

Department of Chemistry

Rajeev Gandhi Govt . Post Graduate College Ambikapur

CROSS CUTTING ISSUES

Class/Cou rse Code	Course Title	Description	Cross cutting issues			
			Gender	Human Values	Professional ethics	Environment & Sustainability
M. Sc.I /MSC 101	INORGANIC CHEMISTRY-I	<ul style="list-style-type: none"> • STEREOCHEMISTRY AND BONDING IN MAIN GROUP COMPOUNDS • REACTION MECHANISM OF TRANSITION • METAL COMPLEXES • METAL LIGAND BONDING • METAL COMPLEXES 				✓
M. Sc.I /MSC 102	ORGANIC CHEMISTRY -I	<ul style="list-style-type: none"> • STEREOCHEMISTRY • CONFORMATIONAL ANALYSIS • ALIPHATIC NUCLEOPHILIC SUBSTITUTION REACTION AND ALIPHATIC ELECTROPHILIC SUBSTITUTION • AROMATIC ELECTROPHILIC SUBSTITUTION REACTIONS • AROMATIC NUCLEOPHILIC SUBSTITUTIONS AND 		✓		✓
M. Sc.I /MSC 103	ANALYTICAL CHEMISTRY-1	<ul style="list-style-type: none"> • FUNDAMENTALS OF CHEMICAL ANALYSIS • CHROMATOGRAPHY • ION EXCHANGE • SOLVENT EXTRACTION • SPECTROSCOPIC TECHNIQUES 				✓
M. Sc.I /MSC 111	INORGANIC CHEMISTRY LAB.	<ul style="list-style-type: none"> • QUALITATIVE ANALYSIS OF MIXTURE CONTAINING EIGHT RADICALS • QUANTATIVE ANALYSIS • ESTIMATION 				✓
M. Sc.I /MSC 112	ANALYTICAL CHEMISTRY LAB	<ul style="list-style-type: none"> • ERROR ANALYSIS & STATISTICAL DATA ANALYSIS • VOLUMETRIC AND GRAVIMETRIC ANALYSIS • CHROMATOGRAPHY • PH METRY /POTENTIOMETRY • SPECTROPHOTOMETRY • NEPHELOMETRY/TURBIDIMETRY • APPLICATION OF COMPUTER IN CHEMISTRY 				✓
M. Sc.I /MSC 104	SOCIAL OUTREACH, ENTERPRENEUR SHIP & INTERSHIP		✓	✓	✓	✓
M. Sc.I /MSC 105	CONSTITUTIONALISM & INDIAN POLITICAL SYSTEM	<ul style="list-style-type: none"> • CONSTITUTION • CONCEPT OF STATE AND CITIZENSHIP • UNION EXECUTIVE AND STATE EXECUTIVE • PARLIAMENT OF INDIA • INDIAN DEMOCRACY • CONTROLLER & ACCOUNTANT GENERAL OF INDIA 	✓	✓	✓	

M. Sc.I /MSC 106	GROUP THEORY ,SPECTROSCOPY AND DIFFRACTION METHOD	<ul style="list-style-type: none"> • DIFFERATION TECHNIQUES • GROUP THEORY • PHOTOELECTRON SPECTROSCOPY • NUCLEAR MAGNETIC RESONANCE SPECTROSCOPY • ELECTRON SPIN RESONANCE SPECTROSCOPY 		✓		✓
M. Sc.I /MSC 107	COMPUTER PROGRAMMING IN CHEMISTRY	<ul style="list-style-type: none"> • FUNDAMENTAL OF PROGRAMMING • INTRODUCTION TO C AND PROGRAMMING • NUMERICAL ANALYSIS • DEVELOPMENT OF SMALL COMPUTER CODE • INTRODUCTION AND USE OF COMPUTER PACKAGES 				✓
M. Sc.I /MSC 108	MEDICINAL CHEMISTRY	<ul style="list-style-type: none"> • DRUG DESIG • PHARMACOKINETICS • ANTINEOPLASTIC AGENT • DRUG SYNTHESIS • CARDIOVASCULAR DRUGS 	✓	✓	✓	✓

