1. Academic Planner with unitization of the entire syllabus (on hourly basis) for the academic year, 2024-25.

For I semester:

28/10/2024 TO 25/02/2025

Teacher Allottement for C-101: INORGANIC CHEMISTRY- I
Unit I, II, III and IV: Dr. B.P. Nethravathi (BPN)

Name of the Department	**PG Department of Chemistry**	Subject Title	**Inorganic Chemistry**
Semester	**I Semester**	Paper	**C-101: INORGANIC CHEMISTRY-I**
Week/Month & Date (Preferably)	Day	Portions Planned for 1 hour	Teacher
1st week November 2024 Unit III	1	**UNIT-III** **HSAB concept:** Basis of HSAB concept, acid-base strength,	Dr. B.P. Nethravathi (BPN)
	2	Hardness and softness, symbiosis, applications of HSAB concept;	
2nd Week November 2024	1	Acid- base concept in non-aqueous media reactions in BrF_3,	
	2	non-aqueous media reactions in N_2O_4	
	3	non-aqueous media reactions in Anhydrous H_2SO_4	
	4	non-aqueous media reactions in CH_3COOH.	
3rd week November 2024	1	Isopoly and heteropoly acids of W, preparations, properties, structure and applications.	
	2	**Stereoisomerism**- Chirality	
	3	optical activity- CD, ORD,	Dr. B.P. Nethravathi (BPN)
4th week November 2024	1	Cotton effect,	
	2	absolute configuration of metal complexes,	
	3	Magnetic circular dichroism	
	1	Revision class	

1st Week December 2024 **UNIT- II**	2	**UNIT- II** **Chemistry of main group elements-** Structure and bonding in boranes	
	3	Carboranes, metallocarboranes,	
2nd Week December 2024	1	Wades rules,	
	2	borazines,	
	3	phosphazenes,	
	4	S,N- compounds.	
3rd Week December 2024	1	**Silicates**- Classification, structures,	Dr. B.P. Nethravathi (BPN)
	2	isomorphous replacement,	
	3	pyroxenes,	
	4	layered and vitreous silicates,	
4th Week December 2024	1	zeolites	
	2	molecular sieves.	
5th Week December 2024	1	Revision class	
	2	**UNIT- I** **Chemical Bonding-** VSEPR model,	
	3	shapes of molecules-ClF_3, ICl_4^-, TeF_5	
	4	I^{3-}, $TeCl_6^{2-}$, XeF_6,	
1st week January 2025	1	$SbCl_6^{3-}$, IF_7, ReF_7, XeF_8^{2-}, TaF_8^{3-};	
	2	Bent rules and energetics of hybridization;	
	3	Electro negativity	
	4	Partial ionic character;	
2nd week January 2025	1	Bonds- Multicenter, SNNergic and Agostic bonding.	
	2	Lattice energy	
	3	Born-Lande equation,	
3rd week January 2025	1	Kapustinskii equation; polarizability and partial covalent character	

	2	Radius-ratio rules,	
	3	structures of simple solids	
	4	Zintl- isoelectronic relationship in solids.	
4th week week January 2025	1	Molecular orbital theory: LCAO	
	2	MO diagrams of heteronuclear diatomic (CO, NO).	
	3	MOT of HF, ICl	
	4	MOT of Triatomic molecules (CO_2 and NO_2^-)	
5th week January 2025 **UNIT-IV**	1	Revision Class	
	2	**UNIT-IV Part A** M – M bond	
	3	metal atom clusters, halide clusters,	
	4	Bonding in $[ReCl_8]^{2-}$	
1st week February 2025	1	Metal carbonyl clusters- LNCC's	Dr. B.P. Nethravathi (BPN)
	2	HNCC's.	
	3	Electron counting in carbonyl clusters,	
	4	Wades-Mingos and Lauher rules.	
2nd week February 2025	1	**Part B. Nuclear Chemistry**The atomic nucleus-elementary particles, quarks	
	2	Classification of nuclides based on Z and N values,	
	3	nuclear stability	
	4	nuclear potential	
3rd week February 2025	1		
	2	filling of orbitals,	
4th week February 2025	1	nuclear configuration,	
	2	Liquid drop model,	
	3	Radioactivity,	
	4	Radioactive decay kinetics	
1st week March	1	Parent-daughter decay-growth relationship	

2025	**2**	Secular and transient equilibria,	
	3	Theories of α decay	
	4	β-, β+ decay	
2nd week March 2025	1	γ- decay, internal conversion, Auger effect.	
	2	Revision class	
	3	Revision class	

TEACHERS ALLOTTEMENT for C-102: Organic Chemistry- I

28/10/2024 TO 25/02/2025

Unit I and II: Dr. Umesha K (UK)

Unit III: Dr. Nagaraju N (NN)

Name of the Department	**PG Chemistry**	**Subject Title**	**Organic Chemistry**
Semester	**I**	**Paper**	**C-102: Organic Chemistry- I**
Week/Month & Date (Preferably)	**Day**	**Portions Planned for 1 hour**	**Teacher**
1st week November 2024 Unit III	1	**Unit I:** Nature of Bonding in Organic Molecules.	UK
	2	**Unit III: Carbohydrates** Introduction. Kiliani-Fischer sNNthesis	NN
2nd Week November 2024	1	Delocalized chemical bonding.	UK
	2	Determination of configuration of the monosaccharides	NN
	3	Conjugation, cross conjugation, resonance.	UK
	4	Conformational analysis of monosaccharides.	NN
3rd week November 2024	1	Aromaticity. Huckel's rule of aromaticity.	UK
4th week	1	SNNthesis of amino sugars (β-D- Glucosamine, galactosamine, N-	NN

November 2024		acetylmuramic acid (NAMA), N-acetyl neuraminic acidNANA).	
	2	Aromatic systems with electron numbers other than six (including azulene, tropone, tropolone and annulenes).	UK
	3	C- and N-glycosides. SNNthesis of aldonic, uronic, aldaric acids and alditols.	NN
	4	Antiaromaticity. Aromaticity in benzenoids, meso-ionic compounds.	UK
1st week of Dec 2024	1	Structure elucidation of sucrose and maltose.	NN
	2	Homo-aromaticity. Alternant and nonalternant hydrocarbons.	UK
2nd week of Dec 2024	1	Structures of lactose, gentiobiose, and meliobiose.PhotosNNthesis of carbohydrates.	NN
	2	Energy levels in odd and even-alternant hydrocarbons, energy levels for the benzyl cation, benzyl free-radical and benzyl carbanion.	UK
	3	**Unit IV : Heterocyclic compounds** Nomenclature of heterocyclic compounds	NN
3rd week of Dec 2024	1	Hyperconjugation. Tautomerism.	UK
	2	Structure, reactivity, sNNthesis and reactions of pyrazole.	NN
	3	**Reaction Mechanisms-I** Generation, structure, stability and reactivity of carbocations.	UK
	4	imidazole, oxazole, isoxazole.	NN
4th week of Dec 2024	1	**Reaction Mechanisms-I C**arbanions, carbon free radicals, carbenes and	UK

		nitrenes.	
	2	thiazole, isothiazole, pyrimidine, purine and indole.	NN
	3	Classification of reactions and mechanisms.	UK
5th week of Dec 2024	1	Preparation and reactions of coumarins, acridines, cinnolenes and quinoxalines.	NN
	2	ThermodNNamic and kinetic requirements, kinetic and thermodNNamic control.	UK
	3	**Vitamins** Biological importance and sNNthesis of Vitamins A.	NN
1st week of Jan 2025	1	Hammond postulate, Curtin-Hammett principle.	UK
	2	Biological importance and sNNthesis of Vitamin B1 (thiamine).	NN
2nd week of Jan 2025	1	Potential energy diagrams, transition states and intermediates.	UK
	2	Biological importance and sNNthesis of Vitamin B6 (pyridoxine).	NN
	3	Methods of determining mechanisms: Based on the structure of products.	UK
	4	Biological importance and sNNthesis of folic acid.	NN
3rd week of Jan 2025	1	Methods of determining mechanisms: Determination of the presence of intermediates.	UK
	2	Biological importance and sNNthesis of pantothenic acid.	NN
4th week of Jan 2025	1	Methods of determining mechanisms: Isotopic labeling, isotope effects, from stereochemical evidence.	UK
	2	Biological importance and sNNthesis of riboflavin.	NN

5th week of Jan 2025	1	Acids and bases: Hard and soft acids and bases. Effect of structure on the strengths of acids and bases.	UK
	2	Biological importance and sNNthesis of Vitamin C.	NN
1st week of Feb 2025	1	**Unit II: Reaction Mechanisms-II** Effect of structure on reactivity:- Resonance and field effects; steric effects.	UK
	2	Biological importance and sNNthesis of Vitamin E (□-tocopherol).	NN
	3	The Hammett equation and linear free energy relationship, substituent and reaction constants.	UK
	4	Biological importance and sNNthesis of Vitamin H (biotin).	NN
2nd week of Feb 2025	1	Taft equation. Nucleophilic substitution reaction at a saturated carbon: SN1, SN2, and SET mechanisms.	UK
	2	Biological importance and sNNthesis of Vitamins K1 and K2.	NN
	3	Effect of substrate structure, attacking nucleophile, leaving group.	UK
	4	**Unit III: Stereochemistry-II** Nomenclature. conformations of fused rings and bridged ring systems.	NN
3rd week of Feb 2025	1	SNNthetic Molecular Receptors: Introduction	UK
	2	Optical isomerism: Elements of symmetry and chirality. D-L conventions. CIP rules, R-S and M-P conventions.	NN
	3	**Stereochemistry-I** Fischer, Newman. Sawhorse and flying wedge projections and their interconversions.	NN

4th week of Feb 2025	1	Heterocyclic compounds revision	NN
	2	Crown ether, cryptates	UK
	3	Prochirality: Enantiotopic and diastereotopic atoms, groups and faces.	NN
	4	Chirality in compounds with a stereogenic centre, and in allenes, alkylidene cycloalkanes and spiranes (with a stereogenic axis).	NN
5th week of Feb 2025	1	Revision class	NN
	2	Cyclophanes, Cyclodextrins, Claxiarenes	UK
	3	Question paper solving	NN
	4	Conformational analysis of cycloalkanes: cyclobutane, cyclopentane, cychexanes (monosubstituted e.g., methyl, *iso*-propyl, *tert*-butyl and di-substituted cyclohexanes e.g., dialkyl, dihalo, diols), and cycloheptane.	NN
1st week of Mar 2025	1	Cram's and Prelog's rules. Conformational analysis:	NN
	2	Ionophore, micelle, Catenanes, Rotaxanes	UK
2nd week of Mar 2025	1	Molecular clefts and tweezers	UK
	2	Revision class	UK
	3	Revision class	NN
3rd week of Mar 2025	1	Class Test	UK

Teacher Allottement for PHYSICAL CHEMISTRY- I

28/10/2024 TO 25/02/2025

Unit I, II, III and IV: Dr. Kavitha R. (KR)

Name of the Department	PG Chemistry Department	Subject Title	PHYSICAL CHEMISTRY
Semester	I	Paper	C-103: PHYSICAL CHEMISTRY- I
Week/Month & Date (Preferably)	Day	Portions Planned for 1 hour	Teacher
1st week of Nov 2024	1	**Quantum Mechanics-I** Introduction to quantum mechanics.	KR
	2	Schrödinger wave equation, Classical mechanics	KR
	3	Time-independent Schrödinger wave equations	KR
	4	Time dependent Schrödinger wave equations	KR
2nd week of Nov 2024	1	The relation between the Time-independent and time dependent Schrödinger wave equations and their solutions.	KR
	2	Eigen wave functions and Eigenvalues.	KR
	3	Physical Interpretation of wave function.	KR
	4	Concepts of Operators: Laplacian, Hamiltonian, Linear and Hermition operators.	KR
3rd week of Nov 2024	1	Angular Momentum operators and their properties.	KR
	2	Commutation of operators and problems	KR
	3	Orthogonality and orthonormality of wave functions.	KR
	4	Average (expectation) values.	KR
4th week of Nov 2024	1	Postulates of quantum mechanics.	KR

