B.Sc., CHEMISTRY (HONOURS)
LESSON PLANS

Academic-Pedagogical-Evaluation:CourseOverview

Pedagogy:	P_1	Lecture
	P_2	Demonstration
	P_3	Question & Answer
	P_4	Debate
	P_5	Audio & video clips
	P_Q	Quiz
	P_T	Test
	P_{10}	Seminar
	P_I	Invited Lecture

SEMESTER - I

COURSE : B.SC - HONOURS (CHEMISTRY, COMPUTERS, MATHEMATICS, PHYSICS, ARTIFICIAL INTELLIGENCE)	**YEAR : I**	**SEMESTER:I**
Subject	COURSE 1: Essentials and Applications of Mathematical, Physical and Chemical Sciences COURSE 2 : Advances in Mathematical, Physical and Chemical Sciences	
Name of the faculty	**R.ANURADHA** **M.PRASHANTHI**	
Units	COURSE 1: UNIT 3: ESSENTIALS OF CHEMISTRY COURSE 2 : UNIT 3 : ADVANCES IN CHEMISTRY	
Duration	20hours	
Learning Objectives	COURSE 1: UNIT 3: To understand the basic principles and concepts underlying a broad range of fundamental areas of chemistry and to connect their knowledge of chemistry to daily life. COURSE 2 : UNIT 3: To understand the Principles and Techniques used in computer – aided drug design and drug delivery systems, to understand the fabrication techniques and working principles of nanosensors. Explore the effects of chemical pollutants on ecosystems and human health .	
Units	COURSE 1: UNIT 3:	COURSE 2 : UNIT 3
Total Hours: 20	10	10

Resource Material:	**Recommended books:** 1. Chemistry in daily life by Kirpal Singh 2. Chemistry of Bio molecules by S.P Bhutan 3. Nanomaterials and applications by M.N.Borah 4. Environmental Chemistry by Anil K.D.E

I. Academic-Pedagogical-Evaluation :Unit-wise Pedagogy

UNIT	DESCRIPTION	PEDAGOGY	INTERNAL EVALUATION
COURSE 1: UNIT 3:	**UNIT I: ESSENTIALS OF CHEMISTRY: Defnition and Scope of chemistry – Importance of Chemistry in daily life – Branches of Chemistry and significance- Periodic Table- Electronic Configuration, Chemical Changes, classification of matter, Biomolecules- carbohydrates, proteins, fats and vitamins**	**P1,P3,P2,P6**	**PQ,PT**
COURSE 2 : UNIT 3	**UNIT I: ADVANCES IN CHEMISTRY: Computer aided drug design and delivery, nanosensors, chemical biology, impact of chemical pollutants on ecosystems and human health, Dye removal- Catalysis method**	**P1,P5,P3,P2**	**PT,PQ**

SEMESTER - II

COURSE : B.SC - HONOURS (CHEMISTRY)	YEAR : I	SEMESTER:II
Subject	**COURSE-III: GENERAL & INORGANIC CHEMISTRY**	
Name of the faculty	**R.ANURADHA** **T.V.N KISHORE**	
Units	1. Atomic Structure and Periodic table 2. Ionic bond 3. The Covalent Bond 4. Metallic and Weak Bonds 5. Acids and Bases	
Duration	45 hours	
Learning Objectives	**At the end of SEMESTER the student will be able to** 1. Understand the structure of atom and the arrangement of elements in the periodictable. 2. Understand the nature and properties of ionic compounds. 3. Identify the structure of a given inorganic compound. 4. Explain the existence of special types of compounds through weak chemical forces. 5. Define acids and bases and predict the nature of salts.	

Units	UNIT -1	UNIT-2	UNIT-3	UNIT-4	UNIT -5
Total Hours : 45	9	9	9	9	9

Resource Material:	**Recommended books:** 1. J. D. Lee, Concise Inorganic Chemistry, 5th ed., Blackwell Science, London, 1996. 2. . B. R. Puri, L. R. Sharma, K. C. Kalia, Principles of Inorganic Chemistry, Shoban LalNagin Chand and Co., 1996. 3. D. F. Shriver and P. W. Atkins, Inorganic Chemistry, 3rd ed., W. H. Freeman and Co,London