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M. Sc.II/MSC 201	INORGANIC CHEMISTRY-2	<ul style="list-style-type: none"> ELECTRONIC SPECTRA AND MAGNETIC PROPERTIES OF TRANSITION METAL COMPLEXES METAL CLUSTURES HOMOGENOUS AND HETEROGENOUS CATALYSIS BY ORGANOMETALLIC COMPOUND BIOINORGANIC CHEMISTRY COORDINATION CHEMMISTRY 		✓		
M. Sc.II/MSC 202	ORGANIC CHEMISTRY -2	<ul style="list-style-type: none"> ADDITION TO CARBON - CARBON AND CARBON - HETERO MULTIPLE BONDS OXIDATIONS AND REDUCTIONS MOLECULAR REARRANGEMENTS NATURE OF BONDING AND REACTION MECHANISM REACTION INTERMEDIATES 		✓		
M. Sc.II/MSC 203	PHYSICAL CHEMISTRY -2	<ul style="list-style-type: none"> RECAPITULATION RAMAN SPECTROSCOPY ELECTRONIC SPECTROSCOPY OF MOLECULES NEUTRON DIFFRACTION ELECTRON DIFFERACTON QUANTUM CHEMISTRY SURFACE CHEMISTRY 		✓		
M.Sc.II/MSC 211	ORGANIC CHEMISTRY LAB	<ul style="list-style-type: none"> QUALITATIVE ANALYSIS -ORGANIC SYNTHESIS QUANTITATIVE ANALYSIS 		✓		
M.Sc.II/MSC 212	PHYSICAL CHEMISTRY LAB	<ul style="list-style-type: none"> ADSORPTION CHEMICAL KINETICS SOLUTION CONDUCTOMETRY POTENTIOMETRYS/pH METRY 		✓		
M.Sc.II/MSC 204	RESEARCH METHODOLOGY &COMPUTER APPLICATION	<ul style="list-style-type: none"> CONCEPT OF RESEARCH TOOLS OF RESEARCH METHODS OF RESEARCH TREATMENT OF DATA COMPUTER FUNDAMENTAL OPERATING SYSTEM OFFICE SOFTWARE PACKAGE 		✓	✓	
M.Sc.II/MSC 205	ENVIRONMENTAL AND FOREST LAWS	<ul style="list-style-type: none"> EVOLUTION OF FOREST AND WILD LIFE LAWS FOREST PROTECTION AND LAW WILDLIFE PROTECTION AND LAW BASIC CONCEPTS INTRODUCTION TO LEGAL SYSTEM LEGISLATIVE FRAMEWORK FOR POLLUTION CONTROL LAWS LEGISLATIVE FRAMEWORK FOR ENVIRONMENT PROTECTION ENVIRONMENTAL CONSTITUTIONALISM 	✓	✓	✓	
M.Sc.II/MSC 206	POLYMER CHEMISTRY	<ul style="list-style-type: none"> BASIC CONCEPTS KINETICS AND MECHANISM INDUSTRIAL NATURAL POLYMERS SPECIALITY POLYMERS 				

M.Sc.II/MSC 207	V (ORGANIC SYNTHESIS-1)	<ul style="list-style-type: none"> • MODERN SYNTHETIC METHODS, REACTIONS AND REAGENTS • NUCLEOPHILIC C-C BOND FORMATION • ELECTROPHILIC C-C BOND FORMATION • MISCELLANEOUS REACTIONS • REAGENTS IN ORGANIC SYNTHESIS 		✓	✓	
M.Sc.II/MSC 208	V (APPLIED CHEMISTRY)	<ul style="list-style-type: none"> • CHEMISTRY OF WATER • CHEMISTRY OF DRUGS • CHEMISTRY OF POLYMERS • CHEMISTRY OF MATERIALS • CHEMISTRY OF ENVIRONMENTAL POLLUTANTS 		✓	✓	