1st week of Dec 2024	1	Solutions of Schrödinger wave equation for a free particle.	KR
	2	Solutions of Schrödinger wave equation for a particle in a ring.	KR
	3	Solutions of Schrödinger wave equation for a particle in a three dimensional box.	KR
	4	Quantum mechanical degeneracy, tunneling (no derivation).	KR
2nd week of Dec 2024	1	Application of Schrödinger equation to harmonic oscillator.	KR
	2	Application of Schrödinger equation to rigid rotator.	KR
	3	Eigen functions and eigenvalues of angular momentum.	KR
	4	Ladder operator method for angular momentum.	KR
3rd week of Dec 2024	1	Schrödinger equation to hydrogen atom in spherical polar co-ordinates.	KR
	2	Solution of Φ, Θ, equation and statements of solution of R equation.	KR
	3	Total wave functions of hydrogen atom.	KR
	4	Quantum numbers and their characteristics.	KR
4th week of Dec 2024	1	List of wave functions for few initial states of hydrogen like atoms.	KR
	2	Diagrams of radial and angular wave functions.	KR
	3	Radial and angular distribution function and their significance.	KR
	4	Electron spin (Stern-Gerlach experiment)	KR
1st week of Jan 2025	1	spin orbital,anti-symmetry and Pauli-exclusion principle,	KR
	2	Slater determinants for lithium and helium atom	KR
	3	Coupling of Angular momenta. Russell-Saunders and JJ-coupling	KR
	4	Term symbols. Spin-orbital interaction and explanation of term multiplicities (Na-D doublet), Zeeman effect.	KR
2nd week of Jan 2025	1	Approximate methods: Need for approximate methods.	KR

3rd week of Jan 2025	1	Perturbation method.	KR
	2	Rayleigh Schrödinger perturbation theory for time-independent non-degenerate system.	KR
	3	Application to electron in a box under the influence of an electric field.	KR
	4	Chemical DNNamics: Macroscopic and microscopic kinetics,	KR
4th week of Jan 2025	1	Review of theories of reaction rate- Collision theory and Transition state theory.	KR
	2	Comparison of collision theory with transition state theory.	KR
	3	Arrhenius equation- characteristics, Significance of energy of activation,	KR
	4	Temperature coefficient and its evaluation.	KR
5th week of Jan 2025	1	Thermo dNNamical formulation of reaction rates (WNNe-jones and Eyring treatment)	KR
	2	Reaction between ions in solutions – Influence of ionic strength on reaction rates (primary and secondary salt effects).	KR
	3	Concept of Steady state kinetics, Chain reactions – chain length and chain inhibition	KR
	4	Comparison of photochemical and thermal reactions	KR
1st week of Feb 2025	1	Mechanisms of thermal and photochemical reactions between hydrogen-bromine and hydrogen-chlorine	KR
	2	Comparative study of thermal and photochemical hydrogen-halogen reactions.	KR
	3	Pyrolysis of acetaldehyde, Decomposition of ethane.	KR
	4	Kinetics of fast reactions- Introduction,	KR
2nd week of Feb 2025	1	Study of reactions by relaxation method (Temperature and pressure jump),	KR
	2	flow method (Plug flow method and Stopped flow method),	KR

	3	Flash photolysis and Shock tube method.	KR
	4	Kinetics of homogeneous catalysis-kinetics of auto catalytic reactions, kinetics of acid-base catalysed reactions.	KR
3rd week of Feb 2025	1	Comparison of enzyme catalysed and chemical catalysed reactions, Mechanism (Lock and Key theory)	KR
	2	Kinetics of enzyme catalyzed reactions-Henri-Michaelis-Menten mechanism, Significance of Michaelis-Menten constant, Lineweaver-Burk plot	KR
	3	Effects of enzyme concentration, pH, Temperature, Activators and Inhibitors on enzyme activity.	KR
	4	Theories of unimoleuclar reactions: Perrin theory,	KR
4th week of Feb 2025	1	Lindemann theory, and Hinshelwood theory.	KR
	2	Surface chemistry- Types of adsorption isotherms, Effect of temperature on adsorption	KR
	3	Mechanical adsorption, Estimation of surface area using BET equation	KR
	4	Gibbs adsorption isotherm and its significance	KR
5th week of Feb 2025	1	Surface tension and surface energy.	KR
	2	Pressure difference across curved surface (Laplace equation)	KR
	3	Vapour pressure of droplets (Kelvin equation)	KR
	4	Surface film on liquids (electro-kinetic phenomena)	KR
1st week of Mar 2025	1	Catalytic activity of surfaces	KR
2nd week of Mar 2025	1	Problem solving in Kinetics	KR
	2	Problem solving in Quantum Mechanics	KR
	3	Problem solving in Quantum Mechanics	KR
3rd week of Mar 2025	1	Revision classes	KR
	2	Question paper solving	KR

TEACHERS ALLOTTEMENT for C-104: Analytical Chemistry
Unit I: Dr. Kavitha R. (KR)
Unit II, III : Prof. Joyti Gupta (JG)
and IV: Dr. S. M. Basavarajaiah (SMB)
28/10/2024 TO 25/02/2025

Name of the Department	**PG Department of Chemistry**	Subject Title	**Organic Chemistry**
Semester	**I Semester**	Paper	**C-104: ANALYTICAL CHEMISTRY**
Week/Month & Date (Preferably)	Day	Portions Planned for 1 hour	Teacher
1st week of Nov 2024	1	Introduction to Analytical Chemistry	SMB
	2	Basics of Analytical chemistry	KR
2nd week of Nov 2024	1	**Quantitative Analysis- Classical methods**	SMB
	2	Classification of analytical methods	
	3	types of instrumental analysis, factors influencing choice of analytical method,	
	4	Safety measures in chemical laboratories	KR
3rd week of Nov 2024	1	qualitative and quantitative analysis, Units used in chemical analysis	SMB
	2	conversion, ppm, ppb, ppt etc.	
	3	Fire hazards, toxic chemicals:	KR
4th week of Nov 2024	1	**Acid-Base:** Theory of indicators,	SMB
	2	Mechanism of Phenophthalien, Methyl red.	

	3	Titration curves for mono functional acid and base,	
1st week of Dec 2024	1	pH calculations,	SMB
	2	Fractions of phosphoric acid species as a function of pH. Titration curves for H_3PO_4.	
	3	Acids/bases/solvents handling,	KR
2nd week of Dec 2024	1	**Complexometry:** Theory of metal ion indicators,	SMB
	2	EDTA titrations,	
	3	Suitability of polydentate ligands as titrants,	
	4	Storage, dilution, disposal of chemicals, acid/ solvent bottles etc.	KR
3rd week of Dec 2024	1	Expressions for the different forms of EDTA in solution as a function of pH,	SMB
	2	Conditional stability constants, effect of pH and nature of titration curve.	
	3	Masking and demasking, type of EDTA titrations,	
	4	Toxic chemicals sampling and handling hazards,	KR
4th week of Dec 2024	1	Titrations involving monodentate, bidentate and polydentate ligands.	SMB
	2	Revision Class	
1st week of Jan 2025	1	**Redox:** Mechanism of indicator action,	SMB
	2	Criteria for the selection of indicators	
	3	Feasibility of redox titration.	
	4	Safety data sheets, miniaturization of analytical instruments,	KR
2nd week of Jan 2025	1	Titration of multicomponet system.	SMB
	2	Nernst equation. Applications:	
	3	Oxidants such as Ce(IV),	

		bromate, Iodates.	
	4	Their significance in modern chemical analysis.	KR
3rd week of Jan 2025	1	**Precipitation:** Solubility product. Theoretical principles of precipitation:	SMB
	2	Titration curve, end point detection, Mohr, Volhard and adsorption indicators. Applications: Estimation of F^-, K^+, CO_3^{2-}, $C_2O_4^{2-}$, acetylenes and mixture of halides.	
	3	Preparation of dilute acids from concentrated/fuming acids like H_2SO_4,	KR
4th week of Jan 2025	1	**Gravimetry** Quantitative precipitation, *Precipitation from Homogeneous Solution (PFHS)*,	SMB
	2	Formation and treatment of precipitates, co-precipitation, post precipitation. Conditions for precipitation, washing, drying and igniting the precipitates,	
	3	Important precipitating agents such as DMG, oxine, thiocyanate and their significance in inorganic analysis. errors in gravimetric analysis.	
	4	Handling liquid bromine, elemental mercury, solvent ether, liquor ammonia, liquid nitrogen.	KR

5th week of Jan 2025	1	Electromagnetic radiation, interaction with matter, absorption,	SMB
	2	Beer-Lambert's law, derivation, molar absorptivity, Sandell sensitivity, Ringbom plot, deviations, limitations,	
	3	Calibration with standards, standard addition, internal standard addition, limit of detection, limit of quantification,	
	4	**Errors in chemical analysis:** absolute, relative error, random error distribution, Gaussian curve, Limitations of analytical methods, determinate and indeterminate errors, minimization of errors.	KR
1st week of Feb 2025 **Unit IV- Separation Methods**	1	Instrumentation, radiation sources, wavelength selection devices, optical slits, single beam and double beam instruments,	SMB
	2	Photo electric colorimeter, scanning devices, merits and limitations, numerical problems on application of Beer's law.	
	3	Solvent Extraction – Types ,batch, continuous, efficiency, selectivity. Distribution coefficient,	
	4	Accuracy and precision, distribution of random errors, the normal error curve.	KR
2nd week of Feb 2025	1	Nernst distribution law, derivation, factors affecting the partition, applications. Chromatography – Types, Terminology,	SMB
	2	Principles of paper, thin layer, column	
	3	Gas chromatography, column efficiency,	

	4	Statistical treatment of finite samples - measures of central tendency and variability: mean, median, range, standard deviation, variance, confidence limits,	KR
3rd week of Feb 2025	1	plate theory, factors affecting the column efficiency, band broadening,	SMB
	2	R_f factor, Van-Deemter equation, medium performance liquid chromatography,	
	3	High performance liquid chromatography,	
	4	Comparison of an experimental mean and a true mean. F-test, rejection of result - Q-test, Student's t-test, numerical problems.	KR
4th week of Feb 2025	1	Reserved phase liquid chromatography,	SMB
	2	super critical fluid chromatography, characteristics of super critical fluids,	
5th week of Feb 2025	1	2D-thin layer chromatography, electrophoresis	SMB
	2	Principles, applications etc. numerical problems on solvent extraction,	
1st week of Mar 2025	1	Rf factor and van Demeter equation.	SMB
	2	Revision Class	
	3	Revision Class	
	4	Revision class	KR

TEACHERS ALLOTTEMENT:

Unit I, Unit II and Unit III: Prof. Sandya

28/10/2024 TO 25/02/2025

Name of the Department	**PG Chemistry**	**Subject Title**	**MATHEMATICS FOR CHEMISTS**
Semester	**I**	**Paper**	**C-105: SOFT CORE**
Week/Month & Date (Preferably)	**Day**	**Portions Planned for 1 hour**	**Teacher**
1st week of Nov 2024	1	**Integrations**: Basic rules-simple substitution.	KVR
	2	Introduction vectors	KVR
2nd week of Nov 2024	1	**Integrations**: Method of partial fractions-Integration by parts.	KVR
	2	**Vectors**: vectors, dot and cross products.	KVR
3rd week of Nov 2024	1	**Integrations**: Define integral and application to areas of plane curves.	KVR
	2	**Vectors**: vectors, dot and cross products.	KVR
4th week of Nov 2024	1	**Integrations**: Functions of several variables: partial derivative.	KVR
	2	**Introduction to Calculus**	KVR
	3	**Vectors**: scalar and vector triple products and their applications.	KVR
1st week of Dec 2024	1	**Integrations**: co-ordinate transformation from cartesian co-ordinates to spherical and cylindrical coordinates and vice-versa.	KVR
	2	**Calculus**: Rule for differentiation.	KVR
	3	Tensors and their applications.	KVR
2nd week of Dec	1	**Elementary differential equation**: Variable	KVR

