.2. Heteronuclear diatomic molecules like CO,		16
	05/08/2024	NO		
	05/08/2024	application of modified MO diagram for CO.		
	06/08/2024	application of MO theory to polyatomic species		
	08/08/2024	H ₃ and H ₃ ⁺		
	12/08/2024	AB ₂ molecules such as BeH ₂		
	12/08/2024	H ₂ O and Correlation diagram		
	13/08/2024	UNIT-II Solid State Chemistry 2.1 Structures of Solids 2.2.1 Explanation of terms viz. crystal lattice, lattice point,		
	19/08/2024	unit cell and lattice constants.		
	19/08/2024	2.1.2 Closest packing of rigid spheres (hcp),		
	20/08/2024	2.1.2 Closest packing of rigid spheres (ccp),		
	22/08/2024	packing density in simple cubic,		
	26/08/2024	bcc and fcc lattices.		
	26/08/2024	Relationship between density, radius of unit cell and lattice parameters.		
	27/08/2024	2.1.3 Stoichiometric Point defects in solids		
29/08/2024	(discussion on Frenkel			
Sep-24	02/09/2024	and Schottky defects expected).		14
	02/09/2024	Numericals		
	03/09/2024	2.2 Superconductivity 2.2.1 Discovery of superconductivity. 2.2.2 Explanation of terms like superconductivity, transition, temperature, Meissner effect.		
	05/09/2024	2.2.3 Different types of super conductors viz. conventional superconductors,		
	12/09/2024	alkali metal fullerenes, high temperature super conductors.		
	17/09/2024	2.2.4 Brief application of superconductors.		
	19/09/2024	UNIT-IV Some Selected Topics 4.1 Chemistry of Non-aqueous Solvents 4.1.1 Classification of solvents and		
	23/09/2024	importance of non-aqueous solvents		
	23/09/2024	4.1.2 Characteristics and study solvents with respect to (i) acid-base reactions and (ii) redox reactions.		
	24/09/2024	1. liquid ammonia		
	26/09/2024	2. dinitrogen tetra oxide as non-aqueous solvents		
	28/09/2024	4.2 Comparative Chemistry of Group 16 4.2.1 Electronic configurations		
	30/09/2024	Trends in physical properties,		

	30/09/2024	Allotropy		
Oct-24		4.2.2 Manufacture of sulphuric acid by Contact process.		7
		Manufacture of sulphuric acid by Contact process.		
		Exam Preparation and Revisions		
		4.3 Comparative Chemistry of Group 17 (5L)		
		4.3.1 Electronic configuration, General characteristics, anomalous properties of fluorine,		
		comparative study of acidity of oxyacid's of chlorine w.r.t acidity,		
		oxidizing properties and structures (on the basis of VSEPR theory)		
		4.3.2 Chemistry of interhalogens with reference to preparations,		
		properties and structures (on the basis of VSEPR theory).		
Total Lectures = 60				

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Academic Calendar				
PRACTICAL Plan for Semester-V Year: 2024-2025				
Course	T.Y.B.Sc. (Chemistry)			Paper: II
Course Code	USCHPO2			
Title	PRACTICAL – Inorganic Chemistry			
Credits	2			
Name of the Faculty	Asst. Prof. Nitin Shivaji Pawar			
Month	Day	Topic	Batch	Lecture per Month
	Thursday	Preparation of bisacetylacetonatocopper(II)		
Jul-24	Thursday	Preparation of Potassium diaquobis- (oxalato)cuprate (II)		
	Thursday	Preparation of Ferrous ethylene diammonium sulphate.		
	Thursday	Determination of percentage purity of the given water soluble salt and qualitative detection w.r.t added impurity cation and anion..		
	Thursday	Determination of percentage purity of the given water soluble salt and qualitative detection w.r.t added impurity cation and anion.		
Aug-24	Thursday	Determination of percentage purity of the given water soluble salt and qualitative detection w.r.t added impurity cation and anion.		
	Thursday	Determination of percentage purity of the given water soluble salt and qualitative detection w.r.t added impurity cation and anion.		