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M.Sc.III/MSC 301	APPLICATION OF SPECTROSCOPY – INORGANIC CHEMISTRY	<ul style="list-style-type: none"> • APPLICATIONS OF ATOMIC ABSORPTION SPECTROSCOPY • VIBRATIONAL SPECTROSCOPY SYMMETRY AND SHAPES • ELECTRON SPIN RESONANCE SPECTROSCOPY HYPERFINE COUPLING • ELECTRONIC SPECTROSCOPY • MOSSBAUER SPECTROSCOPY BASIC PRINCIPLES 				✓
M.Sc.III/MS C 302	APPLICATION OF SPECTROSCOPY – ORGANIC CHEMISTRY	<ul style="list-style-type: none"> • ULTRAVIOLET AND VISIBLE SPECTROSCOPY VARIOUS ELECTRONIC TRANSITIONS (185-800 NM) • MASS SPECTROSCOPY • INFRARED SPECTROSCOPY INSTRUMENTATION AND SAMPLE HANDLING • NUCLEAR MAGNETIC RESONANCE SPECTROSCOPY GENERAL INTRODUCTION AND DEFINITION • SIMPLIFICATION OF COMPLEX SPECTRA-NUCLEAR MAGNETIC DOUBLE RESONANCE 		✓		✓
M.Sc.III/ MSC 303	PHOTOCHEMIS	<ul style="list-style-type: none"> • PHOTOCHEMISTRY • INTERACTION OF ELECTROMAGNETIC RADIATION WITH MATTER • DETERMINATION OF REACTION MECHANISM • PHOTOCHEMISTRY OF ALKENES • PHOTOCHEMISTRY OF CARBONYL COMPOUNDS 		✓		✓
M.Sc.III/ MSC 311	GENERAL CHEMISTRY LAB	<ul style="list-style-type: none"> • INSTRUMENTAL METHODS AND ANALYTICAL TECHNIQUES • A. SPECTROPHOTOMETRIC DETERMINATIONS • B. PH METRY C. POLAROGRAPHY • D. FLAME PHOTOMETRIC DETERMINATIONS • E. NEPHELOMETRIC DETERMINATIONS • F. SEPARATION AND QUANTITATIVE ESTIMATION OF BINARY AND TERNARY MIXTURES BY THE USE OF THE FOLLOWING SEPARATION TECHNIQUES SECTION –B [ORGANIC CHEMISTRY • A. QUANTITATIVE ORGANIC ANALYSIS • B. FUNCTIONAL GROUP ESTIMATION SECTION- C [PHYSICAL AND ANALYTICAL CHEMISTRY] PHYSICAL CHEMISTRY: 		✓		✓

		<ul style="list-style-type: none"> E. CONDUCTOMETRY F. COLORIMETRY G. PH METRY H. POTENTIOMETRY E. DISTRIBUTION COEFFICIENT F. PARTIAL MOLAR VOLUME 				
M.Sc.III/ MSC 304	INTELLECTUAL PROPERTY LAW	<ul style="list-style-type: none"> INTRODUCTION,NATURE,BASIC CONCEPTS AND INTERNATIONAL CONVENTION LAW OF COPYRIGHT LAW OF PATENTS LAW OF TRADEMARK DESIGN AND OTHER FORM OF GEOGRAPHICAL INDICATION (GI) 		✓	✓	✓
M.Sc.III/ MSC 305	TRIBAL STUDIES	<ul style="list-style-type: none"> TRIBAL STUDIES SCHEDULED TRIBE IN INDIA SOME MAJOR TRIBES IN INDIA SOME MAJOR TRIBES IN CENTRAL INDIA ILITERACY PROBLEM OF HEALTH AND SANITATION WELFARE-CONCEPT, CHARACTERISTICS TRIBAL DEVELOPMENT PROGRAMS FOR SCHEDULED TRIBES TRIBAL WELFARE & ADVISORY AGENCIES IN INDIA 	✓	✓	✓	✓
M.Sc.III/ MSC 306	GREEN CHEMISTRY	<ul style="list-style-type: none"> PRINCIPLES & CONCEPT OF GREEN CHEMISTRY MEASURING AND CONTROLLING ENVIRONMENTAL PERFORMANCE EMERGING GREEN TECHNOLOGY AND ALTERNATIVE ENERGY SOURCES RENEWABLE RESOURCES INDUSTRIAL CASE STUDIES 				✓
M.Sc.III/ MSC 307	ORGANIC SYNTHESIS II	<ul style="list-style-type: none"> ISCONNECTION APPROACH PROTECTING GROUPS PRINCIPLE OF PROTECTION OF ALCOHOL TWO GROUP C-C DISCONNECTIONS RING SYNTHESIS SYNTHESIS OF SOME COMPLEX MOLECULES 		✓		✓
M.Sc.III/ MSC 308	HETEROCYCLICCHEMISTR Y	<ul style="list-style-type: none"> NOMENCLATURE OF HETEROCYCLES NON-AROMATIC HETEROCYCLES SMALL RING HETEROCYCLES MESO-IONIC HETEROCYCLES HIGHER HETEROCYCLES 		✓		✓