2024 **UNIT- II**		separable, exact first order equations, linear and homogeneous equation.	
	2	**Calculus**: Chain rule.	KVR
	3	Tensors and their applications.	KVR
3rd week of Dec 2024	1	Second order homogeneous differential equation with constant coefficients f(D), y=0.	KVR
	2	**Calculus**: Chain rule (for f(x)=Un, sin u, log u etc).	KVR
	3	**Vectors**: vectors, dot and cross products; scalar and vector triple products and their applications. Tensors and their applications.	KVR
4th week of Dec 2024	1	Solution of differential equation by power series method.	KVR
	2	**Calculus**: Implicit differentiation.	KVR
	3	Introduction to matrix algebra.	KVR
1st week of Jan 2025	1	Fourier series: Simple problems.	KVR
	2	**Calculus**: Parametric differentiation.	KVR
	3	**Matrix Algebra**: Review of different types of matrices.	KVR
2nd week of Jan 2025	1	**Probability**: Review of permutations and combinations.	KVR
	2	**Calculus**: Successive differentiation of order 2.	KVR
	3	**Matrix Algebra**: Review of different types of matrices (including Hermetian and skew Hermetian);	KVR
3rd week of Jan 2025	1	**Probability**: Probability	KVR

		and addition theorem for mutually exclusive events.	
	2	**Calculus**: Probelms.	KVR
		Matrix Algebra: matrix addition and multiplication.	KVR
4th week of Jan 2025	1	**Probability**: Probability and addition theorem for multiplication theorem for independent events.	KVR
	2	Introduction to differentiation.	KVR
	3	**Matrix Algebra**: Determinant of a square matrix, transpose.	KVR
5th week of Jan 2025	1	**Probability:** Curve fitting-Method of least squares.	KVR
	2	Applications of differentiation.	KVR
	3	**Matrix Algebra**: Adjoint and inverse of a square matrix.	KVR
1st week of Feb 2025	1	**Probability**:Curve fitting-Method of least squares.	KVR
	2	Derivative as a slope of the tangent.	KVR
	3	**Matrix Algebra**: Solution to system of linear equation by matrix method.	KVR
2nd week of Feb 2025	1	**Probability**: Probelms	KVR
	2	Applications of differentiation: derivative as a rate measure-velocity.	KVR
	3	**Matrix Algebra**: Solution to system of linear equation by Cramer's Rule.	KVR
3rd week of Feb 2025 **UNIT-IV**	1	**Probability**: Problems	KVR
	2	Applications of differentiation: Increasing and decreasing functions-	KVR
	3	Characteristic equation of a square matrix, eigenvalues and eigenvectors.	KVR
4th week of Feb 2025	1	Revision class.	KVR

	2	Maxima and minima-second derivative test-point of inflections-problems restricted to polNNomial.	KVR
	3	Characteristic equation of an eigenvalues.	KVR
5th week of Feb 2025	1	Revision class.	KVR
	2	Problems solving.	KVR
	3	Characteristic equation of an eigenvectors.	KVR
1st week of Mar 2025	1	Revision class.	KVR
	2	Revision class	KVR
	3	Revision class	KVR

For III semester:

Teacher Allottement for C-301: Organic Reaction Mechanism

Unit I: Dr. B. P. Nethravathi (BPN)

Unit II III and IV: Prof. Joyti Gupta (JG)

28/10/2024 TO 25/02/2025

Name of the Department	**PG Chem**	**Subject Title**	**Organic Chemistry**
Semester	**III**	**Paper**	**C-301: Org. Reac. Mech.**
Week/Month & Date (Preferably)	**Day**	**Portions Planned for 1 hour**	**Teacher**
1st week of Nov 2024	1	**Unit I: Aliphatic nucleophilic and electrophilic substitution reactions** *Nucleophilic substitution reactions: Introduction*, Substitution at allylic carbon (allylic rearrangement),	BPN
	2	**Unit II**: Generation of free-radicals: Thermal homolysis of peroxides, peresters and azo compounds, photochemical methods.	JG
	3	Free radical reactions: Free-radical mechanisms in general.	JG
	4	Free-radical substitution mechanisms.	JG
2nd week of Nov 2024	1	*Nucleophilic substitution reactions* at a trigonal carbon (hydrolysis of esters and amides use of DCC in the formation of anhydrides)	BPN
	2	Mechanisms at an aromatic substrate.	JG
	3	Neighboring group assistance in free-radical reactions.	JG
	4	Reactivity for aliphatic substrates, reactivity at a bridgehead	JG
3rd week of Nov 2024	1	*Nucleophilic substitution reactions* at a vinylic carbon	BPN
	2	reactivity in aromatic substrates, reactivity in the attacking radical	JG

	3	Halogenation at an alkyl carbon and an allylic carbon, hydroxylation at an aliphatic carbon	JG
	4	hydroxylation at an aromatic carbon, oxidation of aldehydes to carboxylic acids	JG
4th week of Nov 2024	1	Neighboring group participation and SN*i* reactions	BPN
	2	formation of hydroperoxides and peroxides, Gomberg-Bachmann reaction,	JG
	3	Meerwein arylation, Sandmeyer reaction	JG
	4	Kolbe reaction and Hunsdiecker reaction	JG
5th week of Nov 2024	1	*Electrophilic substitution reactions:* SE_2, SE_1 and SE_i mechanisms	BPN
	2	Revision Class	JG
	3	Revision Class	JG
	4	Unit Test	JG
1st week of Dec 2024	1	Hydrogen exchange in SE_2, SE_1 and SE_i mechanisms	BPN
	2	**Unit II : Photochemistry** Physical and Chemical processes, Jablonski diagram. Photosensitization, quantum efficiency, quantum and chemical yields.	JG
	3	*Photochemistry of functional groups*: i) *Olefins*: *Cis-trans* isomerism	JG
	4	*Photochemistry of* [2 + 2]-cycloaddition, rearrangements.	JG
2nd week of Dec 2024	1	migration of double bonds in SE_2, SE_1 and SE_i mechanisms	BPN
	2	*Photochemistry of* Reaction of conjugated olefins; di-π-methane rearrangements (including oxa- and aza- di-π-methane rearrangements)	JG
	3	ii) *Ketones*: Excited state of C=O. Norrish type-I reaction	JG
	4	Norrish type-II cleavages	JG
3rd week of Dec 2024	1	α-halogenation of aldehydes, ketones and acids in SE_2, SE_1 and SE_i mechanisms	BPN
	2	Paterno-Buchi reaction. □,□-unsaturated ketones, [2+2] addition	JG
	3	Rearrangement of cyclohexadienones (application in the sNNthesis of some important natural products)	JG
	4	iii) *Aromatic compounds*: Photorearrangement of benzene and its derivatives	JG
4th week of Dec	1	Aliphatic diazonium coupling reactions	BPN

2024	2	cycloaddition of benzene.	JG
	3	iv) *Photochemical oxidations and reductions*: Cycloaddition of singlet molecular oxygen {[2+2], [4+2]-additions}	JG
	4	Oxidative coupling of aromatic compounds, photoreduction by hydrogen abstraction.	JG
1st week of Jan 2025	1	nitrosation at carbon bearing active hydrogens	BPN
	2	Revision Class	JG
	3	**Pericyclic reactions-I** Molecular orbital symmetry, Woodward-Hoffmann correlation diagrams	JG
	4	FMO and PMO approaches.	JG
2nd week of Jan 2025	1	diazo transfer reactions	BPN
	2	Frontier orbitals of ethylene, 1,3-butadiene	JG
3rd week of Jan 2025	1	sigmatropic shifts involving carbon moieties	JG
	2	1,3,5-hexatriene and allyl system	JG
4th week of Jan 2025	1	carbene and nitrene insertion reactions	BPN
	2	Electrocyclic reactions: conrotatory and disrotatory motions	JG
	3	Electrocyclic reactions: 4n, 4n+2 and allyl systems	JG
	4	Cycloadditions: antarafacial and suprafacial additions	JG
1st week of Feb 2025	1	decarboxylation of aliphatic acids	BPN
	2	[πms + πna] and [πms + πns]-cycloadditions	JG
	3	[ω2a + π2s] and [π4s + ω2s]-cheletropic reactions	JG
	4	Regio, enantio and Endo selectivities in Diels-Alder reactions	JG
2nd week of Feb 2025	1	haloform reaction, Haller Bauer reaction	BPN
	2	Hetero Diels-Alder reaction	JG
	3	Sigmatropic rearrangements: suprafacial and antarafacial shifts of H	JG
	4	sigmatropic shifts involving carbon moieties	JG
3rd week of Feb 2025	1		BPN
	2	[*i, j*]- sigmatropic rearrangements (including Walk, Claisen)	JG
	3	[*i, j*]- sigmatropic rearrangements (including Cope, oxy and aza-Cope rearrangements)	JG
	4	Revision Class	JG
4th week of Feb	1	Revision Class	BPN

2025	2	Unit Test	JG
	3	**Unit IV**: Introduction. The mechanistic role of Thiamine pyrophosphate (TPP) in decarboxylation of α-ketoacids and in the formation of α-ketols in living systems.	JG
	4	The mechanistic role of Pyridoxal phosphate (PLP) in transamination, decarboxylation, dealdolisation and elimination reactions of amino acids in living systems.	JG
1st week of Jan 2025	1	Unit Test	BPN
	2	The mechanistic role of Lipoic acid in the transfer of acyl group reactions in living systems.	JG
	3	The mechanistic role of Coenzyme A (CoASH) in the transfer of acyl group in living systems.	JG
	4	The mechanistic role of Biotin in living systems.	JG
2nd week of Jan 2025	1	Revision Class	BPN
	2	The mechanistic role of Vitamin KH2 coenzyme in carboxylation reactions in living systems.	JG
	3	The mechanistic role of Tetrahydrofolic acid (H4F) in one-carbon transfer reactions in living systems.	JG
	4	The mechanistic role of Vitamin B12 coenzymes in molecular rearrangement reactions and in the sNNthesis of methionine and methane in living systems.	JG
3rd week of Jan 2025	1	Revision Class	BPN
	2	The mechanistic role of Nicotinamide in living systems.	JG
	3	The mechanistic role of Flavin coenzymes in biological redox reactions in living systems.	JG
	4	Revision Class	JG
4th week of Jan 2025		Unit Test	JG
		Revision Class	JG
		Revision Class	JG
1st week of Feb 2025		Unit Test	BPN
		Revision Class	JG
		Revision Class	JG
		Unit Test	JG

Teachers Allottement for C-302: Organic synthesis

UNIT- I, II and IV: Dr. Umesha K. (UK)

UNIT- III: Dr. S. M. Basavarajaiah (SMB)

28/10/2024 TO 25/02/2025

Name of the Department	**PG Chem**	**Subject Title**	**Org Synt**
Semester	**III**	**Paper**	**Ch-302**
Week/Month & Date (Preferably)	**Day**	**Portions Planned for 1 hour**	**Teacher**
1st week of Nov 2024	1	**C-C and C-N bond forming reactions** Darzen's reaction, Use of acetylides in C-C bond formation reactions.	UK
	2	Acid-catalyzed self condensation of olefins, Prins reaction,	
	3	Complex metal hydrides,	SMB
2nd week of Nov 2024	1	Shapiro reaction, Dieckmann cyclization,	UK
	2	Robinson annulations, Hofmann-Loeffler-Freytag reaction.	
	3	Hofmann-Martius reaction. Acyloin condensation.	
	4	Complex metal hydrides,	SMB
3rd week of Nov 2024	1	Houben-Hoesch reaction. Stork-enamine synthesis.	UK
	2	Meyer synthesis. Use of nucleophilic nitrogen and electrophilic carbon (NH_3 as nucleophile in substitution)	
	3	amines and nitrite as nucleophiles in substitution	
4th week of Nov 2024	1	Complex metal hydrides,	SMB
1st week of Dec 2024	1	NH_3 and amines in addition to ketones and aldehydes	UK
	2	Skraup synthesis and Chichibabin reaction	
	3	Mitsunobu reaction and N-Nitroso amine	

		rearrangement reaction	
	4	Birch, reduction	SMB
2nd week of Dec 2024	1	Fischer-Hepp reaction and Japp-Klingmann reaction	UK
	2	Revision Class	
	3	Class Test	
	4	Clemmensen reduction	SMB
3rd week of Dec 2024	1	**Reagents in organic synthesis** Use of NBS and LDA	UK
	2	Use of DCC and Corey-Chaykovsky reagent	
	3	Use of DDQ and Raney Nickel	
	4		SMB
4th week of Dec 2024	1	Use of Diazomethane and TMS-Cl	UK
	2	Use of 1,3-dithianes (Umpolung and reactivity) and PPA	
	3	Clemmensen and diimide reduction	SMB
1st week of Jan 2025	1	Woodward and Prevost hydroxylation	UK
	2	**Oxidations I**: Chromium (VI) oxidants	
	3	Mn (VII) oxidants as oxidizing agents	
	4	Clemmensen and diimide reduction	SMB
2nd week of Jan 2025	1	OsO_4as oxidizing agents	UK
	2	SeO_2 and Ag_2Oas oxidants	
	3	HIO_4as oxidant	
	4	Catalytic hydrogenation (homogeneous and^ heterogeneous).	SMB
3rd week of Jan 2025	1	$Pb(OAc)_4$as oxidant	UK
	2	DMSO as oxidant	
	3	Catalytic hydrogenation (homogeneous and^ heterogeneous).	SMB
4th week of Jan 2025	1	Ozone as oxidizing agent	UK
	2	peroxides (H_2O_2, *t*-BuOOH) as oxidizing agents	
	3	Organoboranes as reducing agents	SMB
5th week of Jan 2025	1	Peroxides (Dibenzoyl peroxide) as oxidizing agents and Oppenaur Oxidation	UK
1st week of Feb 2025	1	peracids (Preparation, properties and applications of CF_3COOOH) as oxidizing agents	UK
	2	peracids (Preparation, properties and applications of *m*-CPBA,) as oxidizing agents	
	3	Organoboranes as reducing agents	SMB