	Thursday	Practical Practice Session		
	Thursday	Practical Practice Session		
Oct-24	Thursday	Journal Checking		
	Thursday	Journal Certification		
		Tot. Lec.		60

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Academic Calendar				
Teaching Plan for Semester-V Year: 2024-2025				
Course	T.Y.B.Sc. (Chemistry)			Paper: V
Course Code	USCH503			
Title	Organic Chemistry			
Credits	2. Credits (60 Lectures)			
Name of the Faculty	Mr. Khan Shoyeab Mutalib			
Month	Date	Topic	Lectures	Lecture per Month
	UNIT I: 1.1 Mechanism of Organic Reactions 1.2 Photochemistry			8
Jun-24	18/6/2024	Syllabus DISCUSSION AND BASIC		
	18/6/2024	Unit I 1.1 Mechanism of organic reactions (10 L) 1.1.1 The basic terms & concepts: bond fission, reaction intermediates		
	19/6/2024	electrophiles & nucleophiles, ligand, base,		
	19/6/2024	electrophilicity vs. acidity & nucleophilicity vs basicity.		
	25/6/2024	1.1.2 Neighbouring group participation in nucleophilic substitution reactions		
	25/6/2024	participation of lone pair of electrons, kinetics and stereochemical outcome		
	2/7/2024	1.1.3 Acyl nucleophilic substitution (Tetrahedral mechanism):		
	2/7/2024	Acid catalyzed esterification of carboxylic acids (AAC2) and base promoted hydrolysis of esters (BAC2).		
Jul-24	3/7/2024	1.1.4.2 Pyrolytic elimination: Cope, Chugaev, pyrolysis of acetates		18
	3/7/2024	1.2 Photochemistry (5 L) 1.2.1 Introduction: Difference between thermal and photochemical reactions.		
	9/7/2024	Jablonski diagram, singlet and triplet states, allowed and		

		forbidden transitions, fate of excited molecules, photosensitization		
	9/07/2024	1.2.2 Photochemical reactions of olefins: photoisomerization, photochemical Rearrangement of 1,4- dienes (di- π methane)		
	9/7/2024	1.2.3 Photochemistry of carbonyl compounds: Norrish I, Norrish II cleavages. Photo reduction (e.g. benzophenone to benzpinacol)		
		Unit II 2.1 Stereochemistry I , 2.2 Agrochemicals		
	10/7/2024	2.1.1 Molecular chirality and elements of symmetry:		
	10/7/2024	Mirror plane symmetry, inversion center,		
	10/7/2024	rotation -reflection (alternating) axis.		
	16/07/2024	2.1.2 Chirality of compounds without a stereo genic center		
	16/07/2024	cummulenes and biphenyls		
	23/07/2024	2.2 Agrochemicals (4 L) 2.2.1 General introduction & scope, meaning & examples of insecticides, herbicides, fungicide, rodenticide, pesticides, plant growth regulators		
	23/07/2024	2.2.2 Advantages & disadvantages of agrochemicals		
	24/07/2024	2.2.3 Synthesis & application of IAA (Indole Acetic Acid) & Endosulphan		
	24/07/2024	2.2.4 Bio pesticides – Neem oil & Karanj oil		
	30/07/2024	2.3 Heterocyclic chemistry: (6 L) 2.3.1 Reactivity of pyridine-N-oxide, quinoline and iso-quinoline.		
	30/07/2024	2.3.2 Preparation of pyridine-N-oxide, quinoline (Skraup synthesis)		
	31/07/2024	iso-quinoline (BischlerNapieralski synthesis).		
	31/07/2024	2.3.3 Reactions of pyridine-N-oxide: halogenation, nitration and reaction with $\text{NaNH}_2/\text{liq.NH}_3$, n-BuLi		
Aug-24	6/8/2024	2.3.4 Reactions of quinoline and isoquinoline,;		16
	6/8/2024	oxidation,reduction,nitration,halogenation and reaction with $\text{NaNH}_2/\text{liq.NH}_3$,n-BuLi		
		Unit III 3.1 IUPAC, 3.2 Synthesis of organic compounds		
	7/8/2024	(5 L) IUPAC Systematic nomenclature of the following classes of compounds (including compounds upto two substituents / functional groups)		
	7/8/2024	3.1.1 Bicyclic compounds – spiro, fused and bridged (upto 11 carbon atoms) – saturated and unsaturated compounds		
	13/08/2024	3.1.2 Biphenyls		
	13/08/2024	3.1.3 Cummulenes with upto 3 double bonds		
	14/08/2024	3.1.4 Quinolines and isoquinolines		
	14/08/2024	3.2 Synthesis of organic compounds (10L) 3.2.1 Introduction: Linear and convergent synthesis, criteria for an ideal synthesis,		
	20/08/2024	concept of chemo selectivity and regioselectivity with examples, calculation of yields.		
	20/08/2024	3.2.2 Multicomponent Synthesis: Mannich reaction		
	21/08/2024	Biginelli reaction. Synthesis with examples (no mechanism)		
	21/08/2024	3.2.3 Green chemistry and synthesis: Introduction: Twelve principles of green chemistry,		
	27/08/2024	concept of atom economy and E-factor, calculations and their significance, numerical examples		