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M.Sc.III/MS C 401	BIOINORGANIC CHEMISTRY	<ul style="list-style-type: none"> METAL IONS IN BIOLOGICAL SYSTEM RESPIRATORY PROTEINS METALLOENZYMES (REDOX AND NON REDOX) / METAL ION TRANSPORT AND STORAGE NITROGENASE ENZYME MEDICINAL BIO-INORGANIC CHEMISTRY/CHELATION THERAPY 		✓		
M.Sc.III/MS C 402	ENVIRONMENTAL CHEMISTRY	<ul style="list-style-type: none"> ATMOSPHERIC CHEMISTRY THE EARTH ;THE LITHOSPHERE THE BIOSPHERE POLLUTION CONTROL 				
M.Sc.III/ MSC 403	SOLID STATE CHEMISTRY	<ul style="list-style-type: none"> SOLID STATE REACTION ELECTRONIC PROPERTIES AND BAND THEORY ORGANIC SOLID LIQUID CRYSTALS THE CRYSTAL LATTICE BONDING IN SOLIDS 				
M.Sc.III/ MSC 411	ORGANIC CHEMISTRY LAB	<ul style="list-style-type: none"> SECTION- A A. MULTI-STEP SYNTHESIS OF ORGANIC COMPOUNDS SECTION –B B. EXTRACTION OF ORGANIC COMPOUND FROM NATURAL SOURCE C. SPECTROSCOPY D. SPECTROPHOTOMETERIC ESTIMATIONS SECTION-C 1. ESTIMATIO : ANY ONE OF THE FOLLOWING ESTIMATION 2. PREPARATION OF DYES – 		✓		
M.Sc.III/ MSC 404	DISSERTATION			✓	✓	✓
M.Sc.III/ MSC 405	PHOTO INORGANIC CHEMISTRY	<ul style="list-style-type: none"> BASICS OF PHOTOCHEMISTRY PROPERTIES OF EXCITED STATES LIGAND FIELD PHOTOCHEMISTRY REDOX REACTIONS BY EXCITED METAL COMPLEXES METAL COMPLEX SENSITIZERS 				
M.Sc.III/ MSC 406	MATERIAL SCIENCE	<ul style="list-style-type: none"> CLASSIFICATION OF CRYSTALS= CRYSTAL GEOMETRY THEORIES OF METALLIC STATE IONIC CONDUCTORS ORGANIC SEMICONDUCTORS 				
M.Sc.III/ MSC 407	CHEMISTRY OF NATURAL PRODUCTS	<ul style="list-style-type: none"> TERPENOID AND CAROTENOID STEROIDS PLANT PIGMENTS PORPHYRINS PROSTGLANDIS 		✓		

