

Anjuman Islam Janjira Degree College of Science

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

Academic Calendar

Teaching Plan for Semester-I Year: 2025-2026

Course	F.Y.B.Sc. (GS)	
Course Code		
Title	SEC : Basic Statistical Tool In Chemistry	
Credits	2 Credits (60 lectures)	
Name of the Faculty	Dr. Sajid F. Shaikh	

Month	Date	Topic	Lectures	Lecture per Month
			60	
July	19-07-25	Determination of mean, median, and mode of titrvalues of acid-base titration (minimum number of titrvalues = 10)		
	26-07-25	Determination of standard deviation and variance of titrvalues of any complexometric titration (minimum number of titrvalues = 10)		
August	02-08-25	Determination of acetic acid in vinegar by potentiometry and calculation of absolute and relative errors		
	09-08-25	Calculate the absolute, average, and relative deviations from the provided data in any chemistry experiment.		
	16-08-25	Determination of absolute and relative error in standardization of $\text{Na}_2\text{S}_2\text{O}_3$ by using 0.05 N $\text{K}_2\text{Cr}_2\text{O}_7$. (The readings of all students of the batch shall be used for calculation, and also expert reading shall		
	23-08-25	To calculate precision in terms of mean, mode, and median for the set of readings, pH values		
	30-08-25	To determine the viscosity of liquid using an Ostwald viscometer and calculate standard deviation for replicate values.		
September	06-09-25	Estimation of Aspirin Content Using Volumetric Method and Quantification of Error Through Absolute and Relative Error Calculations		
	13-09-25	Estimation of hardness of water using complexometry and study of precision by calculating average deviation.		
	20-09-25	Calculation of relative average from mean deviation for a set of readings obtained in the determination of vitamin C from the given sample.		
		Tot. Lec.	60	

Anjuman Islam Janjira Degree College of Science

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

Academic Calendar

PRACTICAL Plan for Semester-I Year: 2025-2026

Course	F.Y.B.Sc. (Chemistry)		Paper: III
Course Code	VSCC1		
Title	Laboratory Techniques: Solution Preparation and Calibration of Equipment		
Credits	2		
Name of the Faculty	Mr. Tamseel Shakeel Shahjahan		

Month	Day	Topic	Batch	Lecture per Month
		Calibration of Laboratory Glassware		
July -25 to Oct -25	Thursday	1. To calibrate the burette for accurate volume delivery of solution	A	30
	Thursday	2. To calibrate a pipette for correct volume transfer.	A	
	Thursday	3. To calibrate a standard measuring flask for its accurate volume capacity.	A	
	Thursday	4. To calibrate a measuring cylinder to make its volume markings accurate.	A	
	Thursday	5. To prepare Primary Standard Solution (any two from sodium carbonate or potassium hydrogen phthalate, succinic acid, or potassium dichromate)	A	
	Thursday	6. Standardization of secondary standard. (Any two from hydrochloric acid, sodium hydroxide, and sodium thiosulphate.)	A	
	Thursday	7. Standardization of potassium permanganate solution using Mohr's salt by redox titration.	A	
	Thursday			
		Calibration of Laboratory Instruments		30
	Thursday	8. Calibration of a pH meter using standard buffer solutions of pH 4, 7, and 10.	A	
	Thursday	9. Calibration of conductometer and measurement of conductance for a given salt sample (minimum two samples, e.g., NaCl and KCl)	A	
	Thursday	10. To compare the conductivity of tap water and distilled water using a conductometer.	A	
	Thursday	11. To determine the strength of an acid in a given sample by titration with sodium hydroxide potentiometrically and determination of the equivalence point using a first derivative graph. (Demonstration)	A	
	Thursday	12. To calibrate a turbidimeter and estimate sulphate ions in a given sample.	A	
	Thursday		A	
	Thursday	Practice Revision	B	9
	Thursday			
Apr-25	Thursday	Journal Cheking	A	
	Thursday		B	
	Thursday	Exam	A	
	Thursday		B	
	Thursday	Exam	A	
	Thursday		B	
		Tot. Lec.		69

Anjuman Islam Janjira Degree College of Science

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

Academic Calendar

PRACTICAL Plan for Semester-I Year: 2025-2026

Course	F.Y.B.Sc. (Chemistry)		Paper: III
Course Code	VSCC1		
Title	Laboratory Techniques: Solution Preparation and Calibration of Equipment		
Credits	2		
Name of the Faculty	Mr. Tamseel Shakeel Shahjahan		

Month	Day	Topic	Batch	Lecture per Month
July -25 to Oct - 2		Calibration of Laboratory Glassware		30
	Thursday	1. To calibrate the burette for accurate volume delivery of solution	A	
	Thursday	2. To calibrate a pipette for correct volume transfer.	A	
	Thursday	3. To calibrate a standard measuring flask for its accurate volume capacity.	A	
	Thursday	4. To calibrate a measuring cylinder to make its volume markings accurate.	A	
	Thursday	5. To prepare Primary Standard Solution (any two from sodium carbonate or potassium hydrogen phthalate, succinic acid, or potassium dichromate)	A	
	Thursday	6. Standardization of secondary standard. (Any two from hydrochloric acid, sodium hydroxide, and sodium thiosulphate.)	A	
	Thursday	7. Standardization of potassium permanganate solution using Mohr's salt by redox titration.	A	
	Thursday			30
		Calibration of Laboratory Instruments		
	Thursday	8. Calibration of a pH meter using standard buffer solutions of pH 4, 7, and 10.	A	
	Thursday	9. Calibration of conductometer and measurement of conductance for a given salt sample (minimum two samples, e.g., NaCl and KCl)	A	
	Thursday	10. To compare the conductivity of tap water and distilled water using a conductometer.	A	
	Thursday	11. To determine the strength of an acid in a given sample by titration with sodium hydroxide potentiometrically and determination of the equivalence point using a first derivative graph. (Demonstration)	A	
	Thursday	12. To calibrate a turbidimeter and estimate sulphate ions in a given sample.	A	
	Thursday		A	
	Thursday	Practicle Revision	B	9
	Thursday			
Apr-25	Thursday	Journal Cheking	A	
	Thursday		B	
	Thursday	Exam	A	
	Thursday		B	
	Thursday	Exam	A	
	Thursday		B	
		Tot. Lec.		69

Anjuman Islam Janjira Degree College of Science

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

Academic Calendar

Teaching Plan for Semester-I Year: 2025-2026

Course	F.Y.B.Sc. (Chemistry)		
Course Code	M3-1		
Title	M3-1: 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	Lecture per Month
25-Jul		Module II Inorganic Chemistry	7
	07-08-25	2.1 Atomic Structure: (3L)	
		Historical perspectives of the atomic structure; J.J. Thomson Model,	
	14/7/2025	Rutherford's Atomic Model- alpha particle scattering experiment,	
	15/7/2025	Bohr's theory, Aufbau	
		principle, Hund's rule of maximum multiplicity and Pauli exclusion principle	
	21/7/2025	Periodic Table and Periodicity: (2L)	
		Long form of Periodic Table: Classification for elements as main group, transition	
		and inner transition elements.	
	22/7/2025	Periodicity in the Following Properties (5L)	
		Atomic and ionic size, electron gain enthalpy, ionization enthalpy, effective nuclear	
		charge (Slater's rule), electronegativity, Pauling and Mulliken methods. (Numerical	
		problems expected, wherever applicable.)	
	Module I Physical Chemistry		
28/7/2025	1.1 Liquid State - I: (2L)		
	Viscosity: Introduction, coefficient of viscosity, relative viscosity, specific viscosity,		
29/7/2025	reduced viscosity, determination of viscosity by Ostwald viscometer		
25-Aug	08-04-25	1.2 Chemical Calculations: (2L)	8
		Methods of expressing concentration of solutions: Normality, Molarity, Molality,	
	08-05-25	Mole fractions, ppm, ppb. Preparation of solutions (Dilution).	
(Numerical problems expected wherever necessary)			
08-11-25	Chemical Kinetics: (6L)		
	Rate of reaction, rate constant, measurement of reaction rates,		
08-12-25	order and molecularity		
	of reaction, Integrated rate equation of first order order reactions (with equal initial concentration of reactants) .		
18/8/2025	Integrated rate equation of Second order reactions (with equal initial concentration of reactants) .		
19/8/2025	Determination of order of reaction by a) Integration method		
25/8/2025	b) Graphical method c) Ostwald's isolation method		
26/8/2025	d) Half time method		

	20/8/2025	(Numerical problems expected wherever necessary).	
		Module III Organic Chemistry (10L)	
	09-01-25	3.1 Classification and Nomenclature of Organic Compounds: (5L) Nomenclature of mono and bi-functional aliphatic compounds on the basis of priority order of the following classes of compounds:	
	09-02-25	Alkanes,	
	09-08-25	alkenes, alkynes,	
	09-09-25	haloalkanes, alcohols	
	15/9/2025	ethers, aldehydes	
	16/9/2025	ketones, carboxylic acids.	
	22/9/2025	Stereochemistry: (5L) Projection formulae: Flying Wedge projection, Fischer Projection,	
	23/9/2025	Newman and Sawhorse Projection formulae (erythro, threo isomers of tartaric acid and 2,3 - dichlorobutane) and their interconversions;	
	29/9/2025	Newman and Sawhorse Projection formulae (erythro, threo isomers of tartaric acid and 2,3 - dichlorobutane) and their interconversions;	
	30/9/2025	Geometrical isomerism in alkene: cis–trans and syn-anti isomerism R/S nomenclature, E/Z notations with C.I.P rules.	
	10-06-25	Conformational analysis of alkanes (ethane, and n-butane); Relative stability with energy profile diagrams	
		Total Lectures = 30	

25-Sep

10

Anjuman Islam Janjira Degree College of Science

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

Academic Calendar

PRACTICAL Plan for Semester-II Year: 2025-2026

Course	F.Y.B.Sc. (Chemistry)		
Course Code	M3CHP1: Chemistry Practical 1		
Title	PRACTICAL - Chemistry Practical 1		
Credits	2		
Name of the Faculty	Asst. Prof. Nitin Shivaji Pawar		
Month	Day	Topic	Batch
July and August	Friday	Physical Chemistry	A
		1 To prepare 0.1 N succinic acid and standardize the NaOH solution	
	Saturday	1 To prepare 0.1 N succinic acid and standardize the NaOH solution	B
	Friday	2) To standardize Sodium thiosulphate solution.	A
	Saturday	2) To standardize Sodium thiosulphate solution.	B
	Friday	3) To determine the rate constant for the hydrolysis of ester using HCl	A
	Saturday	3) To determine the rate constant for the hydrolysis of ester using HCl	B
Sept	Friday	4) Determination of viscosity of aqueous solutions of (i) polymer (ii)	A
	Saturday	4) Determination of viscosity of aqueous solutions of (i) polymer (ii)	B
	Friday	Inorganic Chemistry	A
		1) Volumetric analysis	
		a) To determine the strength of commercial acid sample (HCl).	
Saturday	a) To determine the strength of commercial acid sample (HCl).	B	
25-Oct	Friday	b) To estimate the content of Na2CO3 and NaHCO3 in the given indicator.	A

	Saturday	b) To estimate the content of Na ₂ CO ₃ and NaHCO ₃ in the given indicator.	B
	Friday	Journal Certification	A
	Saturday	Journal Certification	B
		Tot. Lectures	30

Anjuman Islam Janjira Degree College of Science

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

Academic Calendar

Teaching Plan for Semester-III Year: 2025-2026

Course	S.Y.B.Sc.	Paper:
Course Code	-	
Title	Laws and Regulations in Transport -I	
Credits	2	

Name of the Faculty **Mr. Tamseel Shakeel Shahjahan**

Month	Date	Topic	Lectures	Lecture per Month
		Module 1		
Jun-25	19-06-2025	Motor Vehicles Act 1988	15	4
	26-06-2025	Motor Vehicles Act 1988		
Jul-25	03-07-2025	Commencement,		10
	10-07-2025	Commencement,		
	17-07-2025	Definition and Licensing of Drivers and Registration of vehicles		
	24-07-2025	Definition and Licensing of Drivers and Registration of vehicles		
	31-07-2025	Contract Carriage permits		
25-Aug	07-08-2025	Contract Carriage permits		6
	14-08-2025	Offences, penalties and procedures		
	21-08-2025	Offences, penalties and procedures		
25-Sep	04-09-2025	Road Transport Corporation		10
	11-09-2025	Road Transport Corporation		
	18-09-2025	National Highway Act.		
	25-09-2025	National Highway Act.		
	26-09-2025	National Highway Act.		
		Module 2: Laws relating to Railways		
Jun-25	19-06-2025	Railway Act, 1989- Extent and applicability	15	
	26-06-2025	Railway Act, 1989- Extent and applicability		
Jul-25	03-07-2025	railway administration		
	10-07-2025	railway administration		
	17-07-2025	construction and maintenance		
	24-07-2025	construction and maintenance		
	31-07-2025	Fares & Freight		
25-Aug	07-08-2025	Fares & Freight		
	14-08-2025	Passenger & Freight services		
	21-08-2025	Passenger & Freight services		
25-Sep	04-09-2025	Railway Property and offenses		
	11-09-2025	Railway Property and offenses		
	18-09-2025	Accidents and Compensation		
	25-09-2025	Railway tribunal		
	26-09-2025	Railway tribunal		
		Tot. Lec.		30

Lokmanya Tilak Road, Murud-Janjira dist. Raigarh. Maharashtra 402401				
Academic Calendar				
Teaching Plan for Semester-III Year: 2025-2026				
Course	S.Y.B.Sc.		Paper:	
Course Code	-			
Title	Open Elective - Financial Literacy			
Credits	2			
Name of the Faculty	Mr. Tamseel Shakeel Shahjahan			
Month	Date	Topic	Lectures	Lecture per Month
	Module 1: Financial Planning and Financial Products			
Jun-25	14/06/2025	Introduction to Saving	15	6
	21-06-2025	Time value of money,		
	28-06-2025	Management of spe		
Jul-25	05-07-2025	Financial discipline,		8
	12-07-2025	Banking product		
	19-07-2025	Banking Services		
	26-07-2025	Digitization of financial transactions		
25-Aug	02-08-2025	Debit Cards		8
	09-08-2025	Credit Cards		
	16-08-2025	Net banking		
	23-08-2025	UPI		
Sep-25	06-09-2025	Digital wallets		8
	13-09-2025	Security and precautions against Ponzi scheme		
	20-09-2025	Security and precautions against Ponzi scheme		
	27-09-2025	online frauds		
	Module 2: Investment Planning and Management			
Jun-25	14/06/2025	Investment opportunity and financial product	15	
	21-06-2025	Investment opportunity and financial product		
	28-06-2025	Investment opportunity and financial product		
Jul-25	05-07-2025	Insurance Planning:		
	12-07-2025	Life		
	19-07-2025	non-life		
	26-07-2025	medical insurance schemes		
25-Aug	02-08-2025	Introduction to basic Tax Structure		
	09-08-2025	Introduction to basic Tax Structure		
	16-08-2025	Introduction to basic Tax Structure		
	23-08-2025	personal taxation		
Sep-25	06-09-2025	personal taxation		
	13-09-2025	Aspects of Personal tax planning.		
	20-09-2025	Aspects of Personal tax planning.		
	27-09-2025	Aspects of Personal tax planning.		
		Tot. Lec.		30

Anjuman Islam Janjira Degree College of Science				
Lokmanya Tilak Road, Murud-Janjira dist. Raigarh. Maharashtra 402401				
Academic Calendar				
PRACTICAL Plan for Semester-III Year: 2025-2026				
Course	S.Y.B.Sc. Skill Enhancement Course			Paper: III
Course Code	S3SECCH31			
Title	Skills in Chemistry			
Credits	2			
Name of the Faculty	Mr. Tamseel Shakeel Shahjahan			
Month	Day	Topic	Batch	Lecture per Month
	Preparations (Any 6)			

Jun - 25 to Sep - 25	Wednesday	1.1. To prepare the Talcum Powder.		24
	Wednesday	1.2. To prepare the Bath Soap.		
	Wednesday	1.3. To prepare the Shampoo.		
	Wednesday	1.4. To prepare the Nail Polish.		
	Wednesday	1.5. To prepare the Nail Polish Remover.		
	Wednesday	1.6. To prepare Hand Wash.		
	Wednesday	1.7. To prepare Hand Sanitizer.		
	Wednesday	1.8. To prepare Hand Cream.		
	Wednesday	1.9. To prepare Body Lotion		
	Wednesday	1.10. To prepare after Shave Lotion.		
	Analysis			24
	Wednesday	2.1. To determine the amount of matter insoluble in boiling water of the given material.		
	Wednesday	2.2. To determine the moisture, volatility and to test the solubility of the color in the given material.		
	Wednesday	2.3. To study the comparative foaming ability of the various Shampoo brands using Cylinder Shake Method.		
	Wednesday	2.4. To measure the pH of the sample of a cosmetic products using pH meter.		
	Wednesday	2.5. To determine the relative viscosity of a given liquid product using Ostwald Viscometer.		
	Wednesday	2.6. To determine the concentration of Thioglycolic acid in a given Depilatories.		
	Surveys			12
	Wednesday	3.1. To carry out the survey of given cosmetic product's label.		
	Wednesday	3.2. To carry out the study of ingredients in given cosmetic products.		
	Wednesday	3.3. To determine and compare the melting points of the Lipstick of various brands using slip melting point method.		
		Practcale Revision		9
Oct-25		Journal Cheking		
		Exam		
		Exam		
		Tot. Lec.		69