	27/08/2024	i) green reagents: dimethyl carbonate		
	28/08/2024	ii) Green starting materials: D-glucose iii) Green solvents : supercritical CO2 iv) Green catalysts: Bio catalysts		
	28/08/2024	2.4 Planning of organic synthesis i) synthesis of nitroanilines. (o&p) ii) synthesis of halobenzoic acid. (o&p)		
	Unit-IV 4.1 Spectroscopy, 4.2 Natural Products			
Sep-24	3/9/2024	4.1 Spectroscopy I (5 L) 4.1.1 Introduction: Electromagnetic spectrum, units of wavelength and frequency		12
	3/9/2024	4.1.2 UV – Visible spectroscopy: Basic theory, solvents, nature of UV-Visible spectrum, concept of chromophore, auxochrome, bathochromic and hypsochromic shifts, hyperchromic and hypochromic effects, chromophore-chromophore and chromophore-auxochrome interactions		
	4/9/2024	4.1.3 Mass spectrometry: Basic theory. Nature of mass spectrum. General rules of fragmentation.		
	4/9/2024	Importance of molecular ion peak, isotopic peaks, base peak, nitrogen rule, rule of 13 for determination of empirical formula and molecular formula		
	17/9/2024	Fragmentation of alkanes and aliphatic carbonyl compounds		
	17/9/2024	4.2 Natural Products: (10L) 4.2.1. Terpenoids: Introduction, Isoprene rule, special isoprene rule and the gem-dialkyl rule		
	18/9/2024	4.2.2 Citral: a) Structural determination of citral.		
	18/9/2024) Synthesis of citral from methyl heptenone		
	24/9/2024	c) Isomerism in citral. (Cis and trans form).		
	24/9/2024	4.2.3. Alkaloids Introduction and occurrence.		
	25/9/2024	Hofmann's exhaustive methylation and degradation in: simple open chain and N – substituted monocyclic amines		
	25/9/2024	4.2.4 Nicotine: a) Structural determination of nicotine. (Pinner's work included)		
	3/9/2024	b) Synthesis of nicotine from nicotinic acid c) Harmful effects of nicotine		
	3/9/2024	4.2.5 Hormones: Introduction, structure of adrenaline (epinephrine), physiological action of adrenaline		
Oct-24	3/10/2024	Revision 1		4
	3/10/2024	Revision 1		
	9/10/2024	Revision 2		
	9/10/2024	Exam Preparation and Revisions		
			Tot. Lec.	60