2nd week of Feb 2025	1	peracids (Preparation, properties and applications of momoperphthalic acid) as oxidizing agents	UK
	2	Dess-Martin oxidation.	
	3	Revision Class	
	4	"Wolf-Kishner reduction.	SMB
3rd week of Feb 2025	1	**Reductions** Complex metal hydrides, LAH	UK
	2	Complex metal hydrides, $NaBH_4$, dissolving metal reductions (Sodium-Alcohol)	
	3	Dissolving metal reductions (including Birch and Benkeser)	
	4	Meerwein-Pondorrf-verley reduction.	SMB
4th week of Feb 2025	1	Clemmensen reductions	UK
	2	catalytic hydrogenation (homogeneous)	
	3	catalytic hydrogenation (heterogeneous)	
	4	McMurry, Pummer, reactions	SMB
5th week of Feb 2025	1	diimide reduction	UK
	2	Wolf-Kishner reduction	
	3	willgerdot, reactions.	SMB
1st week of Mar 2025	1	Corey-Bakshi-Shibata reaction, McMurry reaction	UK
2nd week of Mar 2025	1	Pummer reaction and Willgerdot reaction	UK
	2	Meerwein-Pondorrf-verley reduction,	
	3	Corey-Bakshi-Shibata and Tishchenko reactions.	SMB
3rd week of Mar 2025	1	Tishchenko reactions	UK
	2	Revision Class	
	3	Class Test	
	4	Revision classess	SMB

Teachers Allottement for C-303: Spectroscopy-II

Unit I and IV: Dr. Sm. M. Basavarajaiah (SMB)
Unit II and III: Prof: K.R. Nagasundara (KRN)

28/10/2024 TO 25/02/2025

Name of the Department	**PG Chem**	**Subject Title**	**Organic Chemistry**
Semester	**III**	**Paper**	**C-303: Spectroscopy-II**
Week/Month & Date (Preferably)	**Day**	**Portions Planned for 1 hour**	**Teacher**
1st week of Nov 2024	1	**Unit I**: Ultraviolet and Visible Spectroscopy: Classification of electronic transitions,	SMB
	2	Ultraviolet and Visible Spectroscopy: Terminology, Substituent and solvent effects	SMB
	3	**Unit III**: Nuclear Magnetic Resonance Spectroscopy: Introduction, Magnetic properties of nuclei-Resonance condition	KRN
2nd week of Nov 2024	1	Ultraviolet and Visible Spectroscopy: UV spectral study of polyenes,	SMB
	2	Ultraviolet and Visible Spectroscopy: UV spectral study of enones and aromatic compounds.	SMB
	3	Nuclear spin, population of nuclear spin levels and NMR isotopes, Relaxation methods,	KRN
	4	Instrumentation and sampling Handling.	KRN
3rd week of Nov 2024	1	Ultraviolet and Visible Spectroscopy: Emprical rules for calculating lamda max.	SMB
	2	Ultraviolet and Visible	SMB

		Spectroscopy: UV spectral study of aromatic compounds.	
4th week of Nov 2024	1	Classical approach and FT-NMR.	KRN
	2	Chemical shift, Factors influencing chemical shifts : electronegativity and electrostatic effects;	KRN
1st week of Dec 2024	1	Ultraviolet and Visible Spectroscopy: Empirical rules for calculating lamda max.	SMB
	2	Vibrational Spectroscopy: Sampling techniques,	SMB
	3	Mechanism of shielding and deshielding in alkanes, alkyl halides, alkenes,	KRN
	4	Mechanism of shielding and deshielding in aromatic compounds,carbonyl compounds and annulenes.	KRN
2nd week of Dec 2024	1	Vibrational Spectroscopy:Group frequencies, factors affecting group frequencies: Bond order, Mass effect, Conjugation,	SMB
	2	Vibrational Spectroscopy:Factors affecting group frequencies: Inductive, resonance, steric effects, intramolecular interactions.	SMB
	3	Pascals triangle-low and high resolution	KRN
	4	Reference compounds (internal and external reference compounds)	KRN
3rd week of Dec 2024	1	Applicationof IR in the study of H-bonding	SMB
	2	Application of IR in the study of tautomerism.	SMB
	3	Karplus Curve, Diamagnetic and Paramagnetic effects and Magnetic anisotropy.	KRN
	4	Equivalence of protons-chemical and magnetic equivalence	KRN
4th week of Dec 2024	1	Complementarity of IR and Raman.	SMB
	2	Identification of the following organic compounds by IR: Alkanes, Alkenes, AlkNNes	SMB
1st week of Jan 2025	1	Spin systems: First order and second order coupling of AB systems	KRN
	2	Simplification of complex spectra.	KRN

		Problems.	
2nd week of Jan 2025	1	Identification of the following organic compounds by IR: Aromatic compounds, Aldehydes, Ketones, Alcohols, Acids and its derivatives	SMB
	2	Identification of the following organic compounds by IR: Amines, Esters, Alkyl halides and Nitro compounds;	SMB
	3	Spin-spin interactions: Homonuclear coupling interactions - AX, AX2, AX3, AMX, AB types.	KRN
	4	Vicinal, germinal and long range coupling-spin decoupling;	KRN
3rd week of Jan 2025	1	Problems using UV and IR	SMB
	2	**Unit IV**: Mass spectrometry and Composite Problems: Basic principles	SMB
	3	Instrumentation – ion production-ion analysis, Temperature effects.	KRN
4th week of Jan 2025	1	Magnetic sector instruments, Quadrapole mass spectrometers.	SMB
	2	Time of flight mass spectrometers-ion cyclotron resonance spectrometers	SMB
5th week of Jan 2025	1	**Unit III**: CIDNP, Nuclear Overhauser effect (NOE)	KRN
	2	Factors influencing coupling constants and Relative intensities.	KRN
1st week of Feb 2025	1	Mass spectrum-molecular ion-types of ions in mass spectra and effects of isotopes on mass spectra.	SMB
	2	Methods of ionization, EI, FAB mass and MALDI methods.	SMB
	3	^{13}C NMR Spectroscopy: Range and factors affecting chemical shifts of alkanes, alkyl halides, alkenes	KRN
	4	Factors affecting chemical shifts of alcohols, ethers, alkNNes, carbonyl compounds and aromatics.	KRN
2nd week of Feb 2025	1	Fragmentation of Alkanes, Alkenes, alkyl halides	SMB
	2	Fragmentation of alcohols, aldehydes, ketones, acids, esters, ethers, amines, nitro and halo compounds peptides,	SMB

	3	Multiple resonance spectroscopy: Introduction to 2D-techniques: DEPT	KRN
	4	COSY, HETCOR, and INADEQUATE.	KRN
3rd week of Feb 2025	1	Fragmentation of acids, esters, ethers, amines, nitro and halo compounds peptides	SMB
	2	Nitrogen rule, Factors affecting cleavagepatterns	SMB
	3	Explanation of the principle, applications to structure elucidation and stereochemistry ofsimple organic molecules.	KRN
	4	DNNamic NMR.NMR spectroscopy of other nuclei with spin I = ½.	KRN
4th week of Feb 2025	1	MeLafferty and MeLafferty +1 rearrangement	SMB
	2	Determination of molecular formula.	SMB
	3	Introduction to ^{15}N, ^{19}F, ^{29}Si and ^{31}P	KRN
	4	NMR spectroscopies. Chemical shift values for ^{15}N, and^{19}F, containing compounds.	KRN
5th week of Feb 2025	1	Composite problems.	SMB
	2	Use of HRMS to determine exact molecular formulae of compounds.	SMB
	3	Chemical shift values for ^{15}N containing compounds.	KRN
	4	Chemical shift values for ^{19}Fcontaining compounds.	KRN
1st week of Mar 2025	1	Application of UV, IR, NMR and MS methods and chemical reactions in the structure elucidation of organic compounds.	SMB
	2	Application of UV, IR, NMR and MS methods and chemical reactions in the structure elucidation of organic compounds.	SMB
2nd week of Mar 2025	3	NMR spectroscopies. Chemical shift values for ^{29}Si and ^{31}P containing compounds.	KRN
	4	Problem solving	KRN
3rd week of Mar 2025	1	Application of UV, IR, NMR and MS methods and chemical reactions in the structure elucidation of organic compounds.	SMB

	2	Application of UV, IR, NMR and MS methods and chemical reactions in the structure elucidation of organic compounds.	SMB
	3	Chemical shift values for ^{29}Si containing compounds. NMR Spectral problem solving Revision Classes NMR Spectral problem solving	KRN
	4	Chemical shift values for ^{31}P containing compounds.	KRN

For II Semester:

01/04/2025 TO 31/08/2025

Teacher Allottement for C-201: Inorganic chemistry- II

Unit I, II, III and IV: Dr. B.P. Nethravathi (BPN)

Name of the Department	**PG Department of Chemistry**	Subject Title	**Inorganic Chemistry**
Semester	**II Semester**	Paper	**C-201: INORGANIC CHEMISTRY-II**
Week/Month & Date (Preferably)	Day	Portions Planned for 1 hour	Teacher
1st week of April 2025 Unit I	1	**I Metal-Ligand equilibria in solution :** Step-wise and overall formation constant and their relationship, trends in step-wise constant,	Dr. B.P. Nethravathi (BPN)
	2	kinetic and thermodNNamic stability of metal complexes,	
	3	factors affecting the stability of metal complexes with reference to the nature of the metal ion	
	4	factors affecting the stability of metal complexes with reference to the nature of the ligand	
2nd week of April 2025	1	Determination of formation constant by pH metry,	
	2	Determination of formation constant by spectrophotometry,	
	3	Determination of formation constant by polarography	
	4	Determination of formation constant by ion exchange methods.	
3rd week of April 2025	1	**I Structure and bonding :** Structure and bonding in hydride, dihydrogen	
	2	Structure and bonding in dioxygen, isocyanide	
	3	Structure and bonding in CO	

	4	Structure and bonding in NO	
4th week of April 2025	1	Structure and bonding in N_2 and tertiary phosphine complexes of transition metals	
	2	Revision class for UNIT 1	
	3	Unit test for Unit I	
	4	Remedial class for Unit I	
5th week of April 2025 **UNIT - II**	1	Problem solving class	
	2	**II Metal – ligand bonding: Introduction**	
	3	**II Metal – ligand bonding:** Stereoisomerism- coordination numbers 3 to 8.	
	4	Crystal field theory, salient features, spectrochemical series,	
1st week of May 2025	1	splitting of d-orbitals in tetragonal, square planar, trigonal bipyramidal and square-pyramidal geometry	
	2	Applications of CFT- colours of transition metal complexes, magnetic properties of octahedral complex, distortion of octahedral complex,	
	3	CFSE and their uses	
	4	Factors affecting CFSE	
2nd week of May 2025	1	limitations of CFT, experimental evidence for metal-ligand covalent bonding in complexes	Dr. B.P. Nethravathi (BPN)
	2	Nephelauxetic effect, Ligand Field Theory,	
	3	MO theory: tetrahedral and octahedral complexes (including π-bonding), angular overlap model.	
	4	Stereochemical non-rigidity	
3rd week of May 2025	1	Continuation of Stereochemical non-rigidity	
	2	self assembly in supramolecular chemistry	
	3	Revision of Unit II	
	4	Unit test for Unit II	
4th week of May 2025	1	Remedial class for Unit II	
	2	Problem solving class	
	3	**III Electronic spectra of coordination compounds:** Spectroscopic ground states.	
	4	Selection rules	