II. Academic-Pedagogical-Evaluation :Unit-wise Pedagogy

UNIT	DESCRIPTION	PEDAGOGY	INTERNAL EVALUATION
I	**Atomic Structure and Periodic table :** Electronic configuration: Bohr theory, duel nature of electrons, Heisenberg uncertainty principle, the Schrodinger equation, significance of wave functions, normalization of wave function, radial and angular wave functions, Pauli's exclusion principle, Hund's rule, sequence of energy levels (Aufbau principle).Periodicity: periodic law and arrangement of elements in the periodic table, IUPAC nomenclature and group number, horizontal, vertical, and diagonal relationships in the periodic table. 1.3 General properties of atoms: size of atoms and ions-atomic radii, ionic radii, covalent radii; trend in ionic radii, ionization potential, electron affinity; electronegativity - Pauling, Mulliken-Jaffe, Allred-Rochow definitions; oxidation states andvariable valency; isoelectronic relationship; inert-pair effect	P1,P3,P2,P6	PQ,PT , P10
II	**Ionic bond** Properties of ionic compounds, factors favouring the formation of ionic compounds-ionization potential, electron affinity, and electronegativity. Lattice energy: definition, factors affecting lattice energy, Born-Haber cycle-enthalpy of formation of ionic compound and stability. Stability of ionic compounds in terms of ΔH_f and U_o. Solubility and thermal stability of ionic compounds. Covalent character in ionic compounds-polarization and Fajan's rules; effects of polarization-solubility, melting points, and thermal stability of typical ionic compounds.	P1,P3,P2,P6	PQ,PT , P10
III	**The Covalent Bond** Valance Bond theory-arrangement of electrons in molecules, hybridization of atomic orbitalsand geometry of molecules-$BeCl_2$, BF_3, CH_4, PCl_5, SF_6– VSEPR model-effect of bonding and nonbonding electrons on the structure of molecules, effect of electronegativity, isoelectronic principle, illustration of structures by VESPR model-NH_3, H_2O, SF_4,	P1,P3,P2,P6	PQ,PT , P10

	ICl_4^-, ICl_2^-, XeF_4, XeF_6 Molecular orbital theory -LCAO method, construction of M.O. diagrams for homo-nuclear and hetero-nuclear diatomic molecules (N_2, O_2, CO and NO)		
IV	**Metallic and Weak Bonds** The Metallic bond: metallic properties, free electron theory, Valence Bond Theory, band theory of metals. Explanation of conductors, semiconductors and insulators. Weak bonds: hydrogen bonding-intra- and intermolecular hydrogen bonding, influence on the physical properties of molecules, comparison of hydrogen bond strength and properties of hydrogen bonded N, O and F compounds; associated molecules-ethanol and acetic acid; Vanderwaals forces, ion dipole-dipole interactions.	**P1,P3,P2,P6**	**PQ,PT, P10**
V	**Acids and Bases** Theories of acids and bases: Arrhenius theory, Bronsted-Lowry theory, Lewis theory, the solvent system, Nonaqueous solvents: classification-protonic and aprotic solvents, liquid ammonia as solvent-solutions of alkali and alkaline earth metals in ammonia. Types of chemical reactions: acid-base, oxidation-reduction, calculation of oxidation number. Definition of pH, pK_a, pK_b. Types of salts, Salt hydrolysis. Pearson's concept, HSAB principle & its importance, bonding in Hard-Hard andSoft-Soft combinations.	**P1,P3,P2,P6**	**PQ,PT, P10**

SEMESTER - II

COURSE : B.SC - HONOURS (CHEMISTRY)	YEAR : I	SEMESTER:II
Subject	**COURSE-IV: INORGANIC CHEMISTRY - I**	
Name of the faculty	**M.PRASHANTHI**	
Units	1. Chemistry of p-block elements – I 2. Chemistry of p-block elements – II 3. Chemistry of d-block elements 4. Chemistry of f-block elements 5. Radioactivity	
Duration	45 hours	
Learning Objectives	**At the end of SEMESTER the student will be able to** 1. Understand the basic concepts of p-block elements. 2. Explain the concepts of d-block elements. 3. Distinguish lanthanides and actinides. 4. Describe the importance of radioactivity.	