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Academic Calendar

Practical Plan for Semester-V Year: 2024-2025

Course	T.Y.B.Sc. (Chemistry)			Paper: V		
Course Code	USCH503					
Title	PRACTICAL Organic Chemistry					
Credits	2					
Name of the Faculty	Mr. Khan Shoyeab Mutalib					
Month	Day	Topic	Batch	Lecture per Month		
				8		
Jun-24	Wednesday	Separation of Solid- Solid type Mixture.	A			
		Benzoic Acid B & Naphthol				
		Separation of Solid- Solid type Mixture				
		Salicylic acid & m-dinitrobenzene				
Wednesday	Separation of Solid- Solid type Mixture					
	m-nitroaniline & m-dinitrobenzene					
Aug-24	Wednesday	Separation of Solid- Solid type Mixture			A	12
		Salicylic acid & alpha naphthol				
	Wednesday	Separation of Solid- Solid type Mixture				
		Salicylic acid & acetanilide				
Sep-24	Wednesday	Separation of Solid- Solid type Mixture	A	16		
		Cinnamic acid + m-nitroaniline				
			Tot. Lec.	60		

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Teaching Plan for Semester-V Year: 2024-2025

Course	T.Y.B.Sc (chemistry)			Analytical
Course Code	USCH504			
Title	Analytical chemistry			
Credits	2.0 Credits (60 Lectures)			
Name of the Faculty	Dr. Sajid F. Shaikh			
Month	Date	Topic	Lectures	Lecture per Month
	UNIT I: INTRODUCTION TO QUALITY CONCEPTS, CHEMICAL CALCULATIONS, AND SAMPLING			15
Jun-24	15/06/2024	Concept of quality, quality control and quality assurance.		
	18/06/2024	Importance of quality control in industry.		
	19/06/2024	Chemical standards and certified reference material; importance in chemical analysis.		
	21/06/2024	Interconversion of various concentration units.		
	21/06/2024	Percent composition of elements in chemical compounds.		
	22/06/2024	Sampling of solids-sample size, bulk ratio, size to weight ratio. Multistage and sequential sampling.		
Jul-24	25/06/2024	Sampling of liquids-homogeneous, heterogeneous, static and flowing liquids.		
	26/06/2024	Sampling of gases-ambient and stack sampling		
	28/06/2024	Apparatus and methods for sampling of gases.		
	29/06/2024	Collection, preservation and dissolution of sample..		15
	Unit II: CLASSICAL METHODS OF ANALYSIS			
	02/07/2024	Neutralization titration -Strong acid versus strong base.		
	03/07/2024	Neutralization titration – weak acid versus weak base.		
	05/07/2024	Redox titration – introduction.		
	06/07/2024	Construction of titration curves and calculation of E _S system in aqueous medium in case of one electron system.		
	09/07/2024	Theory of redox indicators, criteria for selection of an indicator use of diphenyl amine and ferroin as redox indicators.		
	10/07/2024	Complexometric titration		
	16/07/2024	Introduction construction of titration curve.		
	20/07/2024	Use of EDTA as a titrant and its standardization.		
	23/07/2024	Selectivity of EDTA as a titrant.		