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B. Sc. I	Unit-I	Atomic Structure and periodic Properties	Bohr's theory, its limitation and atomic spectrum of hydrogen atom. General idea of de-Broglie matter-waves, Heisenberg uncertainty principle, Detailed discussion of the following periodic properties of the elements, with reference to s and p-block. Trends in periodic table.				✓
	Unit-II	Chemical Bonding-I, II	Ionic bond: Ionic Solids - Ionic structures, radius ratio & co-ordination number, limitation of radius ratio rule, lattice defects, semiconductors, lattice energy Born- Haber cycle, Covalent bond: Lewis structure, Valence bond theory and its limitations, Concept of hybridization, Energetics of hybridization, equivalent and non-equivalent hybrid orbitals.				✓
	Unit-III	Basics of Organic Chemistry	Electronic Displacements: Inductive, electromeric, resonance and mesomeric effects, hyperconjugation and their applications; Dipole moment.		✓		✓
	Unit-IV	Stereochemistry and Conformational analysis	Optical Isomerism: Optical Activity, Specific Rotation, Chirality/Asymmetry, Enantiomers, Molecules with two or more chiral-centres, Diastereoisomers, meso compounds, Relative and absolute configuration, Conformational analysis of alkanes, ethane, butane, cyclohexane and sugars.		✓		✓
	Unit-V	Mathematical concept and Gaseous state chemistry	Basic Mathematical Concepts: Logarithmic relations, curve sketching, linear graphs, Properties of straight line, slope and intercept, Functions, Differentiation of functions, Kinetic molecular model of a gas: postulates and derivation of the kinetic gas equation; collision frequency; collision diameter; mean free path; Maxwell distribution				✓
	Unit-I	s-, p-Block elements,	General concepts on group relationships and gradation properties, Comparative study, salient				✓

B. Sc.-II		Noble gases and qualitative analysis	features of hydrides, solvation & complexation tendencies including their function in biosystems and introduction to alkyl and aryl derivatives .properties of halides nobel gases.				
	Unit-II	Chemistry of aliphatic hydrocarbons	Chemistry of alkanes: Formation of alkanes, Wurtz Reaction, Wurtz-Fittig Reaction, Free radical substitutions: Halogenation-relative reactivity and selectivity. Reactions of alkenes: Electrophilic additions and mechanisms (Markownikoff/ Anti - Markownikoff addition), mechanism of oxymercuration-demercuration, hydroboration- oxidation,		✓		✓
	Unit-III	Aromatic hydrocarbons	Aromaticity: Hückel's rule, aromatic character of arenes, cyclic carbocations/ carbanions and heterocyclic compounds with suitable examples. Electrophilic aromatic substitution: halogenation, nitration, sulphonation and Friedel-Craft's alkylation/acylation with their mechanism. Directive effects of the groups.		✓		✓
	Unit-IV	Liquid & Solid State, Colloid and surface Chemistry	Intermolecular forces, magnitude of intermolecular force, structure of liquids, Properties of liquids, viscosity and surface tension. Gold number, Emulsion, micelles and types, Gel, Syneresis and thixotrophy, Application of colloids. Nature of the solid state, law of constancy of interfacial angles, law of rational indices, Miller indices, elementary ideas of symmetry, symmetry elements and symmetry operations,				✓
	Unit-V	Chemical Kinetics	Rate of reaction, Factors influencing rate of reaction, rate law, rate constant, Order and molecularity of reactions, rate determining step, Zero, First and Second order reactions, Homogeneous and Heterogeneous Catalysis, types of catalyst, characteristic of catalyst, Enzyme catalysed reactions, Micellar catalysed reactions, Industrial applications of Catalysis		✓		✓
B. Sc.-III	Unit-I	Chemistry of transition series elements	Transition Elements: Position in periodic table, electronic configuration, General Characteristics, viz., atomic and ionic radii, variable oxidation states, ability to form complexes, formation of coloured ions, magnetic moment μ_{so} (spin only)				✓