Anjuman Islam Janjira Degree College of Science				
Lokmanya Tilak Road, Murud-Janjira dist. Raigarh. Maharashtra 402401				
Academic Calendar				
Teaching Plan for Semester-III Year: 2025-2026				
Course	S.Y.B.Sc. Chemistry (NEP)			Paper: II
Course Code	S3MJ4			
Title	Progressive Inorganic and Organic Chemistry I			
Credits	2 Credits (30 lectures)			
Name of the Facult	Dr. Amanulla Khan Nasrulla Khan			
Month	Date	Topic	Lectures	Lecture per Month
Jun-25	Unit I Inorganic Chemistry			
	21/06/2025	1.1 Chemical Bonding Non directional Bonding	3L	2
	23/06/2025	Ionic Bond: Conditions for the Formation of Ionic Bond and properties		
	28/06/2025	Types of Ionic Crystals Radius Ratio Rules		

	30/06/2025	Born-Haber Cycle and its Applications		
Jul-25	07-05-25	Directional bonding	(4L)	6
	07-07-25	VBT, introduction and basic tenets		
	07-12-25	Concept of homo nuclear diatomic molecule from He ₂ to Ne ₂		
	14/7/2025	Bonding in Polyatomic Species:		
	19/7/2025	The Role of Hybridization. And types of hybrid orbitals-sp, sp ² , sp ³ , sp ³ d, sp ³ d ² , d ² sp ³ , Sp ³ d ³ with examples.		
	21/7/2025	Molecular Orbital Theory	(5L)	
	25/7/2025	Comparing Atomic Orbitals and Molecular Orbitals.		15
	26/7/2025	Linear combination of atomic orbitals to give molecular orbitals LCAO-MO		
	28/7/2025	approach for diatomic homonuclear molecules).		
Aug-25	08-02-25	Molecular orbital Theory and Bond Order and magnetic property: with reference to O ₂ , O ⁺ ,		
	08-04-25	Molecular orbital Theory and Bond Order and magnetic property: with reference to, O ₂ ⁻ , O ₂ ²⁻		
	13/08/2025	Basic chemistry of Boron and Silicon Basic chemistry of boron and silicon	(3L)	
	16/08/2025	electronic configuration, oxidation state and inert pair effect.		
	18/08/2025	Preparation, bonding and applications of diborane, silicon dioxide and silicon tetra chloride.		
	23/08/2025	Reactions And Reactivity of Halo Alkanes and Halo Arenes: (4L)		
	25/08/2025	Alkyl halides:	(2 L)	
	26/08/2025	Nucleophilic substitution reactions: SN ₁ , SN ₂ and SN _i mechanisms with stereo chemical aspects (examples of chiral carbon are expected)		
Sep-25	09-01-25	Factors affecting nucleophilic substitution reactions: Nature of substrate, nature of solvent, nature of nucleophilic reagent, nature of leaving group.		
	09-06-25	Aryl halides: Reactivity of aryl halides towards nucleophilic substitution reactions. Nucleophilic aromatic substitution:	(2 L)	
	09-08-25	addition-elimination mechanism (S _N Ar), elimination-addition mechanism (benzyne mechanism) and C _{ine} substitution		
	13/09/2025	Chemistry of Carbonyl Compounds:	(8 L)	
	15/09/2025	Recapitulation: Introduction to classes of compounds containing carbonyl group Bonding, structure and reactivity of carbonyl group in aldehyde and ketone. IUPAC nomenclature of aldehydes and ketones.	(1 L)	
	20/09/2025	Methods of Preparation (Mechanisms not expected):Oxidation of primary and secondary alcohol using PCC, K ₂ Cr ₂ O ₇ , Wacker process (Using PdCl ₂), Swern oxidation (oxyllyl chloride / DMSO and Et ₃ N), Jones reagent (CrO ₃ in sulfuric acid), Sarett oxidation (CrO ₃ in pyridine, selective oxidation of OH group in presence of double bond. (Preparation of cinnamaldehyde is expected)	(1 L)	

	22/09/2025	Nucleophilic Addition Reactions: Mechanism of nucleophilic addition reactions Reactivity of aldehyde and ketone. Example: addition of HCN, NaHSO ₃ , Grignard reagent, alcohol, amines, phenyl hydrazine, 2,4 – DNPH	(2 L)	7
	27/09/2025	Oxidation and Reduction (Mechanisms not expected): Reduction to alcohol: Reduction using LiAlH ₄ , NaBH ₄ , MPV reduction, Reduction to hydrocarbon: Clemmensen reduction, Wolff – Kishner reduction Oxidation: Oppenauer oxidation, Baeyer – Villiger oxidation	(1 L)	
	21/09/2025	Active methylene compounds: Introduction and reactivity of active methylene compound and enolate formation, Examples: ethyl acetoacetate, acetyl acetone, malonic ester.	(3 L)	
Oct-25	10-01-25	Some characteristic reactions of these compounds like salt formation, alkylation. Application of active methylene compounds in name reactions		
	10-04-25	viz: 1) Michael addition 2) Knoevenagel condensation		
	10-06-25	Name Reactions (Mechanism and Applications) – I: Simmons-Smith reaction	(3 L)	
	10-08-25	Reformatsky reaction		
	10-11-25	Reimer-Tiemann reaction, Beckmann rearrangement		
		Tot. Lec.	30	30

Anjuman Islam Janjira Degree College of Science

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

Academic Calendar

PRACTICAL Plan for Semester-III Year: 2025-26

Course	S.Y.B.Sc. (Chemistry)	Paper 1 :	Major Practical
Course Code	S3MJCHP3		
Title	Chemistry Practical 3		
Credits	2 Credit		

Name of the Faculty **Mr. Khan Shoyeab Mutalib**

Month	Day	Topic	Lecture	Lecture per Month
	Inorganic Chemistry Inorganic preparation			
June	23/06/2025	Complexometric titration Estimation of total hardness of water		04-01-00
	30/06/2025	Gravimetric estimation Barium as BaCrO4		
	Organic Qualitative Analysis			
July	07-01-25	Salicylic acid		10-01-00
	07-08-25	Acetyl aalicylic acid		
	15/07/2025	o-chloro benzoic acid		
	22/07/2025	Acid Phenols: o or m or p -nitro Phenol		
	29/07/2025	Amines: o or m or p -nitro aniline or p-toluidine		
August	08-05-25	Benzophenone		06-01-00
	08-12-25	acetophenone		
	19/08/2025	Esters: Methyl acetate		
Sep	09-02-25	Ethyl acetate		02-01-00
		Tot. Lec.	30	22

Anjuman Islam Janjira Degree College of Science

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

Academic Calendar

PRACTICAL Plan for Semester-III Year: 2025-26

Course	S.Y.B.Sc. (Chemistry)	Paper I:	Minor
Course Code	S3MN31		
Title	General Principles of Chemistry I		
Credits	2 Credit		

Name of the Faculty **Mr. Khan Shoyeab Mutalib**

Month	Day	Topic	Lecture	Lecture per Month
		Physical Chemistry Polymer Chemistry	(8L)	
June	18/06/2025	Basic Terms: Macromolecule, monomer, repeat unit,		8
	23/06/2025	Polymerisation, (addition and condensation polymerization) Degree of Polymerisation		
	25/06/2025	Classification of Polymer based on source, thermal response.		
	30/06/2025	Physical Properties. Polymer structures linear, branched and cross-linked		
Jul-25	07-02-25	Molecular weight of Polymers: Definition and formulae of Number average weight		
	07-07-25	average molecular weight Z- average molecular weight, (numerical expected)		
	07-09-25	Determination of molar mass of polymer using Ostwald viscometer		
	07-12-25	Mark- Houwink equation		
		Analytical Chemistry Role of Analytical Chemistry	(2L)	8
	14/07/2025	Language of analytical chemistry: important terms and their significance. Purpose of Chemical Analysis; Analysis Based on (i) the nature of information required:(Proximate, Partial, Trace, Complete Analysis) and		
	16/07/2025	On the size of the sample used (Macro, semi-micro and microanalysis) 2.1.3 Non instrumental and instrumental Methods of Analysis: their types and importance		
		Significance of Sampling in Analytical Chemistry	(2L)	
	21/07/2025	Terms involved in Sampling, Purpose of Sampling, Difficulties encountered in sampling		
	23/07/2025	Types of Sampling (i)Random Sampling (ii)Systematic Sampling 2.2.5 Sampling of gases: ambient and stack sampling.		
		Neutralization Titration	(3L)	
	26/07/2025	Concept of pH and its importance in Neutralization Titrations, Endpoint and Equivalence point of Neutralization titrations		
	28/07/2025	Determination of end point by using Indicators causing colour change		
	30/07/2025	Selection of indicators – Ostwald's theory of indicators		
			(3L)	
Aug-25	30/07/2025	Interaction between two hydrogen atoms		8
	08-04-25	the potential energy diagram of the resultant system.		
	08-06-25	Correction applied to the system of two hydrogen atoms formation of H ₂		
		Selected topics of p block Elements	(5L)	
	08-11-25	Preparation, Structure and bonding of tetraborane,		
	13/08/2025	Synthesis of Borax and it's uses		
	13/08/2025	Preparation of extrapure silicon		
	18/08/2025	Preparation, Structure and bonding of tetraborane,		
		Organic Chemistry Chemistry of Amines and Diazonium Salts	(7L)	

	20/08/2025	Introduction to amines: (1L) Nomenclature and classification of amines Effect of substituent on basicity of aliphatic and aromatic amines		8
	20/08/2025	Method of preparation of amines: (2L) Reduction of aromatic nitro compounds using catalytic hydrogenation		
	25/08/2025	Chemical reduction using Fe-HCl, Sn-HCl, Zn-acetic acid, reduction of nitriles		
Sep-25	09-01-25	Reactions of amines: N-alkylation, Hofmann's exhaustive methylation (HEM), N-acylation,		
	09-03-25	Hofmann elimination reaction, reaction with nitrous acid, carbylamine reaction.		
	09-08-25	Diazonium Salts: Preparation of diazonium salts Reactions/synthetic application - Sandmeyer reaction, Gattermann reaction, Gomberg reaction,		
	09-10-25	Replacement of diazo group by -H, -OH, Azo coupling with phenols, naphthols and aromatic amines.		
		Tot. Lec.	30	32

Anjuman Islam Janjira Degree College of Science

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

Academic Calendar

PRACTICAL Plan for Semester-III Year: 2025-26

Course	S.Y.B.Sc. (Chemistry)		Paper 1 :	Minor Practical
Course Code	S3MN3P1			
Title	Practical in General Principles of Chemistry I			
Credits	2 Credit			
Name of the Faculty	Mr. Khan Shoyeab Mutalib			
Month	Day	Topic	Lecture	Lecture per Month
		Inorganic Chemistry 1. Inorganic Preparations:		
June	20/06/2025	Complexometric Titration: Estimate the amount of magnesium in the given Mgso4 solution		8
	27/06/2025	Gravimetric Estimation: Calculate the percentage composition of the mixture of Na2CO3 and NaHCO3		
		Organic Chemistry One Step Preparation and Purification:		
July	07-04-25	Cyclohexanone oxime from cyclohexanone.		16
	07-11-25	Phthalic anhydride from phthalic acid by sublimation		
	18/07/2025	Glucosazone from dextrose or fructose		
	25/07/2025	Acetanilide from aniline		
Aug	08-01-25	m-Dinitrobenzene from nitrobenzene		8
	08-08-25	Revision		
		Tot. Lec.	30	32

Anjuman Islam Janjira Degree College of Science

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

Academic Calendar

Teaching Plan for Semester-III Year: 2025-2026

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			Lecture per Month
Month	Date	Topic		

		Unit-I: Physical Chemistry	
25-Jun	19/6/2025	1.1 Chemical Thermodynamics-II (5L)	4
		1.1.1 Free Energy Functions: Helmholtz Free Energy, Gibbs Free Energy,	
	19/6/2025	Variation of Gibbs Free Energy with Pressure and Temperature.	
	26/6/2025	1.1.2 Gibbs-Helmholtz equation, Concept of fugacity and activity (Numericals expected)	
25-Jul	26/6/2025	1.1.3 Thermodynamics of Open System: Partial Molal Properties,	10
	07-03-25	Chemical Potential and its variation with Pressure and Temperature. Gibbs Duhem equation.	
	07-03-25	Electrochemistry (5L)	
		1.2.1 Electrolytes: Definition, Strong and weak electrolytes and their conductance measurement, ions and electrical conductivity by ions	
	07-10-25	1.2.2 Kohlrausch law of independent migration of ions.	
	07-10-25	1.2.3 Applications of conductance measurements: determination of	
	17/7/2025	solubility and solubility product or sparingly soluble salts: (Numerical expected)	
	17/7/2025	1.2.4 Transference number and its experimental determination using Moving boundary method. (Numerical expected). Factors affecting	
		Solutions (5L)	
	24/7/2025	1.3.1 Thermodynamics of ideal solutions: ideal solutions and Raoult's law; deviations from Raoult's law; non-ideal solutions	
	24/7/2025	Vapour pressure-composition and temperature-composition curves of ideal and non-ideal solutions.	
	31/7/2025	1.3.2 Partial miscibility of liquids: Definition, Effect of Temperature,	
	31/7/2025	Critical solution temperature; Phenol-Water, Triethanolamine – Water	
	08-07-25	1.3.3 Immiscibility of liquids- Nernst distribution law and its applications: solvent extraction	
		Unit-II Analytical Chemistry	
25-Aug	14/8/2025	2.1 Scope of Analytical Chemistry and Errors in Analysis with their types (5L)	6
		2.1.1 Important terms and their significance in Analytical Chemistry.	
	14/8/2025	2.1.2 Errors in Chemical Analysis and their types: i) Determinate Errors	
	21/8/2025	ii) Indeterminate Errors	
	21/8/2025	2.1.3 Classification of determinate errors: i) instrumental errors ii) methodic errors iii) operational or personal errors	
	21/8/2025	2.1.4 Vicarious or immiscible or determinate errors in chemical analysis: Calibration, running of blanks, control determination	
	28/8/2025	2.1.5 Constant and proportionate errors with examples	
25-Sep	09-04-25	2.2 Classical methods: Titrimetric Methods of Analysis (5L)	8
		2.2.1 Terms involved in Titrimetric analysis: i) Titrant ii) Titrand iii) Equivalence Point iv) Indicator v) End point vi) Titration Error	
	09-04-25	2.2.2 Types of volumetric analysis with example and indicators	
		i) Neutralisation (Acidimetry, alkalimetry) ii) Redox (Iodometry,	
	09-11-25	iii) Precipitation iv) Complexometric titrations	
	09-11-25	2.2.3 Standard solutions and standardisation in Titrimetry (primary and secondary standards)	
	18/9/2025	Calculations based on preparation of standard solutions and their	
	18/9/2025	2.3 Instrumental Methods-I (Spectrometry) (5L)	
		2.3.1 Basic Terms: Radiant Power, Absorbance, Transmittance, Monochromatic Light, Polychromatic Light, Wavelength of Maximum	
	25/9/2025	2.3.2 Statement and derivation of Beer's Law and Lambert's Law,	2
25-Oct	25/9/2025	Combined Mathematical Expression of Beer-Lambert's Law (Numerical	
	10-09-25	2.3.3 Block Diagram for Single Beam Colorimeter (Principle, Construction and Working) (Details of Components Expected, i.e. source	
	10-09-25	Comparison between single Beam Colorimeter and double beam colorimeter. Single beam spectrophotometer (Principle, Construction and Working)	
		Tot. Lec.	45

Anjuman Islam Janjira Degree College of Science		
Lokmanya Tilak Road, Murud-Janjira dist. Raigad. Maharashtra 402401		
Academic Calendar		
PRACTICAL Plan for Semester-III Year: 2025-2026		
Course	S.Y.B.Sc.	Paper: (Major Chemistry)
Course Code	S3MJCHP3	
Title	Chemistry Practical 3	
Credits	2	

Name of the Faculty	Asst. Prof. Nitin Shivaji Pawar		
Month	Day	Topic	Batch
25-Jul	Monday	1) Tools of analytical chemistry-I (theory within practical)	A
	Monday	To verify Ostwald's dilution law for weak acid conductometrically.	A
	Monday	To prepare bis(dimethylglyoximate)Ni(II)	A
25-Aug	Monday	To prepare tris ethylene diamine Ni(II) thiosulphate	A
	Monday	To investigate the reaction between K ₂ S ₂ O ₈ and KI with equal initial	A
	Monday	To determine the Solubility product and solubility of AgCl	A
	Monday	Conductometry: Estimation of a given weak acid with a strong base by conductometric titration.	
25-Sep	Monday	Colourimetry: Determination of copper ions as an ammine complex	A
	Monday	Estimation of drugs - Estimation of aspirin.	
	Monday	Estimation of Mg content in talcum powder by using standard EDTA	A
		Tot. Lec.	30