5th week of May 2025	1	Term symbols for d^n ions	
	2	Racah parameters,	
	3	Orgel diagrams	
	4	Correlation diagrams	
1st week of June 2025	1	Tanaube-Sugano diagrams	
	2	spectra of 3d metal-aqua complexes of trivalent V, Cr,	
	3	Divalent Mn, Co and Ni, $CoCl_4^{2-}$	
	4	calculation of Dq, B and β parameters	
2nd week of June 2025	1	CT spectra	
	2	Problems based on given data	
	3	Revision of Unit III	
	4	Unit test for Unit III	
3rd week of June 2025 **UNIT - IV**	1	Remedial class for Unit III	Dr. B.P. Nethravathi (BPN)
	2	Problem solving class	
	3	Types of magnetic behaviour	
	4	magnetic susceptibility and its determination- Gouy,. Diamagnetic correction	
4th week of June 2025	1	Faraday, VSM method	
	2	orbital contribution, spin-orbital coupling	
	3	ferro- and antiferromagnetic coupling	
	4	spin-crossover.	
5th week of June 2025	1	Magnetic properties of Lanthanide and Actinide metal complexes.	
	2	Revision class	
	3	**IV Photochemical reactions of transition metals complexes:** Basic photochemical processes,	
	4	Kasha's rule, quantum yield	
1st week of July 2025	1	Jabolnskii diagrams	
	2	photo substitution reactions	
	3	ligand photo rections	
	4	photo-redox reactions,	
2nd week of July 2025	1	solar energy conversion	
	2	Solar energy to thermal energy	
	3	Solar energy to electrical energy	Dr. B.P. Nethravathi
	4	TiO_2 in environment pollution treatement	

3rd week of July 2025	1	Revision class	(BPN)
	2	Revision class	

Teachers Allottement: for C-202: Organic chemistry- II

01/04/2025 TO 31/08/2025

Unit I, II and III: Annapurna BC (ABC)

Unit IV: Prof. Dr. S. M. Basavarajaiah (SMB)

Name of the Department	**PG Chemistry**	**Subject Title**	**Organic chemistry**
Semester	**II**	**Paper**	**C-202: Organic chemistry- II**
Week/Month & Date (Preferably)	**Day**	**Portions Planned for 1 hour**	**Teacher**
1st week of April 2025	1	**Unit I**: Introduction to Reaction mechanism.	ABC
	2	The arenium ion mechanism.	ABC
2nd week of April 2025	1	Orientation and reactivity. Energy profile diagrams.	ABC
	2	The *ortho*/*para* ratio, *ipso* attack, orientation in other ring systems.	ABC
3rd week of April 2025	1	Quantitative treatment of reactivity in substrates and electrophiles.	ABC
	2	Effect of leaving group. Amination, sulfonylation reactions.	SMB
4th week of April 2025	1	Vilsmeier-Haack reaction. Diazonium coupling.	ABC
	2	Gatterman reaction, Gatterman-Koch reaction. Hoesch reaction	ABC
	3	The SNAr, SN1, benzNNe	SMB

		and SRN1 mechanisms.	
	4	Reactivity: effect of substrate structure, leaving group and attacking nucleophile.	ABC
5th week of April 2025	1	Goldberg reaction, Sommelet-Hauser.	ABC
	2	Bucherer reaction and Schiemann reaction.	SMB
	3	Von Richter reaction and Smiles rearrangements.	ABC
1st week of May 2025	1	**Revision class**	SMB
	2	**Unit II**-Mechanistic and stereochemical aspects of addition reactions involving electrophiles.	ABC
	3	Nucleophiles and free radicals.	ABC
	4	Regio, stereo- and chemoselectivities.	SMB
2nd week of May 2025	1	Orientation and reactivity.	ABC
	2	Addition to cyclopropane ring.	ABC
	3	Hydrogenation of double and triple bonds, hydrogenation of aromatic rings.	SMB
	4	Addition of alkenes and/or alkNNes to alkenes and/or alkNNes.	ABC
3rd week of May 2025	1	**Unit-III: Rearrangements** Wagner-Meerwein, Pinacol-Pinacolone.	ABC
	2	Fries, Wolff, Beckmann reactions.	ABC
	3	Ene sNNthesis. Michael reaction.	ABC
	4	Mechanism of metal hydride reduction (NaH, LiH, LiAlH4, NaBH4) of saturated and unsaturated carbonyl compounds and acids.	SMB
4th week of May 2025	1	Esters and nitriles.	ABC
	2	Hofmann, Curtius, Lossen and Schmidt	ABC

		rearrangements.	
	3	Addition of Grignard reagents and organolithium reagents to carbonyl compounds and unsaturated carbonyl compounds.	SMB
1st week of June 2025	1	Conversion of aldehydes to nitriles. Hydrolysis of nitriles and addition of amines to isocyanates.	ABC
	2	Benzil-benzilic acid rearrangement.	ABC
	3	Formation of xanthates. Wittig reaction. Mannich and Stobbe reactions.	ABC
	4	**Remedial class of Unit-II**	SMB
2nd week of June 2025	1	**Unit-IV**: Introduction to amino acids.	ABC
	2	Tiffeneau-Demjanov reaction. Arndt-Eistert reaction.	ABC
3rd week of June 2025	1	SNNthesis and reactions of amino acids.	ABC
	2	Classification and nomenclature of peptides.	ABC
4th week of June 2025	1	Sanger and Edman methods of sequencing.	ABC
	2	Cleavage of peptide bond by chemical and enzymatic methods.	SMB
5th week of June 2025	1	Peptide sNNthesis-	ABC
	2	Firtsch-Buttenberg-Wiechell rearrangement. Stevens, Wittig and Favorskii rearrangements,	ABC
	3	Protection of amino group (Boc-, Z- and Fmoc-) and carboxyl group as alkyl and aryl esters.	ABC
	4	Use of DCC,	SMB
1st week of July 2025	1	Use of EEDQ,	ABC
	2	Stevens, Wittig and Favorskii rearrangements,	ABC

	3	Use of HOBt	SMB
	4	Use of active esters, in peptide bond formation reactions.	SMB
2nd week of July 2025	1	acid halides, anhydrides in peptide bond formation reactions.	ABC
	2	Dienone-phenol, Baker-Venkatraman rearrangement.	ABC
	3	Deprotection and racemization in peptide sNNthesis.	ABC
	4	Solution and solid phase techniques.	ABC
3rd week of July 2025	1	SNNthesis of oxytocin, gramicidin.	SMB
	2	Baeyer-Villiger oxidation. Neber rearrangement.	ABC
	3	Benzidine rearrangement.	ABC
	4	SNNthesis of enkephalins, LH-RH.	SMB
4th week of July 2025	1	Introduction to peptidomimetics.	ABC
	2.	Peptidomimetics.	ABC
5th week of July 2025	2	**Unit III-Elimination Reactions:** The E2, E1 and E1cB mechanisms and their spectrum. E2C and E2H mechanisms.	ABC
	3	E**2**C and E**2**H mechanisms. Orientation of the double bond.	ABC
	4	**Remedial class for Unit IV.**	SMB

Teacher Allottement for C-203: Physical Chemistry- II

01/04/2025 TO 31/08/2025

Unit I, II III and IV: Dr. Kavitha R. (KR)

Name of the Department	**PG Chemistry Department**	Subject Title	**Physical Chemistry**
Semester	**II Semester**	Paper	**C-203: PHYSICAL CHEMISTRY-II**
Week/Month & Date (Preferably)	Day	Portions Planned for 1 hour	Teacher
1st week of April 2025	1	**Unit-I Thermodynamics' I:** Concepts of partial molar properties – partial molar free energy	Dr. R. Kavitha (KR)
	2	Chemical potential, partial molar volume and its significance.	KR
	3	Gibbs-Duhem equation, Gibbs-Duhem-Margulus equation.	KR
	4	Determination of partial molar volume: Graphical method, intercept method	KR
2nd week of April 2025	1	Apparent molar volume method of PMV. Concept of fugacity and its significance	KR
	2	Determination of fugacity by graphical method and compressibility factor method.	KR
	3	Activity and activity coefficient	KR
	4	Determination of activity coefficient by EMF and solubility method.	KR
3rd week of April 2025	1	ThermodNNamics of Non-ideal system	KR
	2	Concept of excess thermodNNamic function	KR
	3	Relations ship between excess thermodNNamic function G^E, S^E, H^E.	KR

		C^E etc.,	
	4	Phase Rule: Derivation of phase rule from the concept of chemical potential.	KR
4th week of April 2025	1	Application of Phase Rule to three components system: Principle of triangular diagram	KR
	2	Plots for a mixture of three liquids consisting of one, two and three pairs of partially miscible liquids.	KR
	3	**Statistical ThermodNNamics:** Objectives of statistical thermodNNamics	KR
	4	Concept of distributions, Types of ensembles.	KR
5th week of April 2025	1	ThermodNNamic probability, Most probable distribution Law	KR
	2	Partition Function, (Definition and significance)	KR
	3	Molar and molecular partitions function	KR
	4	Derivation of translational partition function and its relation between thermodNNamic functions (E, H,S,G and C_v)	KR
1st week of May 2025	1	Derivation of rotational partition function and its relation between thermodNNamic functions (E, H,S,G and C_v)	KR
	2	Derivation of vibrational partition function and its relation between thermodNNamic functions (E, H, S, G and C_v)	KR
	3	Derivation of electronic partition function and its relation between thermodNNamic functions (E, H, S, G and C_v)	KR
	4	Derivation of Sackur-Tetrode equation for entropy of translation function.	KR
2nd week of May 2025	1	Relation between equilibrium Constant and partition function.	KR
	2	Different Distribution Laws: Types of	KR

3rd week of May 2025		Statistics	
	3	Derivation of the equations for Maxwell – Boltzmann distribution Laws and Problems and their Solutions.	KR
	4	Derivation of the equations for Bose-Einstein distribution Laws and Problems and their Solutions.	KR
4th week of may 2025	1	Derivation of the equations for Fermi-Dirac statistics. Comparison of Bose-Einstein and Fermi-Dirac statistics with Maxwell – Boltzmann statistics. Problems and their Solutions.	KR
	2	**Non-equilibrium ThermodNNamics:** ThermodNNamic criteria for non-equilibrium states	KR
	3	Phenomenological Laws and Onsager's reciprocity relations	KR
	4	Electro kinetic Phenomenon, streaming potential, electrophoresis, sedimentation potential, Electro-osmotic potential based on Onsager's reciprocity relations	KR
5th week of may 2025	1	Postulates and methodologies: Phenomenological Laws	KR
	2	Uncompensated heat and thermodNNamics fuction production.	KR
	3	de-Donder's inequality. Rate of entropy production.	KR
	4	Transformations of the generalized fluxes and forces: eg., Chemical reaction, heat flow, Diffusion or material flow, flow of electric current.	KR
1st week of June 2025	1	Elcetrochemistry of solutions: Ionic atmosphere	KR
2nd week of	1	Debye-Huckel theory for the problem of	KR

June 2025		activity coefficient.	
	2	Debye-Huckel limiting Law, Debye-Huckel equation for appreciable Concentration.	KR
	3	Debye-HuckelOnsagar conductance equation and its extension to ion solvent Interactions.	KR
3rd week of June 2025	1	Debye-HuckelBjerrums mode, Ion association.	KR
	2	Triple ions, triple ions and conductance minima.	KR
	3	ThermodNNamics of electrified interface, derivation of electro capillary Lipmann's equation.	KR
4th week of June 2025	1	Concept of surface excess, thermodNNamic aspects of surface excess.	KR
	2	The method of determination and measurement of interfacial tension as a function of applied potential difference across the interface.	KR
	3	Introduction to double layer Structure of electrified interface	KR
	4	Helmholtz theory of double layer, and its limitations.	KR
5th week of June 2025	1	Guoy- Chapman theory of double layer, and its limitations.	KR
	2	Stern model of double layer, and its limitations.	KR
	3	Concept of Overpotential: Concentration overpotential, activation overpotentialandohmicoverpotential	KR
	4	Derivation of Butlervolmer equation.	KR
1st week of July 2025	1	Electrocatalysis: Definition and Influence of various parameters.	KR
	2	Semiconductor- solution interface: Theory of double layers at semiconductor- electrolyte interface.	KR
	3	Quantum aspects of charge transfer at electrode solution interface	KR