			and μ_{eff} and catalytic behavior. Redox potential, electrochemical series and its applications, Principles involved in extraction of the elements.				
	Unit-II	Coordination Chemistry	Werner's theory and its experimental verification, IUPAC nomenclature of coordination compounds, isomerism in coordination compounds. Stereochemistry of complexes with 4 and 6 coordination numbers. Chelates, polynuclear complexes. Valence bond theory (inner and outer orbital complexes), electroneutrality principle and back bonding. Crystal field theory,				✓
	Unit-III	Chemistry of organic halides	Alkyl halides: Methods of preparation, nucleophilic substitution reactions – SN1, SN2 and SN1 mechanisms with stereochemical aspects and effect of solvent etc.; nucleophilic substitution, elimination reactions. Aryl halides, Benzyne mechanism Trihydric alcohols - Nomenclature, methods of formation, chemical reactions of glycerol.		✓		✓
	Unit-IV	Aldehydes and Ketones	Nomenclature, structure and reactivity of carbonyl group. General methods of preparation of aldehydes and ketones. Mechanism of nucleophilic addition to carbonyl groups: Benzoin, Aldol, Perkin and Knoevenagel condensation. Condensation with ammonia and its derivatives, Wittig reaction, Mannich reaction, Beckmann and Benzil- Benzilic rearrangement. Use of acetate as protecting group, Oxidation of aldehydes, Baeyer-Villiger oxidation of ketones, Cannizzaro reaction,		✓		✓
	Unit-v	Thermodynamics and Thermochemistry	Intensive and extensive variables; state and path functions; isolated, closed and open systems; Zeroth law of thermodynamics. calculations of q, w, U and H Second Carnot's theorem, thermodynamic state of temperature. Concept of entropy Thermochemistry, Laws of Thermochemistry, Heats of reactions, standard states; enthalpy of formation of molecules and ions and enthalpy of combustion and its applications.				
B. Sc. -IV	Unit-I	Chemistry	Electronic structure, oxidation states and ionic				✓

		of lanthanides and Actinides	radii and lanthanide contraction, complex formation, occurrence and isolation, lanthanide compounds. General features and chemistry of actinides, chemistry of separation of Np, Pu and Am from uranium, similarities between the later actinides and the laterlanthanides.				
	Unit-II	Acids Bases and Non Aqueous Solvents	Arrhenius, Bronsted-Lowry, conjugate acids and bases, relative strengths of acids and bases, the Lux-flood, solvent system and Lewis concepts of acids and bases. A. Physical properties of a solvent, types of solvents and their general characteristics, reaction in non-aqueous solvents with reference to liquid ammonia and liquid sulphur dioxide, HF, H ₂ SO ₄ , Ionic liquids.				✓
	Unit-III	Carboxylic acids and derivatives	Preparation, Structure and bonding, Physical and chemical properties including, acidity of carboxylic acids, effects of substituents on acid strength, Hell-Volhard Zeilinsky reaction. Reduction of carboxylic groups, Mechanism of decarboxylation. Preparation of nitroalkanes and nitroarenes. Chemical reactions of nitroalkanes. Mechanism of nucleophilic substitution in nitroarenes and their reduction in acidic, neutral and alkaline medium. Reactivity, structure and nomenclature of amines, physical properties.		✓		✓
	Unit-IV	Chemical and Phase equilibrium	Criteria of thermodynamic equilibrium, Concept of Fugacity, Thermodynamic derivation of relation between Gibbs free energy of reaction and reaction quotient Coupling of exergonic and endergonic reactions. Equilibrium constants and their quantitative dependence on temperature, pressure and concentration. Phase rule, Phase, component and degree of freedom, derivation of Gibbs phase rule, limitation of phase rule, applications of phase rule to one component system: Water system and sulphur system.				✓
	Unit-V	Ionic	Ionization of weak acids and bases, pH scale,				✓