Anjuman Islam Janjira Degree College of Science			
Lokmanya Tilak Road, Murud-Janjira dist. Raigad. Maharashtra 402401			
Academic Calendar			
PRACTICAL Plan for Semester-III Year: 2025-2026			
Course	S.Y.B.Sc.		Paper: (Minor Chemistry)
Course Code	S3MN3P1		
Title	Practical in General Principles of Chemistry I		
Credits	2		
Name of the Faculty	Asst. Prof. Nitin Shivaji Pawar		
Month	Day	Topic	Lecture per Month
25-Jul	Friday	1) Tools of analytical chemistry-I (theory within practical)	
	Friday	Inorganic Preparations:	
	Friday	i) bis (acetylacetonato) Cu(II)	
		ii) Potassium trioxalato Ferrate K ₃ [Fe(C ₂ O ₄) ₃].3H ₂ O	
25-Aug	Friday	To determine the molecular weight of polyvinyl alcohol from viscosity measurement	
		Determination of energy of activation of acid-catalyzed hydrolysis of methyl acetate	
	Friday	To determine the Solubility product and solubility of AgCl	
	Friday	Estimation of Mg content in talcum powder by complexometric titration by using a standard solution of EDTA	
25-Sep	Friday	Conductometry: Estimation of acid content by conductometric titration	
	Friday	4. Gravimetry - Estimation of sulphate as BaSO ₄ .	
		Tot. Lec.	30

Anjuman Islam Janjira Degree College of Science
Lokmanya Tilak Road, Murud-Janjira dist. Raigarh. Maharashtra 402401
Academic Calendar

Teaching Plan for Semester-IV Year: 2025-2026				
Course	T.Y.B.Sc. (Chemistry)			
Course Code	USCH 501			
Title	Physical Chemistry			
Credits	2 Credits (60 Lectures)			
Name of the Faculty				
Month	Date	Topic	Lectures	Lecture per Month
	UNIT I: Molecular Spectroscopy			
June	16-06-25	Introducation to molecular spectroscopy	15	15
	17-06-25	Definitions and vibrational spectroscopy		
	18-06-25	Vibrations of diatomic molecule		
	20-06-25	vibrations energy level		
	20-06-25	Hooke's law and force constant		
	21-06-25	Applications of vibrational spectroscopy		
	21-06-25	Definitions and Rotational spectroscopy		
	23-06-25	Rotational spectroscopy of rigid rotor		
	24-06-25	Rotational energy levels		
	25-06-25	Permanent dipole moment and Rotational spectra		
	27-06-25	Raman spectroscopy: Introduction		
	27-06-25	Raman effect and qunatum theory		
	28-06-25	Raman spectra of H2O and CO2		
	28-06-25	Applications of Raman spectroscopy		
	30-06-25	Numericals on Raman shift		
	Unit II: Chemical Thermodynamics			
July	16-07-25	Introducation to colligative properties	15	15
	18-07-25	Vapour pressure lowering-Static and Dynamic Method		
	18-07-25	Solutions of solids in liquids		
	19-07-25	Elevation in boiling point- concept and thermodynamic derivat		
	19-07-25	Molar Mass Determination from Boiling Point Elevation		
	21-07-25	Depression in Freezing Point – Concept and Derivation		
	22-07-25	Molar Mass Determination from Freezing Point Depression		
	23-07-25	Osmotic Pressure – Basic Concepts		
	25-07-25	Measurement of Osmotic Pressure – Berkeley and Hartley’s M		
	25-07-25	Applications and Summary of Colligative Properties		
	26-07-25	Collision Theory of Reaction Rates – Introduction		
	26-07-25	Application of Collision Theory to Bimolecular Reactions		
	28-07-25	Collision Theory for Unimolecular Reactions		
	29-07-25	Classification of Reactions		
	30-07-25	Study of Fast Reactions		
	UNIT III: Nuclear Chemistry			
August	20-08-25	Introduction to Nuclear Chemistry	15	12
	22-08-25	Types of Radioactivity and Nuclear Radiations		
	22-08-25	Basic Terms in Nuclear Chemistry		
	23-08-25	Detection and Measurement of Radioactivity – GM Counter		
	23-08-25	Detection and Measurement – Scintillation Counter		
	25-08-25	Radioactive Equilibrium		
	26-08-25	Comparison of Chemical vs Nuclear Equilibrium		
	27-08-25	Applications of Radioisotopes as Tracers – Introduction		
	29-08-25	Tracer Applications – Carbon Dating		
	29-08-25	Nuclear Transmutation – Basics		
	30-08-25	Examples of Nuclear Transmutation		
	30-08-25	Q-value of Nuclear Reaction		
	01-09-25	Threshold Energy		
	02-09-25	Fission Process – Mechanism		
	03-09-25	Nuclear Reactors and Fusion		
	UNIT IV: Surface Chemistry			
	19-09-25	Introduction to Surface Chemistry		

September	20-09-25	Adsorption Phenomena		15
	20-09-25	Adsorption Isotherms		
	22-09-00	Adsorption of Gases and Solutes		
	23-09-25	Applications of Adsorption		
	24-09-25	Revision + Problem Solving		
	26-09-25	Introduction to Colloids	15	
	26-09-25	Preparation of Colloids		
	27-09-25	Properties of Colloids – Optical		
	27-09-25	Properties of Colloids – Kinetic		
	29-09-25	Properties of Colloids – Electrical		
	30-09-25	Stability and Coagulation		
	01-10-25	Emulsions and Gels		3
	03-10-25	Applications of Colloids		
	03-10-25	Revision + Numerical Problems		
		Tot. Lec.	60	

Anjuman Islam Janjira Degree College of Science

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

Academic Calendar

Practical Plan for Semester-V Year: 2025-2026

Course	T.Y.BSc. (Chemistry)		
Course Code	USCHP01		
Title	Physical Chemistry Practical		
Credits	2		

Name of the Faculty				
Month	Date	Topic	Batch	Lecture per Month
		Non-Instrumental Experiments		
	14-07-25	Determine the molecular weight of compound by Rast method		
	21-07-25	Interpret the order of reaction graphically and Calculate the rate constant		
	28-06-25	Investigate the absorption of acetic acid on activated charcoal & validity of freundlich isotherm		
		Instrumental Experiments		
	04-08-25	between ferrous ammonium sulphate and ceric ammonium sulphate potentiometrically		
	11-08-25	Determine the velocity constant of alkaline hydrolysis of ethyl acetate by conductometric method		
	25-08-25	Determine acidic and basic dissociation constants of amino acid and hence to isoelectric point		
	01-09-25	Revisions		
	08-09-25	Journal Cheking		
		Journal Certification		
		Tot. Lec.		

Anjuman Islam Janjira Degree College of Science

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

Academic Calendar

Teaching Plan for Semester-IV Year: 2024-2025

Course	T.Y.B.Sc. (Chemistry)	Paper: IV
Course Code	USCH504	
Title	Analytical Chemisrty	
Credits	2 Credits (60 lectures)	

Name of the Faculty			

Month	Date	Topic	Lectures	Lecture per Month
July	Unit I: Intro. to quality concepts, chemical calculation and sampling		15	15
	01-07-25	Introduction to Quality in Analytical Chemistry		
	02-07-25	Quality Control (QC) vs. Quality Assurance (QA)		
	04-07-25	Industry Perspective – Importance of Quality Concepts		
	04-07-25	Laboratory Quality Standards		
	05-07-25	Certified Reference Materials (CRMs) and Laboratory Reagents		
	05-07-25	Conversion of Conc. Units – Molarity, Normality, Molality		
	07-07-25	Percent Composition Calculations in Chemical Compounds		
	08-07-25	Numerical Problems – Unit Conversions and Practical Examples		
	09-07-25	Word Problems – Application-Based Calculations		
	11-07-25	Sampling of Solids – Bulk Ratio, Size-to-Weight Ratio		
	11-07-25	Size Reduction Methods and Equipment for Solid Sampling		
	12-07-25	Sampling of Compact Solids and Particulate Solids		
	12-07-25	Sampling of Liquids – Homogeneous vs. Heterogeneous		
	14-07-25	Sampling of Gases – Ambient and Stack Sampling		
	15-07-25	Collection, Preservation, and Dissolution of Samples		
Unit II: Classical method of analysis			15	15
August	01-08-25	Introduction to Neutralization Titrations		
	01-08-25	Calculation of pH for Weak Acid vs. Strong Base systems		
	02-08-25	Calculation of pH for Weak Acid vs. Strong Base systems		
	02-08-25	Introduction to Redox Titrations		
	04-08-25	Construction of Titration Curves		
	05-08-25	Theory of Redox Indicators		
	06-08-25	Criteria for selection of redox indicator		
	08-08-25	Introduction and Construction of Titration Curves		
	08-08-25	Use of EDTA as Titrant and Its Standardization		
	09-08-25	Formation Constants – Absolute and Conditional Formation		
	09-08-25	Selectivity of EDTA as a Titrant		
	11-08-25	Factors Enhancing Selectivity of EDTA with Examples		
	12-08-25	Factors Enhancing Selectivity of EDTA with Examples		
	13-08-25	Metalochromic Indicators – Theory, Examples, and Applications		
	19-08-25	Advantages and Limitations of EDTA Titrations		
Unit-III Optical Method			15	15
September	05-09-25	Introduction to Atomic Spectroscopy		
	05-09-25	Flame Photometry – Principle and Atomizers		
	06-09-25	Flame Photometry – Wavelength Selectors and Detectors		
	06-09-25	Atomic Absorption Spectroscopy (AAS) – Principle, Source, etc.		
	08-09-25	AAS – Flame and Electrothermal Atomisers		
	09-09-25	Qualitative & Quantitative Analysis – FES & AAS		
	10-09-25	Comparison between FES & AAS, Applications, Adv. & Limit.		
	12-09-25	Intro. and Principle of Fluorescence and Phosphorescence		
	12-09-25	Relationship of Fluorescence Intensity with Concentration		
	13-09-25	Instru. and Applications of Fluorimetry and Phosphorimetry		
	13-09-25	Comparison of Fluorimetry vs. Phosphorimetry		
	15-09-25	Introduction and Principle of Turbidimetry and Nephelometry		
	16-09-25	Factors Affecting Scattering of Radiation – Particle Size, Conc.		
	17-09-25	Wavelength and Refractive Index Effects		
	19-09-25	Instrumentation and Applications		
Unit IV – Methods of Separation– I			15	15
October	04-10-25	Introduction to Solvent Extraction		
	04-10-25	Factors Affecting Extraction		
	06-10-25	Graph of % Extraction vs pH		
	07-10-25	Craig's Countercurrent Extraction		
	08-10-25	Comparison between Solid Phase and Solvent Extraction		
	10-10-25	Introduction and Principle of Gas Chromatography		
	10-10-25	Theory of GC and Terminology		
	11-10-25	Instrumentation – Block Diagram and Components		

	11-10-25	Types of Columns – Packed vs capillary; uses and advantages		
	12-10-25	Stationary Phases in GSC and GLC		
	13-10-25	Detectors in GC – TCD, FID, ECD		
	14-10-25	Qualitative Analysis by GC		
	15-10-25	Quantitative Analysis by GC		
	17-10-25	Comparison between GSC and GLC		
		Tot. Lec.	60	

Anjuman Islam Janjira Degree College of Science				
Lokmanya Tilak Road, Murud-Janjira dist. Raigarh. Maharashtra 402401				
Academic Calendar				
Practical Plan for Semester-V Year: 2025-2026				
Course	T.Y.BSc. (Chemistry)			
Course Code	USCHP504			
Title	Analytical Chemistry Practical			
Credits	2			

Name of the Faculty

Month	Date	Topic	Batch	Lecture per Month
		Non-Instrumental Experiments		
	15-07-25	To determine the amount of persulphate in the given sample solution by back titration with standard Fe (II) ammonium		
	22-07-25	To determine the amount of Iron present in iron sample by redox titration using potassium dichromate with diphenyl amine as an indicator.		
	29-07-25	To estimate amount of Calcium from given sample by complex		
		Instrumental Experiments		
	05-08-25	To determine potassium content of a Fertilizer by Flame Photometry (Calibration curve Method)		
	12-08-25	To determine the amount of sulphate in given water sample turbidimetrically.		
	19-08-25	Estimation of Chromium in water sample spectrophotometrically by using Diphenyl Carbazide.		
	26-08-25	Revisions		
	02-09-25	Journal Cheking		
		Journal Certification		
		Tot. Lec.		

Anjuman Islam Janjira Degree College of Science				
Lokmanya Tilak Road, Murud-Janjira dist. Raigarh. Maharashtra 402401				
Academic Calendar				
Teaching Plan for Semester-V Year: 2025-2026				
Course	T.Y.B.Sc. (Chemistry)			Paper: III
Course Code	USCH503			
Title	Organic Chemistry			
Credits	2.5 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		
	18/06/2025	Syllabus DISCUSSION AND BASIC		
	19/06/2025	1.1.1 The basic terms & concepts: bond fission, reaction intermediates, electrophiles & nucleophiles, ligand, base,		
	19/06/2025	electrophilicity vs. acidity & nucleophilicity vs basicity.		

Jun-25	25/06/2025	1.1.2 Neighbouring group participation in nucleophilic substitution reactions	15	8		
	26/06/2025	participation of lone pair of electrons, kinetics and stereochemical outcome				
	26/06/2025	1.1.3 Acyl nucleophilic substitution (Tetrahedral mechanism):				
	27/06/2025	Acid catalyzed esterification of carboxylic acids (AAC2) and base promoted hydrolysis of esters (BAC2).				
	07-02-25	1.1.4 Pericyclic reactions, classification and nomenclature				
Jully 2025	07-03-25	1.1.4.1 Electro cyclic reactions (ring opening and ring closing), cycloaddition, sigma tropic Rearrangement, group transfer reactions, cheletropic reaction (definition and one example of each type)	15	16		
	07-03-25	1.1.4.2 Pyrolytic elimination: Cope, Chugaev, pyrolysis of acetates				
	07-04-25	1.2.1 Introduction: Difference between thermal and photochemical reactions.				
	07-09-25	Jablonski diagram, singlet and triplet states, allowed and forbidden transitions, fate of excited molecules, photosensitization				
	07-10-25	1.2.2 Photochemical reactions of olefins: photoisomerization, photochemical Rearrangement of 1,4- dienes (di- π methane)				
	07-10-25	1.2.3 Photochemistry of carbonyl compounds: Norrish I				
	07-11-25	Norrish II cleavages. Photo reduction (e.g. benzophenone to benzpinacol)				
	Unit II 2.1 Stereochemistry I					
	16/7/2025	2.1.1 Molecular chirality and elements of symmetry:				
	17/7/2025	Mirror plane symmetry, inversion center,				
	17/7/2025	rotation -reflection (alternating) axis.				
	18/7/2025	2.1.2 Chirality of compounds without a stereo genic center				
	23/7/2025	cummulenes and biphenyls				
Jul-25	24/7/2025	2.2.1 General introduction & scope, meaning & examples of insecticides, herbicides, fungicide, rodenticide, pesticides, plant growth regulators	15			
	24/7/2025	2.2.2 Advantages & disadvantages of agrochemicals				
	25/7/2025	2.2.3 Synthesis & application of IAA (Indole Acetic Acid) & Endosulphan				
	30/7/2025	2.2.4 Bio pesticides – Neem oil & Karanj oil				
	31/7/2025	2.3.1 Reactivity of pyridine-N-oxide, quinoline and iso-quinoline.				
	31/7/2025	2.3.2 Preparation of pyridine-N-oxide, quinoline (Skraup synthesis)				
Aug-25	08-01-25	iso-quinoline (BischlerNapieralski synthesis).	15	16		
	08-06-25	2.3.3 Reactions of pyridine-N-oxide: halogenation, nitration and reaction with NaNH2/liq.NH3, n-BuLi				
	08-07-25	2.3.4 Reactions of quinoline and isoquinoline;.				
	08-07-25	oxidation,reduction,nitration,halogenation and reaction with NaNH2/liq.NH3,n-BuLi				
	3.1 Spectroscopy II					
	08-08-25	2.3.1 Reactivity of pyridine-N-oxide, quinoline and iso-quinoline.				
	13/08/2025	2.3.2 Preparation of pyridine-N-oxide, quinoline (Skraup synthesis)				
14/08/2025	iso-quinoline (BischlerNapieralski synthesis).					
14/08/2025	2.3.3 Reactions of pyridine-N-oxide: halogenation, nitration and reaction with NaNH2/liq.NH3, n-BuLi					
20/08/2025	2.3.4 Reactions of quinoline and isoquinoline;.					