2nd week of July 2025	1	Quantization of charge transfer, tunneling of electrons for hydrogen evolution with reference to electrocatalysis.	KR
3rd week of July 2025	1	Polarography technique-Principle	KR
	2	DME- Merits and limitations,	KR
	3	Polarography, polarogram, half wave potential.	KR
	4	Diffusion controlled current, Ilkovic equation (no derivation),	KR
4th week of July 2025	1	Advanced electrodes	KR
	2	Carbon electrodes types and applications	KR
	3	Ion selective membrane electrodes	KR
	4	Rotating disc nd rotating ring disc electrode	KR

Teachers Allottement for C-204: Spectroscopy-I

01/04/2025 TO 31/08/2025

Unit I: Prof. K.R. Nagasundara (KRN) and Dr. Kavitha R.
Unit II and III: Prof. K.R. Nagasundara (KRN) and Dr. Nagaraju N. (NN)
Unit IV: Kavitha R. (KR)

Name of the Department	**PG Chemistry Department**	Subject Title	**Physical Chemistry**
Semester	**II Semester**	Paper	**C-204: SPECTROSCOPY-I**
Week/Month & Date (Preferably)	Day	Portions Planned for 1 hour	Teacher
1st week of April 2025	1	Symmetry and Group Theory in Chemistry: Definition of groups	K. R. Nagasundara (KRN)
	2	Symmetry and Group Theory in Chemistry: Subgroups, cyclic groups	KRN
	3	Microwave Spectroscopy:Rotations of molecules	NN (N. Nagaraju)
	4	Unifying principles:Interaction of electromagnetic radiation with matter	KR
2nd week of April 2025	1	Symmetry and Group Theory in Chemistry: Conjugate relationships, classes, simpleTheorems in group theory.	KRN
	2	Symmetry and Group Theory in Chemistry: Symmetry elements and symmetry operations	KRN
	3	Microwave Spectroscopy: Rigid diatomic molecule- rotational energy expression, energy level diagram	NN
	4	Unifying principles:Time-dependent perturbation theory	KR
3rd week of April 2025	1	Symmetry and Group Theory in Chemistry:Point groups, Schöenflies notations	KRN

	2	Symmetry and Group Theory in Chemistry: Representations of groups by matrices	KRN
	3	Microwave Spectroscopy:Rotational wave functions and their symmetry	NN
	4	Unifying principles:Transition moment integral, selection rules-symmetry and spin forbidden transitions	KR
4th week of April 2025	1	Symmetry and Group Theory in Chemistry: Reducible and irreducible representations, characters of representations	KRN
	2	Symmetry and Group Theory in Chemistry: Great Orthogonality Theorem (without proof) and its applications.	KRN
	3	Microwave Spectroscopy: Selection rules, expression for the energies of spectral lines, computation of intensities	NN
	4	Electronic Spectroscopy: Born-Oppenheimer approximation,	KR
5th week of April 2025	1	Symmetry and Group Theory in Chemistry: Character tables and their uses	KRN
	2	Symmetry and Group Theory in Chemistry: Representations for the C_n, C_{nv}, C_{nh}, D_{nh}etc groups to be worked out explicitly	KRN
	3	Microwave Spectroscopy:Effect of isotopic substitution, centrifugal distortion and the spectrum of a non-rigid rotor.	NN
	4	Electronic Spectroscopy: Vibrational coarse structure	KR
1st Week May 2025	1	Symmetry and Group Theory in Chemistry: Mulliken symbols for irreducible representations	KRN
	2	Symmetry and Group Theory in Chemistry: Applications of group theory to quantum mechanics	KRN
	3	Microwave Spectroscopy:Rotational spectra of polyatomic molecules	NN
	4	Electronic Spectroscopy: Intensities	KR

		by Franck-Condon principle	
2nd Week May 2025	1	Symmetry and Group Theory in Chemistry: Identifying non-zero matrix elements	KRN
	2	Symmetry and Group Theory in Chemistry: Derivation of the orthonormalization conditions	KRN
	3	Microwave Spectroscopy:Linear, symmetric top and asymmetric top molecules Microwave spectroscopy	NN
	4	Electronic Spectroscopy:Dissociation energy, rotational fine structure	KR
3rd Week May 2025	1	Infrared Spectroscopy-I: Vibrations of molecules	KRN
	2	Infrared Spectroscopy-I: Energy expression, energy level diagram	KRN
	3	Microwave Spectroscopy: Stark effect, techniques and instrumentation in rotational spectroscopy	NN
	4	Infrared Spectroscopy-I: Vibrational wave functions and their symmetry	KRN
4th Week May 2025	1	Infrared Spectroscopy-I: Selection rules, expression for the energies of spectral lines.	KRN
	2	Infrared Spectroscopy-I: Computation of intensities, hot bands	KRN
	3	Raman Spectroscopy: Classical theory of the Raman effect	NN
	4	Electronic Spectroscopy: Fortrat diagram, predissociation	KR
5th Week May 2025	1	Infrared Spectroscopy-I: Effect of isotopic substitution	KRN
1st Week June 2025	1	Infrared Spectroscopy-I: Diatomic vibrating rotor, Born-Oppenheimer approximation,	KRN
	2	Infrared Spectroscopy-I: vibrational-rotational spectra of diatomic molecules	KRN
	3	Raman Spectroscopy: Polarizability as a tensor	NN
2nd Week	1	Infrared Spectroscopy-I: P, Q and R	KRN

June 2025		branches, breakdown of the Born-Oppenheimer approximation.	
	2	Infrared Spectroscopy-II Vibrations of polyatomic molecules	KRN
	3	Raman Spectroscopy:Pure rotational Raman spectra of linear and asymmetric top molecules	NN
3rd Week June 2025	1	Infrared Spectroscopy-II Normal coordinates, translations, vibrations and rotations	KRN
	2	Infrared Spectroscopy-II Vibrational energy levels and wave functions.	KRN
	3	Raman Spectroscopy:Vibrational Raman spectra, Raman activity of vibrations.	NN
	4	Electronic Spectroscopy:Electronic structure of diatomic molecules-basic results of MO theory,	KR
4th Week June 2025	1	Infrared Spectroscopy-II Fundamentals, overtones andcombinations	KRN
	2	Infrared Spectroscopy-II Vibration-rotation spectra of polyatomic molecules	KRN
	3	Raman Spectroscopy:Rule ofmutual exclusion, rotational fine structure- O and S branches	NN
	4	Electronic Spectroscopy:classification of states by electronic angular momentum-σ,π,δ, and molecular orbitals	KR
5th Week June 2025	1	Infrared Spectroscopy-II Parallel and perpendicular vibrations oflinear molecules	KRN
	2	Infrared Spectroscopy-II parallel and perpendicular vibrations ofsymmetric top molecules	KRN
	3	Raman Spectroscopy:Polarization of Raman scatteredphotons	NN
1st Week July 2025	1	Electronic Spectroscopy:selection rules, spectrum of singlet and triplet molecular hydrogen	KR
2nd Week July 2025	1	Techniques and instrumentation, FTIR	KRN
	2	Problem solving in vibrational spectroscopy	KRN

	3	Raman Spectroscopy: Structure determination from Raman and IR spectroscopy-AB_2 and AB_3 molecules	NN
	4	Electronic Spectroscopy:Electronic spectra of polyatomic molecules-localized MOs	KR
3rd Week July 2025	1	Problem solving in vibrational spectroscopy	KRN
	2	Problem solving in vibrational spectroscopy	KRN
	3	Raman Spectroscopy: Techniques and instrumentation	NN
	4	Electronic Spectroscopy: Spectrum of HCHO, change of shape on excitation	KR
4th Week July 2025	1	Problems solving in Microwave spectroscopy	NN
	2	Electronic Spectroscopy:Decay of excited states- radiative (fluorescence and phosphorescence)	KR
	3	Electronic Spectroscopy: Non-radiative decay, internal conversion	KR
	4	Revision Classes and question paper solving	KR

Teachers Allottement for C-205: Green Synthesis (Soft Core)

01/04/2025 TO 31/08/2025

Unit I II and III: Dr. Umesha K (UK)

Name of the Department	PG Chem	Subject Title	Green Synthesis
Semester	II	Paper	Ch-205
Week/Month & Date (Preferably)	Day	Portions Planned for 1 hour	Teacher
1st week of April 2025	1	Use of ultrasound: Introduction, instrumentation	UK
	2	the phenomenon of cavitation	
2nd week of April 2025	1	Sonochemical esterification, substitution, addition	UK
	2	Sonochemical alkylation, oxidation, reduction and coupling reactions	
	3	Use of Microwaves: Introduction, concept	
3rd week of April 2025	1	reaction vessel/medium, specific effects, atom efficiency (% atom utilization)	UK
	2	atom efficiency (% atom utilization), advantages and limitations	
	3	N-alkylation and alkylation of active methylene compounds,	
4th week of April 2025	1	condensation of active methylene compounds with aldehydes and amines.	UK
	2	Diels-Alder reaction	
	3	Deprotection of esters and silyl ethers. Oxidation of alcohols and sulfides.	
5th week of April 2025	1	Revision Class	UK
	2	**Ionic-liquids**: Introduction, structure, synthesis	
1st week of May 2025	1	Applications of some important ionic liquids in organic synthesis.	UK

2nd week of May 2025	1	**Polymer supported reagents in organic synthesis** Introduction- properties of polymer support	UK
	2	advantages of polymer supported reagents and choice of polymers.	
	3	Applications: Substrate covalently bound to the support: Synthesis of oligosachcharides, Dieckmann cyclisation.	
3rd week of May 2025	1	Preparation of polymer bound aldehyde and application in aldol and Wittig reactions.	UK
	2	Synthesis of polystyryl boronic acid and use in diol protection reaction.	
	3	Reagent linked to a polymeric material: Preparation of sulfonazide polymer and application in diazotransfer reaction.	
4th week of May 2025	1	Synthesis of polymer bound per acid and its applications.	UK
	2	Polymer supported catalytic reactions: Preparation of polymer supported $AlCl_3$ and application in etherification and acetal formation reactions.	
5th week of May 2025	1	Revision Class	UK
	2	Class Test	
	3	**Phase transfer catalysis:** Introduction, definition, mechanism of phase transfer catalysis.	
1st week of June 2025	1	Types of phase transfer catalysts and reactions and their Advantages.	UK
	2	Preparation of catalysts and their application in substitution, elimination,	
	3	Preparation of catalysts and their application in addition, alkylation, oxidation and reduction reactions.	
2nd week of June 2025	1	Crown ethers: Introduction, nomenclature, features, nature of donor site.	UK
	2	General synthesis of Crown ethers.	
	3	Synthetic applications: Alkylation, generation of carbenes	
3rd week of June 2025	1	Synthetic applications: aromatic substitution and displacement reactions	UK
	2	Generation and application of superoxide anions. Cation deactivation reactions.	
	3	Revision Class	

4th week of June 2025	1	**Multi-component Reactions:** Studies on the mechanistic aspects and use of the Passerini-Ugi reactions in organic synthesis.	UK
	2	Studies on the mechanistic aspects and use of the Hantsch reactions in organic synthesis.	
	3	Studies on the mechanistic aspects and use of the Doebner-Miller reactions in organic synthesis.	
5th week of June 2025	1	Studies on the mechanistic aspects and use of the Ritter reactions in organic synthesis.	UK
	2	Studies on the mechanistic aspects and use of the Jacobson reactions in organic synthesis.	
1st week of July 2025	1	Studies on the mechanistic aspects and use of the Robinson-Schopf reactions in organic synthesis.	UK
2nd week of July 2025	1	Studies on the mechanistic aspects and use of the Baylis-Hilmann reactions in organic synthesis.	UK
	2	Studies on the mechanistic aspects and use of the Suzuki coupling reactions in organic synthesis.	
	3	Studies on the mechanistic aspects and use of the Biginelli reactions in organic synthesis.	
3rd week of July 2025	1	Studies on the mechanistic aspects and use of the Ivanov reactions in organic synthesis	UK
	2	Studies on the mechanistic aspects and use of the Barbier reactions in organic synthesis.	
	3	Studies on the mechanistic aspects and use of the Betti reactions in organic synthesis.	
4th week of July 2025	1	Revision Classes	UK
	2	Revision Classes	
	3	Revision Classes	
5th week of July 2025	1	Class Test	UK
	2	Revision Classes	