		Equilibria & Photochemistry	common ion effect; dissociation constants of mono protic acids (exact treatment). Salt hydrolysis-calculation of hydrolysis constant, degree of hydrolysis and pH for different salts. Buffer solutions; derivation of Henderson equation and its applications. Characteristics of electromagnetic radiation, Interaction of radiation with matter, difference between thermal and photochemical processes, Lambert-Beer's law and its limitations, physical significance of absorption coefficients. Laws of photochemistry.				
B.Sc.-V	Unit-I	Metal ligand binding in transition metal complexes	(A) Limitations of valence bond theory, Limitation of Crystal Field Theory, Application of CFSE, tetragonal distortions from octahedral geometry, Jahn-Teller distortion, square planar geometry. Qualitative aspect of Ligand field and MO Theory. Thermodynamic and kinetic aspects of metal complexes. A brief outline of thermodynamic stability of metal complexes and factors affecting the stability				✓
	Unit-II	Magnetic properties of transition metal complexes	Types of magnetic behavior, methods of determining magnetic susceptibility, spin only formula, L-S coupling, Electronic spectra of Transition Metal Complexes. Types of electronic transitions, selection rules for d-d transitions, spectroscopic ground states, spectro-chemical series.				✓
	Unit-III	Heterocyclic compounds	Classification and nomenclature, Structure, aromaticity in 5-membered and 6-membered rings containing one heteroatom; Synthesis, reactions and mechanism of substitution reactions of: Furan, Pyrrole (Paal-Knorr synthesis, Knorr pyrrole synthesis, Hantzsch synthesis), Organomagnesium compounds: Grignard reagents formation, structure and chemical reactions.		✓		✓
	Unit-IV	Biomolecules Carbohydrates, Amino	Occurrence, classification and their biological importance. Monosaccharides: relative and absolute configuration of glucose and fructose, epimers and anomers, mutarotation, determination of		✓		✓

		Acids Synthetic polymers and dyes	ring size of glucose and fructose, polymerization, Ziegler-Natta polymerization, Colour and constitution (Electronic Concept). Classification of Dyes. Chemistry of dyes.				
	Unit-V	Quantum mechanics	Black-body radiation, Planck's radiation law, photoelectric effect, Compton effect. Operator: Hamiltonian operator, angular momentum operator, Laplacian operator, postulate of quantummechanics, eigen values, eigen function, Quantum Mechanical approach of Molecular orbital theory, basic ideas- criteria for forming M.O. and A.O., LCAO approximation				
B.Sc.-VI	Unit-I	Organome tallic Chemistry	Definition and classification of organometallic compounds on the basis of bond type. Concept of hapticity of organic ligands. Metal carbonyls: 18- electron rule, electron count of mononuclear, polynuclear and substituted metal carbonyls of 3d series. General methods of preparation (direct combination, reductive carbonylation, thermal and photochemical decomposition) of mono and binuclear carbonyls of 3d series. Alkene hydrogenation (Wilkinsons Catalyst) Polymeration of ethane using Ziegler - Natta Catalyst		✓		✓
	Unit-II	Bioinorga nic Chemistry Hard and Soft acid Inorganic Polymers	Essential and trace elements in biological processes, Excess and deficiency of some trace metals, Toxicity of some metal ions (Hg, Pb, Cd and As), metalloporphyrins with special reference to hemoglobin and myoglobin. Classification of acids and bases as hard and soft. Pearson's HSAB concept, acid-base strength and hardness and softness. Symbiosis, Applications of HSAB principle. Types of inorganic polymers, comparison with organic polymers, synthesis, structural aspects and applications of silicones. Silicates, phosphazenes and polyphosphate.		✓		✓
	Unit-III	Infrared, UV and NMR Spectrosc opy	Basic principle, IR absorption Band their position and intensity, IR spectra of organic compounds Beer Lambert's law, effect of Conjugation, Types of electronic transitions λ_{max} , chromophores and Auxochromes, Bathochromic and Hypsochromic shifts, Intensity of absorption Visible spectrum		✓		✓

			and colour. Basic principles of Proton Magnetic Resonance, Tetramethyl silane (TMS) as internal standard, chemical shift and factors influencing it; Spin – Spin coupling and coupling constant(J).				
	Unit-IV	Spectroscopy	Characterization of Electromagnetic radiation, regions of the spectrum, representation of spectra, width and intensity of spectral transition, Rotational Spectrum of Diatomic molecules. Fundamental vibration and their symmetry vibrating diatomic molecules, Energy levels of simple harmonic oscillator, selection rules, pure vibrational spectrum, determination of force constant, anharmonic oscillator		✓		✓