	21/08/2025	oxidation, reduction, nitration, halogenation and reaction with NaNH ₂ /liq.NH ₃ , n-BuLi		
	Unit III 3.1 IUPAC			
	21/08/2025	IUPAC Systematic nomenclature of the following classes of compounds (including compounds upto two substituents / functional groups)		
Sep-25	22/08/2025	3.1.1 Bicyclic compounds – spiro, fused and bridged (upto 11 carbon atoms) – saturated and unsaturated compounds	15	15
	09-03-25	3.1.2 Biphenyls		
	09-04-25	3.1.3 Cummulenes with upto 3 double bonds		
	09-04-25	3.1.4 Quinolines and isoquinolines		
	3.2 Synthesis of organic compounds			
	09-10-25	IUPAC Systematic nomenclature of the following classes of compounds (including compounds upto two substituents / functional groups)		
	09-11-25	3.1.1 Bicyclic compounds – spiro, fused and bridged (upto 11 carbon atoms) – saturated and unsaturated compounds		
	09-11-25	3.1.2 Biphenyls 3.1.3 Cummulenes with upto 3 double bonds		
	09-12-25	3.1.4 Quinolines and isoquinolines		
	17/09/2025	3.2.1 Introduction: Linear and convergent synthesis, criteria for an ideal synthesis,		
	18/09/2025	concept of chemo selectivity and regioselectivity with examples, calculation of yields.		
	18/09/2025	3.2.2 Multicomponent Synthesis: Mannich reaction Biginelli reaction. Synthesis with examples (no mechanism)		
	19/09/2025	3.2.3 Green chemistry and synthesis: Introduction: Twelve principles of green chemistry,		
	24/09/2025	concept of atom economy and E-factor, calculations and their significance, numerical examples		
		25/09/2025		
	25/09/2025	2.4 Planning of organic synthesis i) synthesis of nitroanilines. (o&p) ii) synthesis of halobenzoic acid. (o&p		
	4.1 Spectroscopy I			
Aug-25	26/09/2025	4.1.1 Introduction: Electromagnetic spectrum, units of wavelength and frequency		
	10-01-25	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		
	10-02-25	4.1.3 Mass spectrometry: Basic theory. Nature of mass spectrum. General rules of fragmentation.		
	10-02-25	Importance of molecular ion peak, isotopic peaks, base peak, nitrogen rule, rule of 13 for determination of empirical formula and molecular formula		
	10-03-25	Fragmentation of alkanes and aliphatic carbonyl compounds		
	4.2 Natural Products:			
	10-04-25	4.2.1. Terpenoids: Introduction, Isoprene rule, special isoprene rule and the gem-dialkyl rule		
	10-06-25	4.2.2 Citral: a) Structural determination of citral.		
	10-07-25	Synthesis of citral from methyl heptenone		
	10-07-25	c) Isomerism in citral. (Cis and trans form).		
	10-08-25	4.2.3. Alkaloids Introduction and occurrence.		
	10-09-25	Hofmann's exhaustive methylation and degradation in: simple open chain and N – substituted monocyclic amines		
	10-09-25	4.2.4 Nicotine: a) Structural determination of nicotine. (Pinner's work included)		
	10-09-25	b) Synthesis of nicotine from nicotinic acid c) Harmful effects of nicotine		

	10-10-25	4.2.5 Hormones: Introduction, structure of adrenaline (epinephrine), physiological action of adrenaline	
	10-10-25	Synthesis of adrenaline from a) Catechol b) p-hydroxybenzaldehyde (Ott's synthesis)	
Oct-25		Revision	
		Exam	
		Tot. Lec.	60
			60

Anjuman Islam Janjira Degree College of Science				
Lokmanya Tilak Road, Murud-Janjira dist. Raigarh. Maharashtra 402401				
Academic Calendar				
Practical Plan for Semester-V Year: 2025-2026				
Course	T.Y.B.Sc. Chemistry			Paper: V
Course Code	USBOP504			
Title	Organic Chemistry Practical			
Credits	3			
Name of the Faculty	Mr. Khan Shoyeab Mutalib			
Month	Date	Topic	Batch	Lecture per Month
Jul-25			A	12
	19/06/2025	Separation Binary Mixture Solid-Solid		
	26/06/2025	Separation Binary Mixture Solid-Solid		
	07-03-25	Separation Binary Mixture Solid-Solid		
Aug-25			A	16
	07-10-25	Separation Binary Mixture Solid-Solid		
	17/7/2025	Separation Binary Mixture Solid-Solid		
	24/7/2025	Separation Binary Mixture Solid-Solid		
	31/7/2025	Separation Binary Mixture Solid-Solid		
Sep-25			A	12
	08-07-25	Separation Binary Mixture Solid-Solid		
	14/08/2025	Separation Binary Mixture Solid-Solid		
	21/08/2025	Separation Binary Mixture Solid-Solid		
	09-04-25	Separation Binary Mixture Solid-Solid		
Oct-25				
	09-11-25	Separation Binary Mixture Solid-Solid		
	18/09/2025	Separation Binary Mixture Solid-Solid		
	25/09/2025	Separation Binary Mixture Solid-Solid		
	26/09/2025	Separation Binary Mixture Solid-Solid		
		Tot. Lec.	60	40

Anjuman Islam Janjira Degree College of Science				
Lokmanya Tilak Road, Murud-Janjira dist. Raigad. Maharashtra 402401				
Academic Calendar				
Teaching Plan for Semester-V Year: 2025-2026				
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: Molecular Symmetry and Chemical Bond			
	1.1 Molecular Symmetry			
	17/6/2025	1.1.1 Introduction and Importance of Symmetry in Chemistry.		

25-Jun	18/6/2025	1.1.2 Symmetry elements		8
	19/6/2025	Symmetry operations.		
	21/6/2025	1.1.3 Concept of a Point Group with illustrations using the following point groups:		
		(i) $C_{\infty}V$ (ii) $D_{\infty}h$		
	24/6/2025	(iii) C_{2v} (iv) C_{3v}		
	25/6/2025	(v) C_{2h} and (vi) D_{3h} .		
		1.2 Molecular Orbital Theory for heteronuclear diatomic molecules		
	26/6/2025	1.2.1 Comparison between homonuclear and heteronuclear diatomic molecules.		
	28/6/2025	1.2.2. Heteronuclear diatomic molecules like CO		
25-Jul	07-01-25	and NO		19
	07-02-25	Modified MO diagram for CO.		
	07-03-25	1.2.3 Application of Molecular orbital theory		
	07-05-25	to Polyatomic species H_3 ,		
	07-08-25	H_3^+ and		
	07-09-25	AB_2 molecules such as BeH_2		
	07-10-25	and H_2O (Correlation diagram expected).		
		Unit II - Solid State Chemistry		17
		2.1 Structures of Solids		
	07-12-25	2.1.1 Explanation of terms viz. crystal lattice, lattice point, unit cell and lattice constants.		
	15/7/2025	2.1.2 Closest packing of rigid spheres (hcp)		
	16/7/2025	2.1.2 Closest packing of rigid spheres (ccp),		
	17/7/2025	2.1.2 packing density in simple cubic,		
	19/7/2025	2.1.2 packing density in bcc		
	22/7/2025	2.1.2 packing density in fcc lattices.		
	23/7/2025	2.1.2 Relationship between density, radius of unit cell and lattice parameters		
	24/7/2025	2.1.2 (Numerical problems expected)		
	26/7/2025	2.1.3 Stoichiometric Point defects in solids		
	29/7/2025	(discussion on Frenkel and Schottky defects expected).		
	30/7/2025	(discussion on Frenkel and Schottky defects expected).		
25-Aug				
		2.2 Superconductivity		
	31/7/2025	2.2.1 Discovery of superconductivity.		
	08-02-25	2.2.2 Explanation of terms like superconductivity, transition temperature, Meissner effect.		
	08-05-25	2.2.3 Different types of super conductors viz. conventional superconductors, alkali metal fullerenes, high temperature super conductors.		
	08-06-25	2.2.4 Brief application of superconductors.		
		Unit III		
		Chemistry of Inner Transition Elements		
	08-07-25	3.1 Introduction: Position in periodic table		
	08-09-25	electronic configuration of lanthanides		
	08-12-25	electronic configuration of actinides.		
	13/8/2025	3.2 Chemistry of Lanthanides with reference to (i) lanthanide contraction and its consequences		
	14/8/2025	3.2 Chemistry of Lanthanides with reference to (i) lanthanide contraction and its consequences		
	16/8/2025	3.2 Chemistry of Lanthanides with reference to (i) lanthanide contraction and its consequences		

	19/8/2025	3.2 Chemistry of Lanthanides with reference to (ii) Oxidation states		14
	20/8/2025	3.2 Chemistry of Lanthanides with reference to (iii) Ability to form complexes		
	21/8/2025	3.2 Chemistry of Lanthanides with reference to (iv) Magnetic and spectral properties.		
	23/8/2025	3.3 Occurrence,		
	26/8/2025	3.3 extraction and separation of lanthanides by (i) Ion Exchange method		
	09-02-25	3.3 extraction and separation of lanthanides by (i) Ion Exchange method		
	09-03-25	3.3 extraction and separation of lanthanides by (ii) Solvent extraction method using TBP . (Principles and technique)		
	09-04-25	3.4 Applications of lanthanides		
	09-06-25	3.4 Applications of lanthanides		
		Unit IV SOME SELECTED TOPICS		
		4.1 Chemistry of Non-aqueous Solvents		
25-Sep	09-09-25	4.1.1 Properties, General classification and importance of non-aqueous solvents.		
	09-10-25	4.1.1 Properties, General classification and importance of non-aqueous solvents.		
	09-11-25	4.1.2 Characteristics and study of liquid ammonia non- aqueous solvents with respect to : (i) acid-base reactions and (ii) redox reactions.		
	13/9/2025	4.1.2 Characteristics and study of dinitrogen tetra oxide as non-aqueous solvents with respect to: (i) acid-base reactions and (ii) redox reactions.		
	16/9/2025	4.1.2 Characteristics and study of dinitrogen tetra oxide as non-aqueous solvents with respect to: (i) acid-base reactions and (ii) redox reactions.		
		4.2 Comparative Chemistry of Group 16		
	17/9/2025	4.2.1 Electronic configurations,		
	18/9/2025	trends in physical properties,		
	20/9/2025	Allotropy		
	23/9/2025	4.2.2 Physico- chemical principles involved in manufacture of sulphuric acid by Contact process.		
	24/9/2025	4.2.2 Physico- chemical principles involved in manufacture of sulphuric acid by Contact process.		
		4.3 Comparative Chemistry of Group 17		
	25/9/2025	4.3.1 Electronic configuration		
	27/9/2025	General characteristics, anomalous properties of fluorine		
	30/9/2025	comparative study of acidity of oxoacids of chlorine w.r.t acidity, oxidizing properties		
	10-01-25	4.3.2 Chemistry of interhalogens with reference to preparations, properties and structures (on the basis of VSEPR theory).		
	10-04-25	4.3.2 Chemistry of interhalogens with reference to preparations, properties and structures (on the basis of VSEPR theory).		
		Total Lectures = 60		

Lokmanya Tilak Road, Murud-Janjira dist. Raigad. Maharashtra 402401			
Academic Calendar			
PRACTICAL Plan for Semester-V Year: 2025-2026			
Course	T.Y.B.Sc. (Chemistry)		Paper: II
Course Code	USCHP02: Inorganic Practicals		
Title	PRACTICAL – Inorganic Chemistry		
Credits	2		
Name of the Faculty	Asst. Prof. Nitin Shivaji Pawar		
Month	Day	Topic	Batch
		I. Inorganic preparations	
25-Jul	Thursday	1. Preparation of Potassium diaquobis- (oxalato)cuprate (II)	
	Thursday	2. Preparation of Ferrous ethylene diammonium sulphate.	
	Thursday	3. Preparation of bisacetylacetonatocopper(II)	
25-Aug	Thursday	Determination of percentage purity of the given water soluble salt and	
	Thursday	Determination of percentage purity of the given water soluble salt and	
	Thursday	Determination of percentage purity of the given water soluble salt and	
	Thursday	Practical Practice Session	
	Thursday	Practical Practice Session	
25-Sep	Thursday	Journal Checking	
	Thursday	Journal Certification	

Anjuman Islam Janjira Degree College of Science				
Lokmanya Tilak Road, Murud-Janjira dist. Raigarh. Maharashtra 402401				
Academic Calendar				
Teaching Plan for Semester-V Year: 2025-2026				
Course	T.Y.B.Sc. Chemistry			Paper: V
Course Code	USACDD501			
Title	APPLIED COMPONENT (Drugs and Dyes)			
Credits	2			
Name of the Faculty	Mr. Tamseel Shakeel Shahjahan			
Month	Date	Topic	Lectures	Lecture per Month
	UNIT – I		15	8
Jun-25	16-06-2025	Definition of a drug, sources of drugs, requirements of an ideal drug, Classification of drugs Nomenclature of drugs: Generic name, Brand name, Systematic name		
	16-06-2025	Definition of the following medicinal terms: Pharmacon, Pharmacology, Pharmacophore, Prodrug, Half – life efficiency, LD50, ED50, GI50 Therapeutic Index. Brief idea of the following terms: Receptors, Agonists, Antagonists		
	17-06-2025	Drug-receptor interaction, Drug Potency, Bioavailability, Drug toxicity, Drug addiction, Spurious Drugs, Misbranded Drugs, Adulterated Drugs, Pharmacopoeia.		
	23-06-2025	Oral and Parenteral routes with advantages and disadvantages, Formulations & combination formulation,		
	23-06-2025	Different dosage forms		

	24-06-2025	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.		
	30-06-2025	Classification based on pharmacological actions: CNS Depressants & CNS Stimulants. Concept of sedation and hypnosis, anesthesia.		
	30-06-2025	Phenytoin (Hydantoin)		
Jul-25	01-07-2025	□ Trimethadione (Oxazolidinedione) (Synthesis from acetone)	13	
	07-07-2025	Alprazolam (Benzodiazepines)		
	07-07-2025	□ Levetiracetam (Pyrrolidines)		
	08-07-2025	□ Amphetamine (Phenethylamine) (Asymmetric synthesis from phenyl acetic acid) Chlorpromazine (Phenothiazines)		
	UNIT - II			15
	14-07-2025	Analgesics and Antipyretics □ Morphine (Phenanthrene alkaloids) Tramadol (Cyclohexanols) (Synthesis from salicylic acid) Aspirin (Salicylates)		
	14-07-2025	Paracetamol (p-Amino phenols)		
	15-07-2025	Anti-inflammatory Drugs Mechanism of inflammation and various inflammatory conditions		
	21-07-2025	Steroids: Prednisolone, Betamethasone		
	21-07-2025	Sodium Diclofenac, Aceclofenac (N-Aryl anthranilic acids) (Synthesis from 2, 6-dichlorodiphenyl amine)		
	22-07-2025	Diphenhydramine (Ethanol amines) Cetirizene (Piperazine) (Synthesis from 4-Chlorobenzhydryl chloride)		
	28-07-2025	Chlorpheniramine maleate (Ethyl amines) Pantoprazole (Benzimidazoles) Classification based on pharmacological action		
	28-07-2025	Isosorbide dinitrate (Nitrates) □ Valsartan (Amino acids) Atenolol (Aryloxy propanol amines) (Synthesis from 3-Hydroxy phenyl acetamide) □ Amlodipine (Pyridines)		
	29-07-2025	Frusemide /Furosemide (Sulfamoyl benzoic acid) Rosuvastatin (Pyrimidine) General idea and types of diabetes; Insulin therapy □ Glibenclamide (Sulphonyl ureas) Metformin (Biguanides)		
	04-08-2025	□ Dapagliflozin (Pyranose) Pioglitazone (Thiazolidinediones) (Synthesis from 2-(5- ethylpyridin-2-yl) ethanol) Idea of Parkinson's disease. □ Procyclidine hydrochloride (Pyrrolidines)		
	04-08-2025	Ethopropazine hydrochloride (Phenothiazines) Levodopa (Amino acids) (Synthesis from Vanillin) General idea of: Expectorants; Mucolytes;		
	05-08-2025	Bronchodilators; Decongestants; Antitussives Ambroxol (Cyclohexanol) (Synthesis from paracetamol) □ Salbutamol (Phenyl ethyl amines) Oxymetazoline (Imidazolines)		
	UNIT - III			
	11-08-2025	Definition of dyes, requirements of a good dye i.e., Colour, Chromophore and Auxochrome, Solubility, Linearity, Coplanarity, Fastness, Substantivity, Economic viability Definition of fastness and its properties and Mordants with examples Explanation of nomenclature or abbreviations of commercial dyes with at least one example.		