	26/07/2024	Factors enhancing selectivity of EDTA.	
	27/07/2024	Advantages and limitations of EDTA as a titrant.	
	30/07/2024	Types of EDTA titrations.	
	31/07/2024	Metalochromic indicators-theory, examples and applications.	
	UNIT : III OPTICAL METHODS		
Aug-24	02/08/2024	Introduction absorption and emission spectra.	15
	03/08/2024	Flame photometry- principle and instrumentation.	
	06/08/2024	Atomic Absorption Spectroscopy- principle and instrumentation.	
	07/08/2024	Qualitative and Quantitative analysis with respect to FES and AAS.	
	09/08/2024	Applications ,Advantages and Limitations.	
	10/08/2024	Molecular fluorescence - introduction and principle.	
	13/08/2024	Molecular phosphorescence - introduction and principle.	
	14/08/2024	Factors affecting molecular fluorescence and fluorescence.	
	16/08/2024	Relationship of fluorescent intensity with concentration.	
	17/08/2024	Instrumentation and applications.	
	20/08/2024	Comparison of fluorimetry and phosphorimetry.	
	21/08/2024	Comparison with absorption method.	
	23/08/2024	Turbidimetry – introduction and principle.	
	24/08/2024	Nephelometry – introduction and principle.	
27/08/2024	Factor affecting scattering of radiation.		
31/08/2024	Instrumentation and applications.		
	UNIT: IV METHODS OF SEPARATION - I		
Sep-24	03/09/2024	Solvent extraction – introduction.	15
	04/09/2024	Factors affecting extraction-role of complexing agents in solvent extraction.	
	06/09/2024	Chelation , ion pair formation and solvation.	
	13/09/2024	Graph of percent extraction versus P^H .	
	14/09/2024	Concept of pH half and its significance.	
	17/09/2024	Craig's counter extraction-principle apparatus and application.	
	18/09/2024	Solix phase extraction-principle, process.	
	20/09/2024	Applications with water and industrial effluent analysis.	
	21/09/2024	Comparison-solid phase and solvent phase extraction.	
	24/09/2024	Gas chromatography-introduction , principle .	
	25/09/2024	Instrumentation of gas chromatography.	
	27/09/2024	Detectors -TCD , FID, ECD.	
28/09/2024	Qualitative , Quantitative analysis and application.		
Oct-24		Revision 1	
		Revision 2	
		Exam Preparation and Revisions	
		Tot. Lec.	60

Anjuman Islam Janjira Degree College of Science

Lokmanya Tilak Road, Murud-Janjira dist. Raigad. Maharashtra 402401

Academic Calendar

Practical Plan for Semester-V Year: 2024-2025

Course	T.Y.B.Sc. (chemistry)	sub	Analytical	
Course Code	USCHP504			
Title	PRACTICAL – Analytical chemistry USBOP504 (For 6 Units)			
Credits	2.0			
Name of the Faculty	Dr. Sajid F. Shaikh			
Month	Day	Topic	Batch	Lectureper Month
		11/06/24, 18/06/24, 25/06/24		12
Jun-24	Tuesday	Introduction to the laboratory.		
		Introduction on lab safety.		
		Detail information about MSDS sheet.		
Jul-24	Tuesday	16/07/2024, 23/07/2024		08
		Aim - To determine the amount of persulphate in the given sample solution by back titration with standard Fe (II) ammonium sulphate solution.		
		Aim – To determine the amount of Iron present in Iron sample by redox titration using potassium dichromate with		

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Academic Calendar

Practical Plan for Semester-V Year: 2024-2025

Course:	T.Y.B.Sc. (Chemistry)	Paper: V		
Course Code	USACDD501			
Title	APPLIED COMPONENT (Drugs and Dyes)			
Credits	2 Credits			
Name of the Faculty	Mr. Tamseel Shakeel Shahjahan			
Month	Date	Topic	Lectures	Lecture per Month
Jun - 24	UNIT – I		15	07
	21-06-24	Definition of a drug, sources of drugs, requirements of an ideal drug,		
	22-06-24	Classification of drugs		
	22-06-24	Nomenclature of drugs: Generic name, Brand name, Systematic name		
	24-06-24	Definition of the following medicinal terms: Pharmacon, Pharmacology, Pharmacophore		
	28-06-24	Prodrug, Half – life efficiency, LD50, ED50, GI50 Therapeutic Index.		
	29-06-24	Brief idea of the following terms: Receptors, Agonists, Antagonists		
	29-06-24	Drug-receptor interaction, Drug Potency, Bioavailability, Drug toxicity,		
Jul - 24	01-07-24	Drug addiction, Spurious Drugs, Misbranded Drugs, Adulterated Drugs, Pharmacopoeia.	15	17
	05-07-24	Oral and Parenteral routes with advantages and disadvantages		
	06-07-24	Formulations & combination formulation,		
	06-07-24	Different dosage forms		
	08-07-24	Pharmacodynamic agents: A brief introduction of the following pharmacodynamic agents and the study with respect to their chemical Structure, chemical class, therapeutic uses, and side effects.		
	12-07-24	Classification based on pharmacological actions: CNS Depressants & CNS Stimulants. Concept of sedation and hypnosis, anesthesia.		
	13-07-24	Phenytoin (Hydantoin) □ Trimethadione (Oxazolindione) (Synthesis from acetone)		
	13-07-24	Alprazolam (Benzodiazepines) □ Levetiracetam (Pyrrolidines) □ Amphetamine (Phenethylamine) (Asymmetric synthesis from phenyl acetic acid) Chlorpromazine (Phenothiazines)		
UNIT - II			15	