For IV Semester: 01/04/2025 TO 31/08/2025

Teachers Allottement for C-401: Organometallic and Heterocyclic Chemistry

Unit I: Dr. B. P. Nethravathi (BPN)

Unit II: Dr. Nagaraju N. (NN)

Unit III and IV: Sri. Yadhunandana N. G. (NN)

Name of the Department	**PG Chemistry**	**Subject Title**	**Organic chemistry**
Semester	**IV**	**Paper**	**C-401: Organometallic and Heterocyclic Chemistry**
Week/Month & Date (Preferably)	**Day**	**Portions Planned for 1 hour**	**Teacher**
1st week of April 2025	1	**Unit I:** Chemistry of Organotransition metal complexes: General introduction. 18- and 16-Electron rules. General rules	BPN
	2	**Unit II:** Introduction to organometallics in Organic SNNthesis.	NN
	3	*Organosilicons*: Introduction, preparation.	NN
	4	**Unit III:** General reactions of trialkylsilyl halides. Peterson olefination.	NN
2nd week of April 2025	1	Complexation and De-complexation Reactions	BPN
	2	*Organozincs*: Preparation, reaction with compounds containing acidic protons.	NN
	3	*Organotins*: Preparation and reactions of tri-*n*-butyltin hydride.	NN
	4	Barton decarboxylation and Barton- McCombie reaction.	NN
3rd week of April	1	s-Bonded systems including h1 ligands.	BPN

2025	2	*Organozincs*: reaction with C-C multiple bonds, trans-metallation.	NN
	3	*Organocerates*: Preparation and reactions of organocerates.	NN
	4	*Organocerates*: reactions of organocerates.	NN
4th week of April 2025	1	P Bonded systems involving dihapto to octahapto ligands: olefins, acetylenes, allyl moieties, butadiene,	BPN
	2	*Organozincs*: addition reactions of zinc reagents with carbonyl compounds. Simmons Smith, and Reformatsky reaction.	NN
	3	*Organomercurials*: Preparation. Electrophilic substitution reactions.	NN
	4	Solvomercuration-de-mercuration and cyclopropanation of alkenes.	NN
5th week of April 2025	1	cyclobutadiene, arenes, cyclopenta, cyclohexa and cycloheptadienyl moieties	BPN
	2	*Organolithiums*: Preparation. Deprotonation reactions.	NN
	3	**Unit IV**: Introduction Heterocyclic Chemistry.	NN
	4	*Small ring heterocycles*: Properties and reactions of 3-membered heterocycle.	NN
1st Week of May 2025	1	cyclohepta, cyclooctatrienes, and cyclooctatetraene moieties.	BPN
	2	*Organolithiums*: nucleophilic addition reactions, reactions with imines, nitriles and isonitriles.	NN
	3	*Small ring heterocycles*: Properties and reactions of 4-membered heterocycles	NN
	4	Properties and reactions of oxiranes, thiranes and aziridines.	NN
2nd Week of May 2025	1	Use of organotransition metal complexes as protecting and stabilizing groups: Protection of olefins, acetylenes	BPN

		and dienes.	
	2	*Organocopper reagents*: (Gilman reagents-lithium dialkyl cuprates): Preparation.	NN
	3	Properties and reactions of azetidines, oxetanes and thietanes.	NN
	4	*Benzo-fused heterocycles*: SNNthesis and reactions of benzofurans, benzothiophenes,	NN
3rd Week of May 2025	1	Stabilization of cyclobutadines and norbornadienones.	BPN
	2	*Organocopper reagents*: reactions with alkyl, allyl, vinyl, benzyl and aryl halides.	NN
	3	Benzoxazoles, benzothiazoles and benzimidazoles.	NN
	4	*Six-membered heterocycles with two or more heteroatoms*: SNNthesis of Diazines, triazines.	NN
4th Week of May 2025	1	Organometallics as electrophiles and nucleophiles: Nucleophilic addition to h2, h5 and h6 complexes.	BPN
	2	*Organocopper reagents*: reactions aldehydes, ketones (including a,b-unsaturated carbonyl compounds) and epoxides.	NN
	3	*Six-membered heterocycles with two or more heteroatoms*: SNNthesis of tetrazines and thiazines.	NN
	4		NN
1st Week of June 2025	1	Electrophilic addition to h4, h6 and carbene complexes.	BPN
	2	*Organoseleniums*: preparation. Use of organoseleniums in the sNNthesis of alkenes.	NN
	3	*Seven and large membered heterocycles*: SNNthesis and reactions of azepanes, oxepines,	NN

		thiepines, diazepines.	
	4	*Seven and large membered heterocycles*: SNNthesis and reactions of thiazepines, azocines.	NN
2nd Week of June 2025	1	**Revision**	BPN
	2	*Organoseleniums*: fromalkyl halides, α,β -unsaturated carbonyl compounds from carbonyl compounds.	NN
	3	*Seven and large membered heterocycles*: SNNthesis and reactions of diazocines, dioxocines and dithiocines.	NN
	4	*Heterocycles containing P, As, Sb and Bi*: SNNthesis of 5- and 6- membered heterocycles with P, As, Sb and Bi.	NN
3rd Week of June 2025	1	**Organometallics in coupling and cyclization reactions:** Coupling and cyclization of organic nucleophiles with olefins (including Heck reaction)	BPN
	2	Organotelluriums*:*Debromination of vic-dibromides, deoxygenation of epoxides.	NN
	3	*Heterocycles containing P, As, Sb and Bi*: Introduction.	NN
	4	SNNthesis of 5- and 6-membered heterocycles with P.	NN
4th Week of June 2025	1	Coupling of olefins with acetylenes (including Felkin's reaction)	BPN
	2	Organotelluriums*:* Oxidation of hydroquinone and sNNthesis of biaryls.	NN
	3	SNNthesis of 5- and 6-membered heterocycles with As.	NN
	4	*Heterocycles containing P, As, Sb and Bi*: SNNthesis of 5- and 6- membered heterocycles with Sb.	NN

1st Week of July 2025	1	Organometallics in isomerisation, oxidation and reduction reactions: Isomerization of olefins	BPN
	2	*Organoaluminiums*: Preparation, hydroalumination.	NN
	3	*Heterocycles containing P, As, Sb and Bi*: SNNthesis of 5- and 6- membered heterocycles with Bi.	NN
	4	Revision	NN
2nd Week of July 2025	1	Allylic alcohols and allylic ethers Oxidation of olefins (including Wacker's process and epoxidation)	BPN
	2	*Organoaluminiums*: carboalumination of alkenes.	NN
	3	*Mesoionic compounds*: General classification, chemistry of some important meso-ionic heterocycles of type-A and type-B and their applications.	NN
	4	*Mesoionic compounds*: Introduction.	NN
3rd Week of July 2025	1	Reduction of olefins and α,β – unsaturated compounds (including Wilkinson's reaction).	BPN
	2	Nucleophillic addition reactions with carbonyl compounds and Hydrocyanation. Preparation of alkenyldialkylalanes and their reactions.	NN
	3	General classification, chemistry of some important meso-ionic heterocycles.	NN
	4	chemistry of some important meso-ionic heterocycles of type-A and type-B and their applications.	NN
4th Week of July 2025	1	Revision	BPN
	2	Revision class.	NN
	3	Revision class.	NN
	4	Revision class.	NN

5th week of July 2025	1	Revision class.	NN
	2	Revision class.	NN

01/04/2025 TO 31/08/2025

Teachers Allottement for C-402: Stereochemistry & RetrosNNthetic Analysis

Unit I and II: Visiting Faculty (VF)

Unit III and IV: Dr. Umesha K. (VF)

Name of the Department	**PG**	**Subject Title**	**RETROSNNTHETIC ANALYSIS**
Semester		**Paper**	**C-402**
Week/Month & Date (Preferably)	**Day**	**Portions Planned for 1 hour**	**Teacher**
1st week of April 2025	1	**Unit I:** Optical activity in the absence of chiral atoms.	VF
	2	Chirality in biphenyls, adamentanes, ansa compounds.	VF
	3	**Unit II: RETROSNNTHETIC ANALYSIS: Disconnection approach** Introduction to sNNthons, and sNNthetic equivalents.	UK
	4	Disconnection approach with examples.	UK
2nd week of April 2025	1	Optical activity in the absence of chiral atoms.	VF
	2	cyclophanes, *trans*-cyclooctene.	VF
	3	Disconnection approach with examples.	UK
	4	Basic principles and terminologies used in disconnection approach.	UK
3rd week of April 2025	1	catenanes, rotaxanes and helicenes.	VF
	2	Assignment of R, S- configuration to these classes of compounds.	VF
	3	One group C-X disconnections with examples.	UK
	4	One group C-X disconnections with examples.	UK
4th week of April	1	Assignment of R, S- configuration	VF

2025		to these classes of compounds.	
	2	Optical activity due to the presence hetero atoms.	VF
	3	Two group C-X disconnections with examples	UK
	4	Chemoselectivity and its guidelines	UK
5th week of April 2025	1	Chirality of organic compounds due to the presence of silicon, nitrogen,	VF
1st week of May 2025	1	Chirality of organic compounds due to the presence of phosphorous, arsenic and sulphur atoms.	VF
	2	Reversal of polarity, Cyclisation reactions.	UK
	3	Revision Class	UK
2nd week of May 2025	1	Determination of R,S-configuration of these compounds using CIP rules.	VF
	2	Determination of R,S-configuration of these compounds using CIP rules.	VF
	3	Unit Test	UK
	4	**Unit III: Protecting groups** Principle of protection of alcohols	UK
3rd week of May 2025	1	**Transannular reactions** Conformational analysis of medium rings.	VF
	2	Trasnannular reactions: Hydrolysis of medium ring epoxides.	VF
	3	Principle of protection of amines	UK
	4	Principle of protection of carboxylic acids	UK
4th week of May 2025	1	Trasnannular reactions: bromination of C8–C10 cyclic dienes.	VF
	2	Determining absolute and relative configuration.	VF
	3	Principle of protection of carbonyl groups	UK
	4	**C-C one group disconnections** SNNthesis of alcohols	UK
5th week of May 2025	1	Revision Class	VF
	2	Unit Test	VF
	3	SNNthesis of carbonyl compounds and alkenes	UK
1st week of June 2025	1	**C-C two group disconnections** SNNthesis of alcohols, SNNthesis	UK

		of carbonyl compounds and alkenes	
2nd week of June 2025	1	**Unit II**: Chemical correlation of configuration: Methods without involving the chiral centre.	VF
	2	Chemical transformation involving the chiral centre. Chemical correlation involving diastereomers.	VF
	3	Use of acetylides and aliphatic nitro compounds in organic sNNtesis.	UK
	4	Diels-Alder reaction, 1,3-difunctionalised compounds, α,β-unsaturated compounds,	UK
3rd week of June 2025	1	Methods based on comparison of optical rotation: Distance rule, Rule of shift, Rule of optical superposition, Mill's rule, Method based on molecular rotation difference	VF
	2	The method of quasi-racemate.	VF
	3	carbonyl compounds condensations, 1,5- difunctionalised compounds.	UK
	4	Micheal addition and Robinson annelation.	UK
4th week of June 2025	1	Use optical rotatory dispersion curves.	VF
	2	α-axial haloketone rule and its applications.	VF
	3	Revision Class	UK
	4	Unit Test	UK
5th week of June 2025	1	Octant rule (application of these rules in the determination of absolute configuration of substituted cyclohexanones, decalones and cholestanones).	VF
	2	Application of these rules in the determination of absolute configuration of substituted cyclohexanones, decalones and cholestanones.	VF
	3	**Unit IV**: Ring sNNthesis SNNthesis of saturated heterocycles and 3-, 4-, 5- and 6-membered rings	UK
	4	SNNthesis of some complex molecules using disconnection approach, Ex: Aromadendrene,	UK
	1	Method based on anomalous X- ray	VF