Aug-25	11-08-2025	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. Natural Dyes: Definition and limitations of natural dyes.	15	12
	12-08-2025	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. Synthetic dyes: Definition of synthetic dyes, primaries and intermediates.		
	18-08-2025	Important milestones in the development of synthetic dyes – Emphasis on Name of the Scientist, dyes and the year of the discovery is required. Natural fibres: cellulosic and proteinaceous fibres, Structural features of wool, silk and cotton and names of dyes applied on each of them.		
	18-08-2025	Semi-synthetic fibres: definition and examples Synthetic fibres: Nylon, Polyesters and Polyamides structures and names of dyes applied on each of them		
	19-08-2025	Blended fabrics: definition and examples Dyeing methods Basic Operations involved in dyeing process: i. Preparation of fibres ii. Preparation of dyebath iii. Application of dyes iv. Finishing		
	25-08-2025	Dyeing Method of Cotton Fibres: (i) Direct dyeing (ii) Vat dyeing (iii) Mordant dyeing (iv) Disperse dyeing		
	25-08-2025	Classification of dyes based on applicability on substrates (examples with structures)		
	26-08-2025	(a) Acid Dyes- Orange II, (b) Basic Dyes-Methyl violet, (c) Direct cotton Dyes- Benzo fast Yellow 5GL (d) Azoic Dyes – Diazo components; Fast yellow G, Fast orange R.		
Sep-25	01-09-2025	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,	15	15
	01-09-2025	Reactive Dyes- Procion Brilliant HB		
	02-09-2025	Optical Brighteners: General idea, important characteristics of optical brighteners and their classes		
	UNIT - IV			
	08-09-2025	Absorption of visible light, Colour of wavelength absorbed, Complementary colour. (i) Armstrong theory (quinonoid theory) and its limitations. (ii) Witt's Theory: Chromophore, Auxochrome,		
	08-09-2025	Bathochromic & Hypsochromic Shift, Hypochromic & Hyperchromic effect iii) Valence Bond theory, comparative study and relation of colour in the following classes of compounds/dyes:		
	09-09-2025	Benzene, Nitrobenzene, Nitroanilines, Nitrophenols, Benzoquinones, Triphenyl methane, Anthraquinones.		
	15-09-2025	(iv) Molecular Orbital Theory. With reference to Ethylene; 1, 3- butadiene & β -carotene.		
	15-09-2025	Introduction to primaries and intermediates Unit processes: definition and brief ideas of following unit processes: (a) Nitration (b) Sulphonation (c) Halogenation		
	16-09-2025	(d) Diazotization: (Direct & Reverse Method) (e) Ammonolysis.		
	22-09-2025	Benzene derivatives: Benzene sulphonic acid; 1,3- Benzene disulphonic acid;		

	22-09-2025	Resorcinol; sulphanic acid; o-, m-, p-chloronitrobenzenes; o-, m-, p-nitroanilines; o-, m-, p-phenylene diamines;		
	23-09-2025	Naphthol ASG Schaeffer acid; Tobias acid;		
	29-09-2025	Naphthionic acid; N.W. acid		
	29-09-2025	H-acid; Naphthol AS		
	30-09-2025	Anthraquinone; 1-Amino anthraquinone; Benzanthrone.		
			Tot. Lec.	60

Anjuman Islam Janjira Degree College of Science		
Lokmanya Tilak Road, Murud-Janjira dist. Raigarh. Maharashtra 402401		
Academic Calendar		
Teaching Plan for Semester-V Year: 2025-2026		
Course	T.Y.B.Sc. Chemistry	Paper: V
Course Code	USACDD501	
Title	APPLIED COMPONENT (Drugs and Dyes)	
Credits	2	

Name of the Faculty	Mr. Tamseel Shakeel Shahjahan			
Month	Date	Topic	Batch	Lecture per Month
Jun – 25 to Sep - 25	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.		
	Saturday	Journal Checking		
	Saturday	Journal Certification		
	Saturday	Journal Certification		
		Tot. Lec.		60

Anjuman Islam Janjira Degree College of Science		
Lokmanya Tilak Road, Murud-Janjira dist. Raigarh. Maharashtra 402401		
Academic Calendar		
Teaching Plan for Semester-II Year: 2024-2025		
Course	F.Y.B.Sc. (GS)	
Course Code	USCHSEC202	
Title	SEC : Basic Statistical Tool In Chemistry	
Credits	2 Credits (60 lectures)	

Name of the Faculty				
Month	Date	Topic	Lectures	Lecture per Month
		Create chemical equations & formulas in MS Word		
		Plot graph + calculate rate constant of hydrolysis of methyl acetate using Excel		
		Draw acyclic, cyclic, polycyclic, heterocyclic structures using ChemSketch/ChemDraw		
		Plot potentiometric titration using Origin software		
		Determine molecular weight, bond angles, bond lengths using ChemSketch/ChemDraw		

		Design 5 basic reaction mechanisms using ChemDraw (with arrows, charges)		
		Determine order of reaction graphically using integrated rate law in Excel/Origin		
		Draw curly arrow mechanism of an SN2 reaction in ChemDraw		
		Create 2D & 3D graphs from experimental data in Origin		
		Convert IUPAC names → structures (5 examples) in ChemSketch/ChemDraw		
		Tot. Lec.	60	

Anjuman Islam Janjira Degree College of Science

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

Academic Calendar

Teaching Plan for Semester-II Year: 2025-2026

Course	F.Y.B.Sc. (Chemistry)	
Course Code	M3-2	
Title	Basics in Physical, Inorganic and Organic Chemistry II	
Credits	2 Credits (30 lectures)	

Name of the Faculty **Asst. Prof. Nitin Shivaji Pawar**

Month	Date	Topic	Lecture per Month
Nov	17/11/2025	Module I Physical Chemistry 1.1 Liquid State - II: (2L) Surface tension: Introduction	4
	18/11/2026	methods of determination of surface tension by Drop number method (Numericals expected)	
	24/11/2025	1.2 Gaseous State (3L) Kinetic theory of gases, Maxwell-Boltzmann's distribution of velocities	
	25/11/2025	Ideal gas laws, Deviation from ideal gas laws, Ideal and real gases, Reasons for deviation from ideal gas laws,	
Dec	12-01-25	Compressibility factor, Boyle's temperature, van der Waals equation of state (Derivation). (Numericals expected)	8
	12-02-25	1.3 Electrochemistry (2L) Conductance, specific conductance, equivalent conductance, molar	
	12-08-25	Variation of molar conductance with concentration of strong and weak electrolyte. (Numericals expected)	
	12-09-25	1.4 Chemical Thermodynamics (3L) Thermodynamic Terms: System, surrounding, boundaries, types of system,	
	15/12/2025	First law of thermodynamics: Concept of heat (q), work (w), internal energy (U), enthalpy, heat capacity,	
	16/12/2025	relation between heat capacities, sign conventions, calculations of heat, work, internal energy and enthalpy (H) (Numerical problems expected)	
	22/12/2025	Module II Inorganic Chemistry 2.1 Concept of Qualitative Analysis: (5L)	
	23/12/2025	Role of Papers impregnated with Reagents in qualitative analysis (with reference to papers impregnated with starch iodide,	
Jan	01-05-26	Precipitation equilibria, Formation of precipitates like AgCl, AgBr, AgI and BaSO4	7
	01-06-26	effect of common ions, uncommon ions,	
	01-12-26	oxidation states, buffer action.	
	13/1/2026	2.2 Chemical Bond and Reactivity: (5 L) Types of chemical bond, shapes of molecules, Lewis dot structure,	
	19/1/2026	comparison between ionic and covalent bonds, polarizability (Fajan's Rule),	
	20/1/2026	shapes of molecules, Lewis dot structure,	
	27/1/2026	Sidgwick Powell Theory, basic VSEPR theory for ABn type molecules with and without lone pair of electrons,	
	02-02-26	applications and limitations of VSEPR theory.	

Feb	02-03-26	3.1 Fundamentals of Organic Reaction Mechanism: (5L) Basic terms and concepts: Homolytic and Heterolytic fission with curly arrows with suitable examples.	8
	02-09-26	Electrophiles and Nucleophiles. Types (primary, secondary, tertiary, allyl, benzyl), shape and their relative stability	
	02-10-26	Electrophiles and Nucleophiles. Types (primary, secondary, tertiary, allyl, benzyl), shape and their relative stability	
	16/2/2026	reactive intermediates: i. Carbocations ii. Carbanions and iii. Free radicals	
	17/2/2026	Introduction to types of organic reactions: Addition, Elimination and Substitution reaction. (With one example of each)	
	23/2/2026	3.2 Bonding and Structure of Organic Compounds: (5L) Hybridization: sp ³ , sp ² , sp hybridization of carbon and nitrogen; sp ³ and	
	24/2/2026	Hybridization: sp ³ , sp ² , sp hybridization of carbon and nitrogen; sp ³ and sp ²	
Mar	03-02-26	hybridizations of oxygen in Organic compounds (alcohol, ether, aldehyde, ketone,	4
	03-09-26	carboxylic acid, ester, cyanide, amine and amide)	
	03-10-26	Overlap of atomic orbitals: Overlaps of atomic orbitals to form sigma and pi bonds, shapes of organic molecules.	
	16/3/2026	Shapes of molecules: Influence of hybridization on bond properties (as applicable to ethane, ethene, ethyne).	
	17/3/2026	Revision	
	23/3/2026	Revision	
	24/3/2026	Revision	
	30/3/2026	Revision	
Total Lectures = 30			

Anjuman Islam Janjira Degree College of Science

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

Academic Calendar

PRACTICAL Plan for Semester-II Year: 2025-2026

Course	F.Y.B.Sc. (Chemistry)	
Course Code	M3CHP2	
Title	PRACTICAL - Chemistry Practical 2	
Credits	2	
Name of the Faculty	Asst. Prof. Nitin Shivaji Pawar	

Month	Day	Topic	Batch
Nov	Friday	To determine the amount of strong acid in the given solution by	A
	Friday	To determine the dissociation constant of weak acid (K _a) using	A
	Friday	To determine enthalpy of dissolution of salt (KNO ₃)	A
Dec	Friday	To standardize commercial sample of HCl using borax and to write	A
		Qualitative analysis of simple salts	
	Friday	Qualitative analysis of simple salts: (4 mixtures to be analyzed)	A
		Tot. Lectures	30

Anjuman Islam Janjira Degree College of Science

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

Academic Calendar

PRACTICAL Plan for Semester-II Year: 2025-2026

Course	F.Y.B.Sc. (Chemistry)		Paper: III
--------	-----------------------	--	------------

Course Code	VSCCH2			
Title	Commercial Analysis of Food Samples			
Credits	2			
Name of the Faculty	Mr. Tamseel Shakeel Shahjahan			
Month	Day	Topic	Batch	Lecture per Month
Nov -25 to Mar -2	Thursday	Measure the pH of the the given food sample (acidic/basic) using a pH meter.	A	60
	Thursday	Estimation of Vitamin C (Ascorbic Acid) in lemon squash or any vitamin C-containing artificial product sample by using a 2,4-Dichlorophenol indicator	A	
	Thursday	Qualitative analysis of macronutrients (two samples each): proteins (Biuret test) and carbohydrates (Benedict's test)	A	
	Thursday	Estimation of calcium in milk powder by complexometric titration	A	
	Thursday	Estimation of acetic acid in preservative (vinegar) potentiometry. (Demo)	A	
	Thursday	Detection of contaminants or adulterants in the following food samples (any one adulterant) i) Milk ii) Tea powder. iii) Turmeric powder iv) Chili powder	A	
	Thursday	Estimate moisture percentage in a food sample using the laboratory oven drying method. (Any two samples)	A	
	Thursday	Analyze milk-based products for the presence of adulterants using suitable chemical tests. Any four (urea, detergent, sugar, hydrogen peroxide.)	A	
	Thursday	Detection of adulteration of aniline dyes, papaya seeds, and brick powder in spice and condiment samples using standard identification techniques.	A	
	Thursday	Estimation of the reducing sugar content in the selected sample	A	
	Thursday	To estimate dietary fiber content in a food sample using the gravimetric method.	A	
	Thursday	Quantitative analysis in % of iron flakes in tea and coffee samples using a simple magnetic detection method. (Two samples each)	A	
	Thursday	Arrange an industrial visit with a report.	A	
	Thursday	Demonstrate the procedure for estimating hydroxymethylfurfural (HMF) content in honey samples.	A	
	Thursday	Practice Revision	A	
Apr-25	Thursday	Journal Cheking	A	
	Thursday			
	Thursday	Exam	A	
	Thursday			
		Tot. Lec.		60

Anjuman Islam Janjira Degree College of Science				
Lokmanya Tilak Road, Murud-Janjira dist. Raigarh. Maharashtra 402401				
Academic Calendar				
Teaching Plan for Semester-IV Year: 2025-2026				
Course	S.Y.B.Sc. Chemistry (NEP)			Paper: II
Course Code	S3MJ6			
Title	Progressive Inorganic and Organic Chemistry II			
Credits	2 Credits (30 lectures)			
Name of the Facul	Mr.Khan Shoyeab Motalib			
Month	Date	Topic	Lectures	Lecture per Month
		Unit I Inorganic Chemistry Comparative chemistry of transition metals		

November	10-11-25	Position of transition elements in periodic table, occurrence	4L	6
	15-11-25	oxidation state and transition elements		
	17-11-25	Magnetic properties of transition metal compounds. Origin of magnetism (Spin & Spin-Orbital)		
	22-11-25	Qualitative tests for transition metal ions (Cr, Mn, Fe, Co, Ni, and Cu)		
		Coordination chemistry		
	24-11-25	Introduction to coordination compounds,		
	29-11-25	basic terms and nomenclature, types of ligands		
December	01-12-25	Isomerism (stereoisomerism of coordination compounds no. 6)	7L	6
	08-12-25	Theories of coordination compounds (Werner's Theory)		
	13-12-25	Effective atomic number rule, Eighteen electron rule.		
	15-12-25	VBT for sp3d2 and d2sp3 hybridization , inner and outer orbital ,		
	20-12-25	Complexes, limitation of VBT Applications of coordination compounds		
	22-12-25	Study of oxides, volatile oxides and oxo acids		
	03-01-26	Oxides of nitrogen with respect to preparation and structure of NO, NO2, N2O and N2O4	4L	
	05-01-26	Volatile oxides and oxo acids of sulphuric acid and nitric acid		
	10-01-26	Uses and environment aspects of sulphuric acid		
	12-01-26	nitric acid with respect to acid rain and photochemical smog respectively.		
		Unit II Organic Chemistry Heterocyclic Compounds:	6L	
January	17-01-26	Introduction: (1 L) Introduction, classification, nomenclature of 5 and 6-membered heterocycles containing one heteroatom		
	19-01-26	Five membered heterocycles (Furan, Pyrrole and Thiophene)		
	24-01-26	Synthesis of furan, pyrrole and thiophene (Paal-Knorr synthesis, Knorr pyrrole synthesis, and Hantzsch synthesis), thiophene (Hantzsch synthesis), Reactivity of furan, pyrrole and thiophene towards electrophilic substitution on the basis of stability of intermediate.		
	31-01-26	Reactions of furan, pyrrole and thiophene: halogenation, nitration, sulphonation, Vilsmeier- Haack reaction, Friedel-Crafts reaction.		
	February	02-02-26		Furan: Diels-Alder reaction, ring opening reaction. Pyrrole: Acidity and basicity of pyrrole, comparison of basicity of pyrrole, pyrrolidine and pyridine.
		Six membered heterocycles (Pyridine)		
07-02-26		Hantzsch synthesis pyridine. Reactivity of pyridine towards electrophilic and nucleophilic substitution on the basis of electron distribution		
09-02-26		Pyridine: Basicity, sulphonation of pyridine (with and without catalyst), (Chichibabin reaction)	6L	
		Stereochemistry of mono and disubstituted cyclohexanes (6L)		
14-02-26		Conformational analysis (2 L) Monosubstituted cyclohexanes: methyl cyclohexane, tert-butylcyclohexane. Disubstituted cyclohexanes:		
16-02-26		1,2-dimethylcyclohexane, 1-tert-butyl-4 methylcyclohexane,		
21-02-26	Cis-trans isomerism in disubstituted cyclohexanes: (1 L) 1-chloro-2-methylcyclohexane, 1,3-dimethylcyclohexane			
23-02-26	Elements of Symmetry: (1L) Mirror plane symmetry, inversion center, rotation -reflection (alternating) axis			
28-02-26	Stereochemical Consequences: (2L) Cis-1,2-dimethylcyclohexane, cis-1,3-dimethylcyclohexane-optically inactive (presence of plane of symmetry),			

March	02-03-26	trans-1,2-dimethylcyclohexane-optically active. Note: Gauche-butane interaction to be discussed.		
	Name Reactions (Mechanism and Applications) – II			
	07-03-26	Darzens reaction		
	09-03-26	Wittig reaction 2.3.3 McMurry reaction		
	13-03-26	Wagner-Meerwein rearrangement		
		Tot. Lec.	30	32