	15-07-24	Analgesics and Antipyretics □ Morphine (Phenanthrene alkaloids)		
	19-07-24	Tramadol (Cyclohexanols) (Synthesis from salicylic acid) Aspirin (Salicylates) Paracetamol (p-Amino phenols)		
	20-07-24	Anti-inflammatory Drugs Mechanism of inflammation and various inflammatory conditions		
	20-07-24	Steroids: Prednisolone, Betamethasone Sodium Diclofenac, Aceclofenac (N-Aryl anthranilic acids) (Synthesis from 2, 6-dichlorodiphenyl amine)		
	22-07-24	Diphenhydramine (Ethanol amines) □ □ Cetrizene (Piperazine) □ (Synthesis from 4-Chlorobenzhydryl chloride)		
	26-07-24	Chlorpheniramine maleate (Ethyl amines) □ Pantoprazole (Benzimidazoles)		
	27-07-24	Classification based on pharmacological action □ Isosorbide dinitrate (Nitrates) □ Valsartan (Amino acids)		
	27-07-24	Atenolol (Aryloxy propanol amines) (Synthesis from 3-Hydroxy phenyl acetamide) □ Amlodipine (Pyridines)		
	29-07-24	Frusamide /Furosemide (Sulfamoyl benzoic acid) Rosuvastatin (Pyrimidine)		
Aug - 24	02-08-24	General idea and types of diabetes; Insulin therapy □ Glibenclamide (Sulphonyl ureas)		19
	03-08-24	Metformin (Biguanides) □ Dapagliflozin (Pyranose) Pioglitazone (Thiazolidinediones) (Synthesis from 2-(5- ethylpyridin-2-yl) ethanol)		
	03-08-24	Idea of Parkinson's disease. □ Procyclidine hydrochloride (Pyrrolidines)		
	05-08-24	Ethopropazine hydrochloride (Phenothiazines) Levodopa (Amino acids) (Synthesis from Vanillin)		
	09-08-24	General idea of: Expectorants; Mucolytes; Bronchodilators; Decongestants; Antitussives		
	10-08-24	Ambroxol (Cyclohexanol) (Synthesis from paracetamol) □ Salbutamol (Phenyl ethyl amines) Oxymetazoline (Imidazolines)		
	UNIT - III		15	
	10-08-24	Definition of dyes, requirements of a good dye i.e., Colour, Chromophore and Auxochrome, Solubility, Linearity, Coplanarity, Fastness, Substantivity, Economic viability		
	12-08-24	Definition of fastness and its properties and Mordants with examples Explanation of nomenclature or abbreviations of commercial dyes with at least one example.		
	16-08-24	Suffixes – G, O, R, B, K, L, C, S, H, 6B, GK, 6GK,		