1st week of July 2025		scattering.	
	2	Revision class	VF
	3	SNNthesis of some complex molecules using disconnection approach, Ex: Longifloene, Cortisone,	UK
	4	SNNthesis of some complex molecules using disconnection approach, Ex: Reserpine and Vitamin-D.	UK
2nd week of July 2025	1	Unit Test	VF
	2	Revision class	VF
	3	SNNthesis of some complex molecules using disconnection approach, Ex: Juvabione and Fredericamycin-A.	UK
	4	SNNthesis of some complex molecules using disconnection approach, Ex: Lycorane.	UK
3rd week of July 2025	1	Revision class	VF
	2	Revision class	VF
	3	Revision class	UK
	4	Unit Test	UK
4th week of July 2025	1	Revision class	VF
	2	Revision class	VF
	3	Revision class	UK
	4	Unit Test	UK

01/04/2025 TO 31/08/2025

Teachers Allottement for C-403: Organic SNNthesis

Unit I: Dr. SM Basavarajaiah (SMB)

Unit II, III and IV: Visiting Faculty (VF)

Name of the Department	**PG Chemistry**	**Subject Title**	**Organic Chemistry**
Semester	**IV**	**Paper**	**C-403: Organic SNNthesis.**
Week/Month & Date (Preferably)	**Day**	**Portions Planned for 1 hour**	**Teacher**
1st week of April 2025	1	**Unit I: C-C and C-N bond forming reactions** Darzen's reaction, Use of acetylides in C-C bond formation reactions.	SMB
	2	**Unit IV**: Asymmetric SNNthesis: Introduction'*ee'* and methods of determination of '*ee'*.	VF
2nd week of April 2025	1	Acid-catalyzed self condensation of olefins, Prins reaction,	SMB
	2	Shapiro reaction, Dieckmann cyclization,	VF
	3	Stereoselectivity: classification, terminology and principle.	VF
3rd week of April 2025	1	Robinson annulations, Hofmann-Loeffler-Freytag reaction.	SMB
	2	Hofmann-Martius reaction. Acyloin condensation.	VF
	3	Houben-Hoesch reaction. Stork-enamine sNNthesis.	VF

	4	Stereoselectivity: classification, terminology and principle.	VF
4th week of April 2025	1	Meyer sNNthesis. Use of nucleophilic nitrogen and electrophilic carbon (NH3 as nucleophile in substitution)	SMB
	2	amines and nitrite as nucleophiles in substitution	VF
	3	NH_3 and amines in addition to ketones and aldehydes	VF
	4	Asymmetric sNNthesis and asymmetric induction.	VF
5th week of April 2025	1	Skraup sNNthesis and Chichibabin reaction	SMB
	2	Mitsunobu reaction and N-Nitroso amine rearrangement reaction	VF
	3	Double diastereoselection and double asymmetric induction.	VF
1st week of May 2025	1	Fischer-Hepp reaction and Japp-Klingmann reaction	VF
	2	Reagents in organic sNNthesis Use of aluminium isopropoxide	VF
	3	**Unit II**: Use of NBS and LDA	VF
	4	Acyclic stereoselection: Addition of nucleophiles to carbonyl compounds (1,2- 1,3- asymmetric induction).	VF
2nd week of May 2025	1	Use of DCC and Corey-Chaykovsky reagent	SMB
	2	Use of DDQ and Raney Nickel	VF
	3	Addition of nucleophiles to carbonyl compounds (1,4- asymmetric induction).	VF
3rd week of May 2025	1	Use of Diazomethane and TMS-Cl	VF
	2	Use of 1,3-dithianes (Umpolung and reactivity) and PPA	VF
	3	Use of Yamaguchi reagent and woodward and Prevost hydroxylation	VF
	4	Class test	VF
4th week of May 2025	1	**Unit II: Oxidations I**: Chromium (VI) oxidants	VF
	2	Mn (VII) oxidants and OsO_4	VF
	3	Asymmetric aldol condensation. Addition of allylmetal and	VF

		allylboranes to carbonyl group.	
5th week of May 2025	1	SeO_2 as oxidants	VF
	2	HIO_4 as oxidant	VF
	3	$Pb(OAc)_4$ as oxidant	VF
	4	Diastereoselection in cyclic systems: Nucleophilic addition to cyclic ketones (formation of axial and equatorial alcohols.	VF
1st week of June 2025	1	Ag_2O as oxidants	VF
	2	catalytic hydrogenation, alkylation, diastereoselective oxidations and stereoselective cyclization of poylenes.	VF
	3	Use of (+)- and (–)- DET in asymmetric epoxidation.	VF
2nd week of June 2025	1	DMSO as oxidant	VF
	2	**Unit III: Oxidations II**: ozone, peroxides (H2O2)	VF
	3	peroxides (*t*-BuOOH)	VF
	4	Polymer-bound chiral catalysts in asymmetric induction.	VF
3rd week of June 2025	1	peroxides (dibenzoylperoxide)	VF
	2	peracids (Preparation, properties and applications of CF_3COOOH) as oxidizing agents	VF
	3	peracids (Preparation, properties and applications of *m*-CPBA,) as oxidizing agents	VF
	4	Enantioselective sNNthesis: Reduction with chiral hydride donors [(S)-PBMgCl.	VF
4th week of June 2025	1	peracids (Preparation, properties and applications of momoperphthalic acid) as oxidizing agents	VF
	2	Dess-Martin oxidation.	VF
	3	(-)- *i*$BOAlCl_2$, alpine-borane,	VF
1st week of July 2025	1	**Unit III: Reductions** Complex metal hydrides,	VF
	2	dissolving metal reductions (including Birch and Benkeser)	VF
	3	Clemmensen reductions	VF

	4	(S)-BINAL-H, (R,R)-DIOP, and (S,S)-CHIRAPHOS).	VF
2nd week of July 2025	1	catalytic hydrogenation (homogeneous)	VF
	2	Catalytic hydrogenation (heterogeneous) and diimide reduction.	VF
	3	Enantioselective alkylation of ketones *via* hydrazones.	VF
	4	Revision class	SMB
3rd week of July 2025	1	Wolf-Kishner reduction and McMurry reaction.	VF
	2	Enantioselective alkylation with chiral PTC. Asymmetric amplification.	VF
	3	Enantioselective Michael addition and intramolecular aldol condensation.	VF
4th week of July 2025	1	Pummer reaction and Corey-Bakshi-Shibata reaction.	VF
	2	Willgerdot reaction and Tishchenko reactions.	VF
	3	Revision class.	VF
	4	Revision class.	SMB

01/04/2025 TO 31/08/2025

Teachers Allottement for C-404: Medicinal Organic Chemistry

Unit I and III: Dr. S. M. Basavarajaiah (SMB)

Unit II and IV: Sri. Yadhunandana N. G. (NN)

Name of the Department	**PG Chemistry**	**Subject Title**	**ORGANIC CHEMISTRY**
Semester	**IV**	**Paper**	**C-404: Medicinal Organic Chemistry**
Week/Month & Date (Preferably)	**Day**	**Portions Planned for 1 hour**	**Teacher**
1st week of April 2025	1	**Unit I:** Introduction to Medicinal chemistry.	SMB
	2	Basics of drug receptor interactions.	SMB
2nd week of April 2025	1	Theories of drug activity-Occupation theory.	SMB
	2	Theories of drug activity-Rate theory.	SMB
3rd week of April 2025	1	Theories of drug activity-Induced fir theory.	SMB
	2	Hansch equation. Computer-aided drug design.	SMB
	3	**Unit IV**: Introduction and general mode of action Local infective agents.	NN
	4	**Unit II**: Antibiotics.	NN
4th week of April 2025	1	Molecular modelling examples.	SMB
	2	SNNthesis of sulphonamides, furazolidone.	NN
	3	Structure elucidation of	NN

		streptomycin.	
	4	**Unit I**: Occurrence. Nomenclature, basic skeleton, Diels hydrocarbon and stereochemistry.	SMB
5th week of April 2025	1	Isolation, structure and structural elucidation of sterols.	SMB
	2	Isolation, structure and structural elucidation of bile acids.	SMB
	3	Ciprofloxacin, dapsone, aminosalicyclic acid.	NN
1st week of May 2025	1	Sex hormones and corticosteroids.	SMB
	2	Isoniazide, ethionamide.	NN
	3	SNNthesis of streptomycin.	NN
	4	SNNthesis of cholesterol	SMB
2nd week of May 2025	1	SNNthesis of cholesterol	SMB
	2	ethambutal, fluconazole,	NN
	3	Structure elucidation penicillins.	NN
	4	SNNthesis of estrone, progesterone.	SMB
3rd week of May 2025	1	econozole, griseofulvin	NN
	2	SNNthesis of penicillins.	NN
	3	SNNthesis of testosterone.	SMB
	4	SNNthesis of androsterone, testosterone.	SMB
4th week of May 2025	1	Photo products of ergosterol-vitamins D.	SMB
	2	chloroquin and primaquin	NN
	3	Structure elucidation of cephalosporin-C.	NN
	4	Barton reaction for the sNNthesis of aldosterone.	SMB
5th week of May 2025	1	Marker degradation. Brief discussion of homosteroids, norsteroids and oral contraceptives.	SMB
	2	Introduction to Psychoactive drugs- neurotransmitters. CNS depressants, general anaesthetics.	NN
	3	SNNthesis of cephalosporin-C.	NN
	4	SNNthesis of (*dl*)-norgestrel and ethinyl oestradiol.	SMB
1st week of June	1	SNNthesis of (*dl*)-norgestrel and	SMB

2025		ethinyl oestradiol.	
	2	Mode of action of hypnotics, sedatives, anti-anxiety drugs, benzodiazepines, busprione.	NN
	3	Structure elucidation chloromycetin.	NN
	4	**Unit III***: Antidiabetics*: Sequence of A- & B- chains of insulin.	SMB
2nd week of June 2025	1	*Antidiabetics*: Glibenclamide, metformin, ciglitazone.	SMB
	2	Antipsychotic drugs- the neuroleptics, antidepressants, butyrophenones, serendipity and drug development.	NN
	3	SNNthesis of chloromycetin.	NN
	4	*Antihistamines*: Methapyrilene, chlorpheniramine.	SMB
3rd week of June 2025	1	*Antivirals* **:** Acyclovir, amantidine, rimantidine and zidovudine.	SMB
	2	Neurochemistry of mental diseases.	NN
	3	Structure elucidation of tetracyclins (terramycin and aureomycin).	NN
	4	*Antineoplastic agents:* Introduction, cancer chemotherapy, special problems.	SMB
4th week of June 2025	1	Role of alkylating agents and antimetabolites in treatment of cancer.	SMB
	2	Stereochemical aspects of psychotropic drugs. SNNthesis of chlorpromazine, diazepam, Oxazepam.	NN
	3	SNNthesis of tetracyclins (terramycin and aureomycin).	NN
	4	Mention of carcinolytic antibiotics and mitotic inhibitors. SNNthesis of mechlorethamine,	SMB
1st week of July-2025	1	Cyclophosphamide, melaphan, uracil mustards and 6-mercaptopurine.	SMB
	2	chlorazepam, alprazolam,	NN

		phenytoin, ethosuximide.	
	3	Structure elucidation and sNNthesis of terramycin and aureomycin.	NN
	4	Recent development in cancer chemotherapy. Hormone and natural products.	SMB
2nd week of July-2025	1	*Cardiovascular drugs:* Introduction, cardiovascular diseases.	SMB
	2	Trimethadione, barbiturates, thiopental sodium, glutethimide.	NN
	3	Revision class and question paper solving.	NN
	4	Drug inhibitors of peripheral sympathetic function, central intervention of cardiovascular output.	SMB
3rd week of July-2025	1	Direct acting arteriolar dilators. SNNthesis of amyl nitrite, sorbitrate,	SMB
	2	Diltiazem, quinidine, verapamil, methyldopa, atenolol, oxyprenol.	SMB
	3	Revision class and question paper solving.	SMB
	4	Class test	SMB