Anjuman Islam Janjira Degree College of Science

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

Academic Calendar

PRACTICAL Plan for Semester-IV Year: 2025-26

Course	S.Y.B.Sc. (Chemistry)		Paper 1 :	Major Practical
Course Code	S3MJCHP4			
Title	Chemistry Practical 3			
Credits	2 Credit			
Name of the Faculty	Mr. Khan Shoyeab Mutalib			
Month	Day	Topic	Lecture	Lecture per Month
	Inorganic Chemistry Inorganic preparation			
November	11-11-25	Volumetric Analysis / Redox titration Estimation of amount of Iron present in the given ferric alum solution		
	18-11-25	Iodometric titration Estimation of Cu(II) by using sodium thiosulfate		
	24-01-25			
	25-11-25	Cyclohexanone oxime from cyclohexanone.		
December	02-12-25	Glucosazone from dextrose or fructose		
	16-12-25	Tribromoaniline from aniline.		
	23-12-25	β -Naphthylbenzoate from β -naphthol		
	30-12-25	m-Dinitrobenzene from nitrobenzene		
January	05-01-26	Acetanilide from aniline		
	12-01-26	p-Bromoacetanilide from acetanilide		
	19-01-26	Iodoform from acetone		
February	02-02-26	Phthalic anhydride from phthalic acid by sublimation		
		Tot. Lec.	30	30

Anjuman Islam Janjira Degree College of Science

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

Academic Calendar

Teaching Plan for Semester-IV Year: 2025-2026

Course	S.Y.B.Sc. (Chemistry)		Paper I:	Minor
Course Code	S3MN41			
Title	General Principles of Chemistry II			
Credits	2 Credit			
Name of the Faculty	Mr. Khan Shoyeab Mutalib			
Month	Day	Topic	Lecture	Lecture per Month
	Unit I Physical Chemistry Solid State		7L	
November	04-11-25	Laws of Crystallography		
	10-11-25	Types of Crystals		
	11-11-25	Characteristics of simple cubic, face-centered cubic and body-centered cubic systems,		
	17-11-25	interplanar distance in a cubic lattice (only expression for ratio of interplanar distances are expected)		

November	18-11-25	Use of X-rays in the study of crystal structure, Bragg's equation (derivation expected),		
	24-11-25	X-rays diffraction method of studying crystal lattice structure, structure of NaCl and KCl		
	25-11-25	Determination of Avogadro's number (Numericals expected)		
	Unit II Analytical Chemistry		8L	
December	01-12-25	Classical methods-Gravimetric analysis		
	02-12-25	Introduction and Principle of Gravimetric analysis Types of Gravimetric Methods (i) Volatilization gravimetry		
	08-12-25	Precipitation gravimetry, Steps involved in precipitation gravimetric analysis		
	09-12-25	Applications of Gravimetric Analysis: (i) Determination of sulfur from organic compounds; (ii) Estimation of Nickel in Cu-Ni alloy using dimethyl glyoxime		
		Basic Concepts in Instrumental Methods		
	15-12-25	Relation between the Analyte, Stimulus and measurement of change in the observable property.		
	16-12-25	Types of Analytical Instrumental Methods based on (i) Optical interactions (eg. Spectrometry: UV-Visible, Polarimetry)		
January	05-01-26	Electrochemical interactions (eg. Potentiometry, Conductometry,) (iii) Thermal interactions (eg, Thermogravimetry)		
	06-01-26	Criteria for rejection of doubtful result and Test of Significance		
	12-01-26	2.5 d rule and 4.0 d rule		
	13-01-26	Q test (iii) F-test (variance ratio test)		
		Unit III Inorganic Chemistry Comparative chemistry of transition	4L	
	19-01-26	Position of transition elements in periodic table		
	20-01-26	occurrence (ores and minerals)		
	27-01-26	oxidation state and transition elements		
February	02-02-26	Unusual oxidation states, colour, Ability of charge transfer		
		Coordination chemistry	2L	
	03-02-26	Introduction to coordination compounds,		
	09-02-26	basic terms and nomenclature, types of ligands.		
		10-02-26	2L	
		Introduction, acidity of cations and basicity of anions		
		Unit IV Organic Chemistry		
	10-02-26	Carboxylic Acids and their Derivatives Recapitulation:	2L	
	16-02-26	Nomenclature, Structure and physical properties, Acidity of carboxylic acids,		
	17-02-26	Effects of substituents on acid strength of aliphatic and aromatic carboxylic acids.		
		Preparation of carboxylic acids	1L	
	23-02-26	Oxidation of alcohols and alkyl benzene, Carbonation of Grignard, Hydrolysis of nitriles		
		Reactions of carboxylic acids:	2L	
	24-02-26	Salt formation, Decarboxylation, Reduction of carboxylic acids with LiAlH ₄ , diborane,		
March	02-03-26	Hell-Volhard-Zelinsky reaction (Mechanism not expected)		
	02-03-26	Nucleophilic Acyl Substitution	2L	
	09-03-25	Mechanism of nucleophilic acyl substitution and acid-catalyzed nucleophilic acyl substitution		
	09-03-25	Application of nucleophilic acyl substitution		
		Tot. Lec.	30	0

Academic Calendar

PRACTICAL Plan for Semester-IV Year: 2025-26

Course	S.Y.B.Sc. (Chemistry)	Paper 1 :	Minor Practical
Course Code	S3MN4P1		
Title	Practical in General Principles of Chemistry II		
Credits	2 Credit		
Name of the Faculty	Mr. Khan Shoyeab Mutalib		
Month	Day	Topic	Lecture per Month
Inorganic Chemistry 1. Inorganic Preparations			
November	07-11-25	Volumetric Analysis / Redox titration: To determine the percentage of calcium carbonate in precipitated chalk	10
	14/ii/2025	To determine volumetrically the strength of given Mohr's salt solution	
	21-11-25	Determine the amount of sodium carbonate and sodium hydroxide present together in the given solution.	
	28-11-25	Inorganic preparation sodium hexanitro cobaltate	
Organic Chemistry One Step Preparation and Purification			
December	05-12-25	Characterisation of Organic Compounds	8
	12-12-25	Characterisation of Organic Compounds	
	19-12-25	Characterisation of Organic Compounds	
	02-01-26	Characterisation of Organic Compounds	
January	09-01-26	Characterisation of Organic Compounds	6
	06-02-26	Characterisation of Organic Compounds	
February	13-02-26	Characterisation of Organic Compounds	6
	20-02-26	Revision	
			30
			30

Anjuman Islam Janjira Degree College of Science

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

Academic Calendar

Teaching Plan for Semester-IV Year: 2025-2026

Course	S.Y.B.Sc. (Chemistry)	Paper: I
Course Code	S3MJ5	
Title	Progressive Physical and Analytical Chemistry II	
Credits	2 Credits (45 lectures)	
Name of the Faculty	Asst. Prof. Nitin Shivaji Pawar	Lecture per Month
Month	Date	Topic
		Unit-I: Physical Chemistry
Nov	11-06-25	1.1.1 Introduction to reaction mechanism
	11-06-25	(concept of elementary steps, intermediates,
	13/11/2025	the overall reaction mechanism with an example of Thermal chain reactions: H ₂ and Br ₂ reaction.
	13/11/2025	1.1.2 Types of Complex Chemical reactions: Reversible or opposing,
		1.2 Electrochemistry-II (SL)
	20/11/2025	1.2.1 Electrochemical cells, Nernst equation and its importance in generating electricity through chemical reactions.
	27/11/2025	Types of electrochemical cells - Reversible and irreversible cells (Definition, example, characteristics)
	27/11/2025	1.2.2 Types of electrodes, Standard electrode potential,
Dec	12-04-25	Electrochemical series.
	12-04-25	1.2.3 Calculation of equilibrium constant and pH measurement using quinhydrone electrode, from EMF data. (Numericals to be solved wherever necessary)
		1.3 Phase Equilibria (SL)
		4

	12-11-25	1.3.1 Introduction to Phase equilibria, Phases, components and degrees of freedom of a system,	
	04-01-00	criteria of phase equilibrium. Gibbs Phase Rule.	
Jan	01-01-26	1.3.2 Phase diagrams of one-component systems (water and sulphur).	10
	1/1/206	1.3.3 Two-component systems involving eutectics – Condensed Phase rule,	
	01-08-26	Definition of eutectic Phase diagram of Lead-Silver system.	
		Unit II Analytical Chemistry 2.1 Methods of Separation (5L)	
	01-08-26	2.1.1. Types of separation methods Based on volatility – Distillation (definition, types and example)	
	15/1/2026	Based on electrical effects – Electrophoresis (definition, principle and applications)	
	15/1/2026	2.1.2. Chromatography – General idea of paper chromatography and thin layer chromatography (principle, technique and applications)	
	22/1/2026	2.1.3. Solvent Extraction – Introduction, Nernst Distribution Law, Distribution Ratio. Single-step and multistep extraction, Percentage	
	22/1/2026	Batch Extraction (Simple separating technique -diagram and process) (Numerical problems expected on 2.1.3)	
		2.2 Instrumental Methods-II (6L)	
	29/1/2026	2.2.1 Potentiometry – Principle, role of reference and indicator electrodes,	
	29/1/2026	Graphical Methods of detection of end points. (first derivative and second derivative methods)	
Feb	02-05-26	2.2.2 pH metry – Principle, construction and working of the glass electrode.	6
	02-05-26	2.2.3 Conductometry – Conductivity cell: Construction. Principle, application in neutralization titration with respect to strong acid–strong	
	12/2/206	2.2.3 Conductometry – application in neutralization titration with respect to strong acid–strong base, strong acid – weak base, strong base	
	02-12-26	2.3 Statistical Treatment of Analytical Data (4L)	
		2.3.1 Normal error curve or Gaussian distribution curve: Equation and important features of Gaussian distribution curve.	
	26/2/2026	Gaussian error curve and precision and accuracy.	
Mar	03-05-26	Obtaining equation of the best fitting line for line passing through origin and for line not passing through origin using: i) method of averages ii) method of least squares	4
	03-05-26	[Numerical problems expected on 2.3.2]	
	03-12-26	Revision	
	03-12-26	Revision	
		Tot. Lec.	30

Anjuman Islam Janjira Degree College of Science

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

Academic Calendar

PRACTICAL Plan for Semester-IV Year: 2025-2026

Course	S.Y.B.Sc.	Paper: (Major Chemistry)
Course Code	S3MJCHP4	
Title	Chemistry Practical 4	

Credits	2		
Name of the Faculty	Asst. Prof. Nitin Shivaji Pawar		
Month	Day	Topic	Batch
Nov	Monday	Determination of energy of activation of acid-catalyzed hydrolysis of methyl acetate.	A
	Monday	To determine the standard reduction potential of Ag Ag ⁺ using Nernst Equation	A
	Monday	To determine ΔG^0 and equilibrium constant for cell reaction in the	A
Dec	Monday	To determine the amount of strong acid present in a given solution by titration with a strong base using a pH meter	A
	Monday	Tools in analytical chemistry-II	A
	Monday	Paper Chromatography: - Separation of Cation Fe (III), Ni (II) and Cu	A
	Monday	Colorimeter: - Estimation of the concentration of Iron by using 1,10-Phenanthroline.	
Jan	Monday	Potentiometry: - Estimation of Fe (II) in the given solution by titration	A
	Monday	Estimation of copper by EDTA method using fast sulphone black F	
			A
		Tot. Lec.	30

Anjuman Islam Janjira Degree College of Science			
Lokmanya Tilak Road, Murud-Janjira dist. Raigad. Maharashtra 402401			
Academic Calendar			
PRACTICAL Plan for Semester-IV Year: 2025-2026			
Course	S.Y.B.Sc.		Paper: (Minor Chemistry)
Course Code	S3MN4P1		
Title	Practical in General Principles of Chemistry II		
Credits	2		
Name of the Faculty	Asst. Prof. Nitin Shivaji Pawar		
Month	Day	Topic	Lecture per Month
Nov	Friday	To understand the effect of concentration on reaction rate by investigating reaction between K ₂ S ₂ O ₈ and KI	
	Friday	To verify Ostwald's dilution law for weak acid conductometrically	
	Friday	To determine the amount of strong acid present in a given solution by	
	Friday	To determine the standard reduction potential of Ag Ag ⁺ using Nernst	
Dec	Friday	1. Tools in Analytical chemistry-II	
	Friday	2. Filtration, Floccs, Funnels, Separating Funnels, Distillation apparatus	
	Friday	Estimation of carbonate and non-carbonate hardness of water.	
	Friday	Colorimeter: Estimation of concentration of Iron by using 1,10-	
		Gravimetry - Estimation of nickel (II) as Ni-DMG.	
		Tot. Lec.	30

Anjuman Islam Janjira Degree College of Science				
Lokmanya Tilak Road, Murud-Janjira dist. Raigarh. Maharashtra 402401				
Academic Calendar				
PRACTICAL Plan for Semester-IV Year: 2025-2026				
Course	S.Y.B.Sc. Vocational Skill Course			Paper: III
Course Code	S3VSCCH41			
Title	Soil and Water Analysis			
Credits	2			
Name of the Faculty	Mr. Tamseel Shakeel Shahjahan			
Month	Day	Topic	Batch	Lecture per Month

	Experiments (Any 10)			
Nov - 25 to Mar - 26	Wednesday	To measure organic matter and moisture content of soil using redox titration.	A	60
	Wednesday	To find Alkalinity of different types of soil sample by acid-base titration.	A	
	Wednesday	Estimation of water holding capacity of soil by gravimetry	A	
	Wednesday	Measurement of electrical conductivity of the soil sample by using Electrical conductivity meter.	A	
	Wednesday	To estimate bulk density and particle density of the soil sample using specific gravity bottle	A	
	Wednesday	Preparation of the soil health card and demonstration of soil Analysis Kit	A	
	Wednesday	Determination of pH of Water using pH meter (electrometrically)	A	
	Wednesday	To Measure the conductivity of water sample using Conductometer	A	
	Wednesday	Estimation of the acidity of water sample titrimetrically	A	
	Wednesday	Analysis of carbonate and bicarbonate of water sample by titration with HCl	A	
	Wednesday	Estimation of chloride present in water sample by Argentometry	A	
	Wednesday	Evaluate of sulphate present in given water sample by turbidimetry	A	
	Wednesday	Determination of nitrate present in given water sample by spectrophotometry	A	
	Wednesday	To measure dissolved oxygen (DO) in water sample using Winkler's (azide modification) method	A	
	Wednesday	Practical Revision	A	
April	Wednesday	Journal Cheking		
	Wednesday			
		Exam		
		Tot. Lec.		60

Anjuman Islam Janjira Degree College of Science				
Lokmanya Tilak Road, Murud-Janjira dist. Raigarh. Maharashtra 402401				
Academic Calendar				
Teaching Plan for Semester-VI Year: 2025-2026				
Course	T.Y.B.Sc. (Chemistry)			
Course Code	USCH601			
Title	Physical Chemistry			
Credits	2 Credits (60 Lectures)			
Name of the Faculty	Dr. Sajid F. Shikh			
Month	Date	Topic	Lectures	Lecture per Month
		UNIT-I: Electrochemistry & Applied Electrochemistry		
		Revision of basic concepts, sign convention, types of electrodes	15	15
		Activity & Activity Coefficient: Lewis concept, ionic strength, mean ionic activity coefficient		
		Derivation of Debye-Hückel limiting law		
		Chemical cells & Concentration cells: Types, concentration cells with & without transference		
		Liquid junction potential, derivation & elimination methods		
		Electrolyte concentration cells with numerical examples		
		Numerical problems on concentration cells & activity coefficient		
		Polarization: Concentration polarization, causes & elimination		

		Decomposition Potential & Overvoltage		
		Factors affecting decomposition potential		
		Overvoltage – concept, hydrogen overvoltage, Tafel's equation		
		Experimental determination of overvoltage		
		Numerical problems on Tafel equation & overvoltage		
		Applications of overvoltage in electroplating & corrosion		
		Revision + University question discussion (Unit I)		
		UNIT-II: Polymers & Phase Equilibria		
		Recapitulation: Basic terms – monomer, polymer, functionality		
		Classification of polymers: Source, thermal response, structure		
		Physical properties of polymers – crystallinity, glass transition temperature		
		Method of determination of molar mass: Ultra-Centrifuge (derivation,)		
		Ostwald viscometer (derivation & numerical)		
		Numerical problems on molar mass determination		
		Light Emitting Polymers: Introduction, characteristics, mechanism		
		Method of preparation & applications of LEPs		
		Antioxidants & Stabilizers: Role, types – UV stabilizers, colorants, antistatic agents		
		Phase Equilibria – Introduction, Gibbs phase rule, terms: component, degree of freedom		
		Condensed phase rule, reduced phase rule		
		Three component system – Introduction, triangular phase diagram		
		Type I – One pair of partially miscible liquids		
		Type II – Two pairs of partially miscible liquids, Type III – Three pairs		
		Revision + Previous year questions (Unit II)		
		UNIT-III: Quantum Chemistry & Renewable Energy		
		Classical mechanics: Limitations, black body radiation, photoelectric effect		
		Compton effect, de-Broglie hypothesis		
		Quantum mechanics: Planck's theory, wave-particle duality		
		Heisenberg's uncertainty principle (numerical)		
		Progressive & standing waves, Schrödinger's time-independent wave equation		
		Boundary conditions, interpretation & properties of wave function		
		Operators: Definition, addition, subtraction, multiplication, commutative & non-commutative		
		Linear operator, Hamiltonian operator, eigen function & eigen value		
		Renewable energy resources: Need & importance		
		Solar energy: Solar cells, photovoltaic effect		
		Differences between conductors, semiconductors, insulators & its band gap		
		Silicon solar cell – construction & working		
		Hydrogen as fuel of future: Advantages of hydrogen as universal energy medium		
		Production of hydrogen by direct electrolysis of water		
		Revision + Numerical practice (Unit III)		
		UNIT-IV: NMR & ESR Spectroscopy		
		NMR – Principle: Nuclear spin, magnetic moment, nuclear 'g' factor		
		Energy levels in magnetic field, Larmor precession		

		Relaxation processes: Spin-lattice & spin-spin relaxation		15
		Instrumentation: NMR spectrometer block diagram		
		Chemical shift – concept, shielding & deshielding, factors affecting		
		TMS as reference, δ and τ scale (numerical)		
		Spin-spin coupling, coupling constant 'J'	15	
		Applications of NMR with examples		
		ESR – Principle: Fundamental equation, g-value (dimensionless constant)		
		g-electron factor, hyperfine splitting		3
		Kramer's degeneracy, zero-field splitting		
		Instrumentation: ESR spectrometer block diagram		
		ESR spectrum of hydrogen atom		
		ESR spectrum of deuterium atom		
		Comparison between NMR & ESR + Revision (Unit IV)		
		Tot. Lec.	60	

Anjuman Islam Janjira Degree College of Science

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

Academic Calendar

Practical Plan for Semester-VI Year: 2025-2026

Course	T.Y.BSc. (Chemistry)		
Course Code	USCH P02		
Title	Physical Chemistry Practical		
Credits	2		
Name of the Faculty	Dr. Sajid F. Shikh		

Month	Date	Topic	Batch	Lecture per Month
		Non-Instrumental Experiments		
		To determine the molecular weight of high polymer by viscosity measurement.		
		To study phase diagram of three component system by weight method.		
		Instrumental Experiments		
		To determine the amount of iodide, bromide and chloride in the mixture by potentiometric titration with silver nitrate.		
		To determine the Solubility product and solubility of AgCl potentiometrically using chemical cell.		
		To titrate a mixture of weak acid and strong acid against strong base and estimate the amount of each acid in the		
		To estimate the amount of Fe (III) in the complex formation with salicylic acid by Static method.		
		Revisions		
		Journal Cheking		
		Journal Certification		
		Tot. Lec.		