		naming of dyes by colour index (two examples) used in dye industries.		
	17-08-24	Natural Dyes: Definition and limitations of natural dyes. Examples and uses of natural dyes w.r.t Heena, Turmeric, Saffron, Indigo, Madder, Chlorophyll with names of the chief dyeing material/s in each natural dye.		
	17-08-24	Synthetic dyes: Definition of synthetic dyes, primaries and intermediates. Important milestones in the development of synthetic dyes – Emphasis on Name of the Scientist, dyes and the year of the discovery is required.		
	19-08-24	Natural fibres: cellulosic and proteinaceous fibres, Structural features of wool, silk and cotton and names of dyes applied on each of them.		
	23-08-24	Semi-synthetic fibres: definition and examples		
	24-08-24	Synthetic fibres: Nylon, Polyesters and Polyamides structures and names of dyes applied on each of them		
	24-08-24	Blended fabrics: definition and examples		
	26-08-24	Dyeing methods		
	30-08-24	Basic Operations involved in dyeing process: i. Preparation of fibres ii. Preparation of dyebath iii. Application of dyes iv. Finishing		
	31-08-24	Dyeing Method of Cotton Fibres: (i) Direct dyeing (ii) Vat dyeing (iii) Mordant dyeing (iv) Disperse dyeing		
	31-08-24	Classification of dyes based on applicability on substrates (examples with structures) (a) Acid Dyes- Orange II, (b) Basic Dyes-Methyl violet,		
Sep - 24	02-09-24	(c) Direct cotton Dyes- Benzo fast Yellow 5GL (d) Azoic Dyes – Diazo components; Fast yellow G, Fast orange R.		14
	06-09-24	Coupling components. Naphthol AS, Naphthol ASG (e) Mordant Dyes- Eriochrome Black A, Alizarin. (f) Vat Dyes- Indanthrene brown RRD, (g) Sulphur Dyes- Sulphur Black T (no structure) (h) Disperse Dyes-Celliton Fast brown 3R, Reactive Dyes- Procion Brilliant HB		
	13-09-24	Optical Brighteners: General idea, important characteristics of optical brighteners and their classes		
	UNIT - IV			
	14-09-24	Absorption of visible light, Colour of wavelength absorbed, Complementary colour.	15	
	14-09-24	(i) Armstrong theory (quinonoid theory) and its limitations.		

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		(ii) Witt's Theory: Chromophore, Auxochrome, Bathochromic & Hypsochromic Shift, Hypochromic & Hyperchromic effect	
	16-09-24	iii) Valence Bond theory, comparative study and relation of colour in the following classes of compounds/dyes: Benzene, Nitrobenzene, Nitroanilines, Nitrophenols, Benzoquinones, Triphenyl methane, Anthraquinones.	
	20-09-24	(iv) Molecular Orbital Theory. With reference to Ethylene; 1, 3- butadiene & β -carotene.	
	21-09-24	Introduction to primaries and intermediates	
	21-09-24	Unit processes: definition and brief ideas of following unit processes: (a) Nitration (b) Sulphonation	
	23-09-24	(c) Halogenation (d) Diazotization: (Direct & Reverse Method) (e) Ammonolysis.	
	27-09-24	Benzene derivatives: Benzene sulphonic acid; 1,3-	
	28-09-24	Benzene disulphonic acid; Resorcinol; sulphanilic acid;	
	28-09-24	o-, m-, p-chloronitrobenzenes; o-, m-, p-nitroanilines;	
	30-09-24	o-, m-, p-phenylene diamines; Naphthol ASG	
Oct - 24	04-10-24	Schaeffer acid; Tobias acid;	04
	05-10-24	Naphthionic acid; N.W. acid	
	05-10-24	H-acid; Naphthol AS	
	07-10-24	Anthraquinone; 1-Amino anthraquinone; Benzanthrone.	
Total Lectures			60

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Academic Calendar

Practical Plan for Semester-V Year: 2024-2025

Course:	T.Y.B.Sc. (Chemistry)			Paper: V
Course Code	USACDD5P1			
Title	APPLIED COMPONENT (Drugs and Dyes)			
Credits	2 Credits			
Name of the Faculty	Mr. Tamseel Shakeel Shahjahan			
Month	Day	Topic	Batch	Lecture per Month
Jun – 24 to Sep – 24	Saturday	Estimation of Ibuprofen (back titration method)	A	60
	Saturday	Estimation of Acid neutralizing capacity of a drug		
	Saturday	Preparation of Aspirin from salicylic acid.		
	Saturday	Preparation of Anthraquinone from Anthracene		
	Saturday	Separation of components of natural pigments by paper chromatography (eg: chlorophyll)		
	Saturday	Preparation of Orange II dye (semi-microscale 1.0gms) and its use for dyeing different fabrics.		
Oct - 24	Saturday	Journal Checking		
	Saturday	Journal Certification		
	Saturday	Journal Certification		
			Total Lectures	60