Anjuman Islam Janjira Degree College of Science

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

Academic Calendar

Teaching Plan for Semester-VI Year: 2024-2025

Course	T.Y.B.Sc. (Chemistry)	Paper: IV
Course Code	USCH604	
Title	Analytical Chemisrty	
Credits	2 Credits (60 lectures)	

Name of the Faculty		Dr. Sajid F. Shikh		
Month	Date	Topic	Lectures	Lecture per Month
	UNIT-I		15	15
		Potentiometry vs Voltammetry		
		Polarizable/Non-polarizable electrodes		
		Polarography – Basic principle		
		H-shaped polarographic cell, DME		
		Ilkovic equation, Residual current		
		Diffusion current, Half-wave potential		
		Oxygen interference & removal		
		Quantitative aspects – Pilot ion, Internal standard		
		Wave height-concentration plots		
		Standard addition method		
		Polarographic maxima & suppressors		
		Applications of Polarography		
		Amperometric titrations – Principle		
		Rotating Platinum Electrode		
		Amperometric titration curves + Revision		
	UNIT-II		15	15
		HPLC – Introduction & Principle		
		HPLC Instrumentation – Solvent reservoir		
		Degassing, Pumps (screw-driven, syringe)		
		Sample injection, HPLC columns		
		Detectors (UV-Vis, RI)		
		Qualitative & Quantitative applications		
		HPTLC – Principle & Stationary phase		
		HPTLC – Sample application & Mobile phase		
		HPTLC Detectors – Scanning densitometer		
		Single beam & Double beam densitometer		
		Fluorometric detector		
		Advantages & Applications of HPTLC		
		Comparison TLC vs HPTLC		
		Ion Exchange Chromatography – Principle		
		Types, Selectivity, Capacity + Revision		
	Unit-III		15	15
		Food Chemistry – Need & Preservation methods		
		Chemical preservatives (sulphur dioxide, boric acid etc.)		
		Physical methods (Pasteurization, Irradiation)		
		Boric acid by titrimetry		
		Milk – Composition, Types, Adulterants		
		Lactose by Lane-Eynon method		
		Honey – Reducing sugars by Wilstatter method		
		Tea – Tannin by Lowenthal method		
		Coffee – Caffeine & Chicory role		
		Cosmetics – Introduction & Sensory properties		
		Face powder – Ca & Mg estimation		
		Lipstick – Water soluble salts, Ash analysis		
		Deodorants – Zn oxide, Al antiperspirants		
		Deodorants – Properties & Estimation		
		Revision + Food adulteration cases		
	UNIT-IV			
		Thermal methods – TGA, DTA, DSC introduction		
		TGA – Principle, Instrumentation, TG curve		
		CaC ₂ O ₄ ·H ₂ O & CuSO ₄ ·5H ₂ O thermogram		
		Factors affecting TG, Applications		
		DTA – Principle, Instrumentation		
		DTA curves (CaC ₂ O ₄ ·H ₂ O, CuSO ₄ ·5H ₂ O)		

	Applications of DTA	15	15
	TGA vs DTA comparison		
	Thermometric titrations – Principle		
	HCl vs NaOH thermometric titration		
	Ca ²⁺ + Mg ²⁺ vs EDTA titration		
	Boric acid vs NaOH titration		
	Neutron Activation Analysis (NAA) – Principle		
	Advantages, Limitations & Applications of NAA		
	Full Revision + University questions		
	Tot. Lec.	60	

Anjuman Islam Janjira Degree College of Science

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

Academic Calendar

Practical Plan for Semester-VI Year: 2025-2026

Course	T.Y.BSc. (Chemistry)		
Course Code	USCHP604		
Title	Analytical Chemistry Practical		
Credits	2		
Name of the Faculty	Dr. Sajid F. Shikh		
Month	Date	Topic	Batch
		Non-Instrumental Experiments	
		Estimation of magnesium content in Talcum powder by complexometric titration, using standardized solution of	
		Estimation of reducing sugar in honey by Willstatter method.	
		Estimation of Sodium using cation exchanger.	
		Instrumental Experiments	
		Estimation of acetic acid in Vinegar sample by using Quinhydrone electrode potentiometrically.	
		Determination of phosphoric acid in cola sample pH metrically	
		Determination of the amount of fluoride in the given solution colorimetrically/spectrophotometrically.	
		Revisions	
		Journal Cheking	
		Journal Certification	
		Tot. Lec.	

Anjuman Islam Janjira Degree College of Science

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

Academic Calendar

Teaching Plan for Semester-VI Year: 2025-2026

Course	T.Y.B.Sc. (Chemistry)	Paper: III
Course Code	USCH603	
Title	Organic Chemistry	
Credits	2 Credits (60 Lectures)	
Name of the Faculty	Mr. Khan Shoyeab Mutalib	
Month	Date	Topic
		1.1 Stereochemistry II
	14-11-25	Idea of enantioselectivity (ee) and diastereoselectivity (de)
	19-11-25	Topicity: enantiotopic and
	20-11-25	diastereotopic atoms, groups and faces.

November	20-11-25	1.1.2 Stereochemistry of – i) Substitution reactions: S _N i (reaction of alcohol with thionyl chloride)	10	9	
	21-11-25	ii) Elimination reactions: E2–Base induced dehydrohalogenation of 1- bromo-1,2-diphenylpropane.			
	26-11-25	iii) Addition reactions to olefins			
	27-11-25	a) Bromination (electrophilic anti addition)			
	27-11-25	b) Syn hydroxylation with OsO ₄			
	28-11-25	Syn hydroxylation with KMnO ₄			
December	03-12-25	c) Epoxidation followed by hydrolysis	5	6	
	04-12-25	1.2 Amino acids & Proteins 5L			
	04-12-25	1.2.1 α-Amino acids: General Structure, configuration, and classification based on structure and nutrition.			
	05-12-25	Properties: pH dependency of ionic structure, isoelectric point and zwitter ion.			
	17-12-25	Methods of preparations: Strecker synthesis, Gabriel phthalamide synthesis			
	18-12-25	1.2.2 Polypeptides and Proteins: Nature of peptide bond. Nomenclature and representation of polypeptides (di-and tri-peptides) with examples,			
	18-12-25	Merrifield solid phase polypeptide synthesis. Proteins: General idea of primary, secondary, tertiary & quaternary structure			
		2.1 Molecular Rearrangements			
January	19-12-25	Mechanism of the following rearrangements with examples and stereochemistry wherever applicable.	5	18	
	01-01-25	2.1.1 Migration to the electron deficient carbon: Pinacol-pinacolone rearrangement.			
	01-01-26	2.1.2 Migration to the electron deficient nitrogen: Beckmann rearrangement.			10
	02-01-26	2.1.3 Migration involving a carbanion: Favorskii rearrangement			
	07-01-26	2.1.4 Name reactions: Michael addition, Wittig reaction.			
		2.2 Carbohydrates			
	08-01-26	2.2.1 Introduction: Classification, reducing and non-reducing sugars, DL notation.	10		
	08-01-26	2.2.2 Structures of monosaccharides: Fischer projection (4-6 carbon monosaccharides)			
	09-01-26	Haworth formula (furanose and pyranose forms of pentoses and hexoses).			
	09-01-26	Interconversion: open chain and Haworth forms of monosaccharides with 5 and 6 carbons.			
	15-01-26	Chair conformation with stereochemistry of D-glucose, Stability of chair form of D-glucose.			
	15-01-26	2.2.3 Stereoisomers of D-glucose: Enantiomer, diastereomers, anomers, epimers.			
	21-01-26	2.2.4 Mutarotation in D-glucose with mechanism.			
	22-01-26	2.2.5 Chain lengthening & shortening reactions: Modified Kiliani-Fischer synthesis (D-arabinose to D-glucose and D- 13 mannose), Wohl method (D-glucose to D-arabinose).			
	22-01-26	2.2.6 Reactions of D-glucose and D-fructose: (a) Osazone formation (b) reduction: H ₂ /Ni, NaBH ₄			
		(c) Oxidation: bromine water, HNO ₃ , HIO ₄ (d) acetylation (e) methylation (d) and (e) with cyclic pyranose forms.			
		3.1 Spectroscopy II			
	23-01-26	1.1 IR spectroscopy: Basic Theory, Nature of IR spectrum, selection rule, finger print region			
	28-01-26	3. 3.1.2 ¹ H-NMR spectroscopy: Basic theory of ¹ H-NMR, nature of ¹ H-NMR spectrum, chemical shift (δ unit), standard for ¹ H-NMR, solvents used.			
	29-01-26	Factors affecting chemical shift: (1) inductive effect (2) anisotropic effect (with reference to C=C, C≡C, C=O and benzene ring).			

	29-01-26	Spin- spin coupling and coupling constant. application of deuterium exchange technique. application of H1-NMR in structure determination.	10		
	30-01-26	3.1.3 Spectral characteristics of following classes of organic compounds, including benzene and monosubstituted benzenes, with respect to IR and 1H-NMR: (1) alkanes			
February	04-02-26	(2) alkenes (3) alkynes (4) haloalkanes (5) alcohols	13		
	05-02-26	(6) carbonyl compounds (7) ethers (8) amines (broad regions characteristic of different groups are expected).			
	05-02-26	Problems of structure elucidation of simple organic compounds using individual or combined use of UV-Vis, IR, Mass and 1H-NMR spectroscopic technique are expected.			
	06-02-26	Problems			
	3.2 Nucleic Acids				
	11-02-26	3.2 Nucleic Acids Controlled hydrolysis of nucleic acids.			5
	12-02-26	sugars and bases in nucleic acids.			
	12-02-26	Structures of nucleosides in DNA and RNA			
	18-02-26	Structures nucleotides in DNA and RNA			
	20-02-26	Structures of nucleic acids (DNA and RNA) including base pairing.			
	4.1 Polymers				
	25-02-26	4.1.1: Introduction: Terms monomer, polymer, homopolymer, copolymer, thermo plastics and thermosets.			
	26-02-26	4.1.2: Addition polymers: Polyethylene, polypropylene, teflon, polystyrene, PVC, Uses.			
	26-02-26	4.1.3: Condensation polymers: Polyesters, polyamides, uses of each one of these			
	27-02-26	polyurethanes, polycarbonates, phenol formaldehyde resins and uses of each one of these			
March	04-03-26	4.1.4: Stereochemistry of polymers: Tacticity, mechanism of stereochemical control of polymerization using Ziegler Natta catalysts	8	11	
	05-03-26	4.1.5: Natural and synthetic rubbers: Polymerisation of isoprene: 1,2 and 1,4 addition (cis and trans), Styrene butadiene copolymer.			
	05-03-26	4.1.6: Additives to polymers: Plasticisers, stabilizers and fillers.			
	06-03-26	Biodegradable polymers: Classification and uses. polylactic acid structure, properties and use for packaging and medical purposes.			
	4.2 Catalysts and Reagents 7L				
	06-03-26	Study of the following catalysts and reagents with respect to functional group transformations and selectivity (no mechanism) 4.2.1: Catalysts: Catalysts for hydrogenation: a. Raney Nickel	8		
	11-03-26	b. Pt and PtO2 (C=C, CN, NO2, aromatic ring)			
	12-03-26	c. Pd/C: C=C, COCl→CHO (Rosenmund)			
	12-03-26	d. Lindlar catalyst: alkynes			
	13-03-26	4.2.2: Reagents: a. LiAlH4 (reduction of CO, COOR, CN, NO2)			
	13-03-26	b. NaBH4 (reduction of CO) c. SeO2 (Oxidation of CH2 alpha to CO)			
	14-03-26	d. mCPBA (epoxidation of C=C) e. NBS (allylic and benzylic bromination)			
		Exam Preparation and Revisions			
		Tot. Lec.	60	60	

Anjuman Islam Janjira Degree College of Science				
Lokmanya Tilak Road, Murud-Janjira dist. Raigarh. Maharashtra 402401				
Academic Calendar				
Practical Plan for Semester-VI Year: 2025-2026				
Course	T.Y.B.Sc. Chemistry			Paper: III
Course Code	USBOP604			
Title	Organic Chemistry Practical			
Credits	2			
Name of the Faculty	Mr. Khan Shoyeab Mutalib			
Month	Date	Topic	Batch	Lecture per Month
			A	
November	20-11-25	Separation Binary Mixture Solid-Liquid		12
	28-11-25	Separation Binary Mixture Liquid-Liquid		
	04-12-25	Separation Binary Mixture Solid-Liquid		
December	05-12-25	Separation Binary Mixture Solid-Liquid	A	16
	12-12-25	Separation Binary Mixture Liquid-Liquid		
	19-12-25	Separation Binary Mixture Solid-Liquid		
	01-01-26	Separation Binary Mixture Liquid-Liquid		
January	08-01-26	Separation Binary Mixture Solid-Liquid		16
	15-01-26	Separation Binary Mixture Liquid-Liquid		
	22-01-26	Separation Binary Mixture Solid-Liquid	A	
	29-01-26	Separation Binary Mixture Liquid-Liquid		
			A	
February	05-02-26	Separation Binary Mixture Liquid-Liquid		16
	12-02-26	Separation Binary Mixture Solid-Liquid		
	26-02-26	Separation Binary Mixture Liquid-Liquid		
	04-03-26	Separation Binary Mixture Liquid-Liquid		
		Tot. Lec.	60	60

Anjuman Islam Janjira Degree College of Science				
Lokmanya Tilak Road, Murud-Janjira dist. Raigad. Maharashtra 402401				
Academic Calendar				
Teaching Plan for Semester-VI Year: 2025-2026				
Course	T.Y. B.Sc (Chemistry)			Paper: II
Course Code	USCH602			
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: Unit I Tenets of Crystal Field Theory			
	15/11/2025	1.1 Limitations of Valence Bond Theory		
	18/11/2025	1.2 Fundamentals of Crystal Field Theory		
	19/11/2025	1.3 Crystal field Splitting of d orbitals in octahedral, square planar and tetrahedral complexes.		
	20/11/2025	1.3 Crystal field Splitting of d orbitals in octahedral, square planar and tetrahedral complexes.		

Nov	22/11/2025	1.3 Crystal field Splitting of d orbitals in octahedral, square planar and tetrahedral complexes.	9	
	25/11/2025	1.4 Distortions from the octahedral geometry: (i) effect of ligand field (ii) Jahn-Teller distortions.		
	26/11/2025	1.4 Distortions from the octahedral geometry: (i) effect of ligand field (ii) Jahn-Teller distortions.		
	27/11/2025	1.5 Crystal field splitting parameter $10Dq(\Delta)$, factors affecting $10Dq$, spectrochemical series.		
	29/11/2025	1.6 Crystal field stabilization energy(CFSE), calculation of CFSE for octahedral complexes with d0 to d10 metal ion configurations.		
Dec	12-02-25	1.6 Crystal field stabilization energy(CFSE), calculation of CFSE for octahedral complexes with d0 to d10 metal ion configurations.	13	
	12-03-25	1.7 Consequences of crystal field splitting on various properties such as ionic radii of the first transition series.		
	12-04-25	1.7 Consequences of crystal field splitting on various properties such as ionic radii, hydration energy of formation of metal complexes of the first transition series.		
	12-06-25	1.8 Limitations of CFT: Evidences for covalence in metal complexes with respect to (i) intensities of d-d transitions		
	12-09-25	1.8 Limitations of CFT: Evidences for covalence in metal complexes with respect to (ii) ESR spectrum of $[\text{IrCl}_6]^{2-}$		
	12-10-25	1.8 Limitations of CFT: Evidences for covalence in metal complexes with respect to (iii) Nephelauxetic effect.		
	Unit II Molecular orbital Theory and properties of coordination			
		2.1 Molecular orbital Theory		
	12-11-25	2.1.1 Identification of the central metal orbitals and their symmetry suitable for formation of σ bonds with ligand orbitals.		
	13/12/2025	2.1.2 Construction of ligand group orbitals.		
	16/12/2025	2.1.3 Construction of molecular orbitals for ML_6 complex. Examples like $[\text{FeF}_6]^{4-}$, $[\text{Fe}(\text{CN})_6]^{4-}$, $[\text{CoF}_6]^{3-}$ $[\text{Co}(\text{NH}_3)_6]^{3+}$		
	17/12/2025	2.1.4 Effect of π -bonding on complexes .		
		2.2 Stability of Metal-Complexes		
	18/12/2025	2.2.1 Thermodynamic and kinetic perspectives of metal complexes with examples.		
	20/12/2025	2.2.2 Stability constants: stepwise and overall stability constants and their interrelationship.		
	23/12/2025	2.2.3 Factors affecting thermodynamic stability.		
		2.3 Reactivity of metal complexes		
	24/12/2025	2.3.1 Comparison between Inorganic and organic reactions. 2.3.2 Types of reactions in metal complexes		
		2.3.3 Study of Inert and labile complexes with respect to $[\text{Ti}(\text{H}_2\text{O})_6]^{3+}$ and $[\text{Cr}(\text{H}_2\text{O})_6]^{3+}$ complexes.		
		2.3.4 Ligand substitution reactions : Associative and Dissociative mechanisms.		
		2.2.5 Acid hydrolysis, base hydrolysis and anation reactions.		

Jan		2.4 Electronic Spectra	
	01-07-26	2.4.1 Origin of electronic spectra	
	01-08-26	2.4.2 Types of electronic transitions in coordination compounds: intra- ligand, Charge transfer and intra-metal transitions. 2.4.3 Selection rules for electronic transitions.	
	01-10-26	2.4.4 Electronic configuration and electronic micro states, Terms and Term symbols for transition metal ions, rules for determination of ground state term.	
	13/1/2026	2.4.5 Determination of Terms for p2 and d1 electronic configurations.	
		Unit III 3.0 Organometallic chemistry	
	14/1/2026	3.1 Organometallic Compounds of main group metal	
	15/1/2026	3.1.1 General characteristics of various types of organometallic compounds, viz. ionic, π -bonded and electron deficient compounds.	
	17/1/2026	3.1.2 General synthetic methods of organometallic compounds : (i) Oxidative-addition, (ii) Metal-metal exchange(trans-metallation),	
	20/1/2026	(iii) Carbanion-halide exchange,(iv) Metal-hydrogen exchange(metallation) and (v) Methylene- insertion	
	21/1/2026	3.1.3 Some chemical reactions of organometallic compounds: (i) Reactions with oxygen and halogens,	
	22/1/2026	(ii) Alkylation and arylation reactions (iii) Reactions with protic reagents	
		3.2 Metallocenes	
	24/1/2026	Introduction,	
	27/1/2026	Ferrocene: Synthesis,	
	28/1/2026	properties	
	29/1/2026	structure and bonding on the basis of VBT.	
	31/1/2026	structure and bonding on the basis of VBT.	
Feb		3.3 Role of transition metals in Catalysis	
	02-03-26	3.3.1 Comparison between homogeneous and heterogeneous catalysis	
	02-04-26	3.3.2 Basic steps involved in homogeneous catalysis	
	02-05-26	3.3.3 Mechanism of Wilkinson's catalyst in hydrogenation of alkenes.	
	02-04-26	3.3.3 Mechanism of Wilkinson's catalyst in hydrogenation of alkenes.	
		Unit IV	
		SOME SELECTED TOPICS	
		4.1 Metallurgy	
	02-07-26	4.1.1 Types of metallurgies,	
	02-10-26	4.1.2 General steps of metallurgy;	
	02-11-26	Concentration of ore, calcinations,	
	02-12-26	roasting, reduction and refining.	
	14/2/2026	4.1.3 Metallurgy of copper: occurrence, physicochemical principles,	
	17/2/2026	Extraction of copper from pyrites& refining by electrolysis.	

	18/2/2026	Extraction of copper from pyrites& refining by electrolysis.	
		4.2 Chemistry of Group 18	
	21/2/2026	4.2.1 Historical perspectives	
	24/2/2026	4.2.2 General characteristics and trends in physical and chemical properties	
	25/2/2026	4.2.3 Isolation of noble gases	
	26/2/2026	4.2.4 Compounds of Xenon fluorides (XeF ₂ ,XeF ₄ ,XeF ₆) with respect to preparation and structure (VSEPR)	
	28/2/2026	4.2.5 Applications of noble gases	
Mar	03-04-26	4.3 Introduction to Bioinorganic Chemistry.	
	03-05-26	4.3.1Essential and non essential elements in biological systems.	
	03-07-26	4.3.2 Biological importance of metal ions such as Na ⁺ ,K ⁺ ,Fe ⁺² /Fe ⁺³ and Cu ⁺² (Role of Na ⁺ and K ⁺ w.r.t ion pump)	
	03-10-26	4.3.2 Biological importance of metal ions such as Na ⁺ ,K ⁺ ,Fe ⁺² /Fe ⁺³ and Cu ⁺² (Role of Na ⁺ and K ⁺ w.r.t ion pump)	
		Total Lectures = 60	

Anjuman Islam Janjira Degree College of Science			
Lokmanya Tilak Road, Murud-Janjira dist. Raigad. Maharashtra 402401			
Academic Calendar			
PRACTICAL Plan for Semester-VI Year: 2025-2026			
Course	T.Y.B.Sc. (Chemistry)		Paper: II
Course Code	USCHP02: Inorganic Practicals		
Title	PRACTICAL – Inorganic Chemistry		
Credits	2		
Name of the Faculty	Asst. Prof. Nitin Shivaji Pawar		
Month	Day	Topic	Batch
25-Jul	Thursday	Preparation of Tris(acetylacetonato) iron(III)	
	Thursday	Green synthesis of bis(dimethylglyoximato) nickel(II) complex using	
	Thursday	Preparation of potassium trioxalato aluminate (III)	
25-Aug	Thursday	II. Determination of percentage purity of the given water soluble salt	
	Thursday	II. Determination of percentage purity of the given water soluble salt	
	Thursday	II. Determination of percentage purity of the given water soluble salt	
25-Sep	Thursday	Journal Checking	
	Thursday	Journal Certification	

Anjuman Islam Janjira Degree College of Science				
Lokmanya Tilak Road, Murud-Janjira dist. Raigarh. Maharashtra 402401				
Academic Calendar				
Teaching Plan for Semester-VI Year: 2025-2026				
Course	T.Y.B.Sc. Chemistry			Paper: V
Course Code	USACDD601			
Title	APPLIED COMPONENT (Drugs and Dyes)			
Credits	2			
Name of the Faculty	Mr. Tamseel Shakeel Shahjahan			

Month	Date	Topic	Lectures	Lecture per Month
		UNIT – I		
Nov-25	18-11-2025	Discovery of a Lead compound: Screening, drug metabolism studies	15	8
	18-11-2025	clinical observation, Lipinski's rule of 5		
	19-11-2025	Medicinal properties of compounds from Natural Sources: Anti-infective and anticancer properties of Turmeric (Curcumin)		
	23-11-2025	Development of drug: The Pharmacophore identification, modification of structure or functional group, Structure activity relationship (Sulphonamides).		
	25-11-2025	Structure modification to increase potency: Homologation, Chain branching and Extension of the structure.		
	25-11-2025	Computer assisted drug design.		
	26-11-2025	Introduction, Absorption		
	30-11-2025	Distribution, Bio- transformation, Excretion		
Dec-25	02-12-2025	Different types of chemical transformation of drugs with specific examples		15
	02-12-2025	Antibiotics and antivirals: Definition, ☐ Amoxicillin (β -lactam antibiotics) ☐ Cefpodoxime (Cephalosporins)		
	03-12-2025	☐ Doxycycline (Tetracyclines) ☐ Levofloxacin (Quinolones) (Synthesis from 2, 3, 4 -Trifluoro -1- nitrobenzene) Aciclovir/Acyclovir (Purines)		
	07-12-2025	Antimalarials: Types of malaria; Symptoms; Pathological detection during window period (Life cycle of the parasites not to be discussed) ☐ Chloroquine (3-Amino quinolones)		
	09-12-2025	Artemether (Benzodioxepins) Following combination to be discussed: Artemether-Lumefantrine (no structure)		
	09-12-2025	Drugs effective in the treatment of Nematodes and Cestodes infestations. ☐ Diethyl carbamazine (Piperazines)		
	10-12-2025	Albendazole (Benzimidazoles) (Synthesis from 2-Nitroaniline) 2L ☐ Clotrimazole (Imidazole) ☐ Fluconazole (Triazole) (Synthesis from 1- Bromo – 2, 4- di-fluorobenzene)		
		UNIT - II		
	14-12-2025	Types of Amoebiasis ☐ Metronidazole, Ornidazole, Tinidazole (Imidazole) (Synthesis of Metronidazole from glyoxal By Debus- Radziszewski imidazole synthesis route)		
	16-12-2025	Antitubercular and Antileprotic Drugs Types of Tuberculosis; Symptoms and diagnosis of Tuberculosis. Types of Leprosy.		
	16-12-2025	General idea of Antibiotics used in their treatment. ☐ PAS (Amino salicylates) ☐ Isoniazide (Hydrazides) ☐ Pyrazinamide (Pyrazines) ☐ (+) Ethambutol (Aliphatic diamines) (Synthesis from 1- Nitropropane)		
	17-12-2025	☐ Dapsone (Sulphonamides) (Synthesis from 4-Chloronitrobenzene) ☐ Clofazimine (Phenazines) ☐ Bedaquiline (Quinoline) Following combination therapy to be discussed: (i) Rifampin + Ethambutol + Pyrazinamide Rifampin + Isoniazide + Pyrazinamide		
	21-12-2025	Anti-Neoplastic Drugs Idea of malignancy; Causes of cancer Brief idea of Immuno Stimulants & Immuno depressants		
	23-12-2025	Lomoustine (Nitrosoureas) ☐ Anastrozole (Triazoles) (Synthesis from 3, 5-bis (bromo methyl) toluene)		
	23-12-2025	Cisplatin (Chloro Platinum) Vincristine, Vinblastine, Vindesine (Vinca alkaloids) (structure not expected)		
	24-12-2025	Anti-HIV Drugs Idea of HIV pathogenicity, Symptoms of AIDS AZT/Zidovudine, Lamivudine, DDI (Purines)		
	04-01-2026	Vitamin Therapy Therapeutic uses and Hypervitaminosis with respect to water		
	06-01-2026	Insoluble Vitamins (A, D, E, & K)		

Jan-25	06-01-2026	water-soluble Vitamins (B12 and C)	16
	07-01-2026	Introduction; Carbon nano particles (structures) and Carbon nano tubes: □ Functionalization for Pharmaceutical applications	
	11-01-2026	Targeted drug delivery □ In vaccine (Foot and mouth disease) □ Use in Bio-physical treatment.	
	13-01-2026	Gold nano particles in treatment of: Cancer; Parkinsonism; Alzheimer. Silver nano particles: Antimicrobial activity	
	13-01-2026	Drugs and Environmental Aspects □ Impact of Pharma-industry on environment, □ International regulation for human Experimentation with reference to: “The Nuremberg Code” and “The Helsinki Declaration”	
	UNIT - III		
	14-01-2026	i) Nitro dyes: Naphthol Yellow S, ii) Nitroso dyes: Gambine Y , iii) Azo dye: Mono azo dyes: Orange IV, Eriochrome Black T; Dis azo dyes: Congo red; Tris azo dyes: Direct Deep Black EW	
	18-01-2026	iv) Diphenyl methane Dyes: Auramine O v) Triphenyl methane dyes: diamino Derivatives: Acid Magenta;	
	20-01-2026	Tri amino Derivatives: Malachite Green; Phenolic Derivatives: Rosolic Acid vi) Heterocyclic dyes a) Thiazine dyes: Methylene Blue b) Azine dyes: Safranin T c) Xanthene Dyes: Eosin d) Oxazine Dyes: Capri Blue e) Acridine Dyes: Acriflavine	
	20-01-2026	vii) Quinone Dyes: a) Naphthaquinone: Naphthazarin b) Anthraquinone Dyes: Indanthrene Blue viii) Indigoid Dyes: Indigo ix) Phthalocyanine Dyes: Monastral Fast Blue B	
	21-01-2026	Synthesis of the following dyes i) Orange IV from sulphanilic acid ii) Eriochrome Black T from β- naphthol	
	25-01-2026	iii) Congo red, from Nitrobenzene	
	27-01-2026	iv) Direct deep black from benzidine	
	27-01-2026	v) Auramine O from benzaldehyde	
	28-01-2026	vi) Malachite Green,	
Feb-25	01-02-2026	vii) Safranin T from o-toluidine viii) Indanthrene Blue from anthraquinone	16
	03-02-2026	x) Indigo from aniline & mono chloro acetic acid	
	03-02-2026	Impact of the textile and leather dye Industry on the environment with special emphasis on water pollution	
	04-02-2026	Health Hazards: Toxicity of dyes w.r.t food colours	
	08-02-2026	Effluent Treatment Strategies: Brief introduction to effluent treatment plants (ETP) Primary Remediation processes:(Physical Processes) Sedimentation,Aeration, Sorption (activated charcoal, fly ashetc.)	
	10-02-2026	Secondary Remediation processes: Biological Remediation –Biosorption, bioremediation and biodegradation Chemical Remediation: Oxidation Processes (chlorination),Coagulation-flocculation Precipitation	
	UNIT - IV		
	10-02-2026	Dyes used in formulations (Tablets, capsules, syrups etc)	
	11-02-2026	Biological staining agents Methylene blue, Crystal violet and Safranin T DNA markers Bromophenol blue, Orange G, Cresol red	
	15-02-2026	Dyes as therapeutics Mercurochrome, Acriflavine, Crystal Violet, Prontosil	
	17-02-2026	Dyes used in food and cosmetics: a) Properties of dyes used in food and cosmetics	
	17-02-2026	b) Introduction to FDA and FSSAI Commonly used food colours and their limits	
	18-02-2026	Paper and leather dyes Structural features of paper and leather	
	22-02-2026	Dyes applicable to paper and leather	
	24-02-2026	Miscellaneous dyes i) Hair dyes	

	24-02-2026	ii) Laser dyes iii) Indicators iv) Security inks v) Coloured smokes and camouflage colours		
	25-02-2026	Introduction, Definition of pigments with examples		
Mar-25	01-03-2026	Properties of pigments		
	03-03-2026	Difference between dyes and pigments		
	03-03-2026	Definition of Lakes and Toners, Requirement of Pigments		
	03-03-2026	Types of Pigments, Extraction method of Pigments		
	04-03-2026	Growth and development of the Indian Dyestuff Industry		
	08-03-2026	Strengths, Weaknesses, Opportunities and Challenges of the Dyestuff industry in India Make in India - Future Prospects of the Dye Industry		
			Tot. Lec.	60

Anjuman Islam Janjira Degree College of Science

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

Academic Calendar

Teaching Plan for Semester-VI Year: 2025-2026

Course	T.Y.B.Sc. Chemistry	Paper: V
Course Code	USACDD501	
Title	APPLIED COMPONENT (Drugs and Dyes)	
Credits	2	

Name of the Faculty Mr. Tamseel Shakeel Shahjahan

Month	Date	Topic	Batch	Lecture per Month
Nov – 25 to Mar – 26	Saturday	O-Methylation of β -naphthol.	A	60
	Saturday	Preparation of Paracetamol from p-aminophenol.		
	Saturday	Preparation of Fluorescein		
	Saturday	TLC of a mixture of dyes (safranin-T, Indigo carmine, methylene blue)		
	Saturday	CASE STUDY		
	Saturday	Journal Checking		
	Saturday	Journal Certification		
	Saturday	Journal Certification		
		Tot. Lec.		60