Units	UNIT -1	UNIT-2	UNIT-3	UNIT-4	UNIT -5
Total Hours : 45	9	9	9	9	9

Resource Material:	**Recommended books:** 1. Basic Inorganic Chemistry by Cotton and Wilkinson 2. Advance Inorganic chemistry vol-I by Satya Prakash 3. Inorganic chemistry by Puri and Sharma 4. Concise Inorganic Chemistry by J D Lee 5. Nuclear Chemistry by Maheshwar Sharon, 2009

III. Academic-Pedagogical-Evaluation :Unit-wise Pedagogy

UNIT	DESCRIPTION	PEDAGOGY	INTERNAL EVALUATION
I	**Chemistry of p-block elements – I 9 h** Group 13: Preparation & structure of Diborane, Borazine and $(BN)_x$ Group14: Preparation, classification and uses of silicones and Silanes. Group 15: Preparation & structure of Phosphonitrilic Chloride $P_3N_3Cl_6$	**P1,P3,P2,P6**	**PQ,PT , P10**
II	**Chemistry of p-block elements – II 9 h** Group 16: Classification of Oxides, structures of oxides and Oxoacids of Sulphur Group 17: Preparation and Structures of Interhalogen compounds. Pseudohalogens,	**P1,P3,P2,P6**	**PQ,PT , P10**
III	**Chemistry of d-block elements: 9 h** Characteristics of d-block elements with special reference to electronic configuration, variable valence, colour, magnetic properties, catalytic properties and ability to form complexes. Stability of various oxidation states of 3d series-Latimer diagrams.	**P1,P3,P2,P6**	**PQ,PT , P10**
IV	**Chemistry of f-block elements: 9 h** Chemistry of lanthanides - electronic configuration, oxidation states, lanthanide contraction, consequences of lanthanide contraction, colour, magnetic properties. Separation of lathanides by ion exchange method. Chemistry of actinides - electronic configuration, oxidation states, actinide contraction, comparison of lanthanides and actinides.	**P1,P3,P2,P6**	**PQ,PT , P10**
V	**Radioactivity 9 h** Definition, Isotopes, n/p ratio, binding energy, types of radioactivity, Soddy-Fajan's displacement law,Law of Radioactivity, Radioactive decay series, Nuclear Reactions-fissionand fusion, Applications of radioactivity.	**P1,P3,P2,P6**	**PQ,PT , P10**

SEMESTER - III

COURSE : B.SC HONOURS	YEAR : II	SEMESTER:III
Subject	**Course V: FUNDAMENTALS IN ORGANIC CHEMISTRY**	
Name of the faculty	**T.V.N.KISHORE** **R.ANURADHA**	
Units	1. Structural theory in Organic Chemistry 2. Saturated Hydrocarbons (Alkanes and Cycloalkanes) 3. Unsaturated Hydrocarbons (Alkenes and Alkynes) 4. Benzene and its reactivity 5. Orientation of aromatic substitution	
Duration	45 hours	
Learning Objectives	**At the end of SEMESTER the student will be able to** 1. Understand and explain the differential behaviour of organic compounds based on fundamental concepts learnt. 2. Formulate the mechanism of organic reactions by recalling and correlating the fundamental properties of the reactants involved. 3. Learn and identify many organic reaction mechanisms . 4. Correlate and describe the stereo-chemical properties of organic compounds and reactions.	

Units	UNIT-1	UNIT-2	UNIT-3	UNIT-4	UNIT-5
Hours Split:Total: 45	9	9	9	9	9

Resource Material:	**List of Reference Books** 1.Morrison, R. N. & Boyd, R. N. Organic Chemistry, Dorling Kindersley (India) Pvt. Ltd. (PearsonEducation). 2.Finar, I. L. Organic Chemistry (Volume 1), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education). 3. Guide book to Mechanism in Organic Chemistry by Peter Sykes 6th edition,1985. **III**

IV. Academic-Pedagogical-Evaluation :Unit-wise Pedagogy

UNIT	DESCRIPTION	PEDAGOGY	INTERNAL EVALUATION
I	**Unit 1. Structural theory in Organic Chemistry** Types of bond fission and organic reagents (Electrophilic, Nucleophilic, and free radical reagents). Reaction intermediates – Carbocations, carbanions & free radicals. Bond polarization: Factors influencing the polarization of covalent bonds, inductive effect - Application of inductive effect (a) Basicity of amines (b) Acidity of carboxylic acids (c) Stability of carbonium ions. Resonance or Mesomeric effect, application to (a) acidity of phenol, and (b) acidity of carboxylic acids. Hyper conjugation and its application to stability of carbonium ions, Free radicals and alkenes.	**P1,P3,P2,P6**	**PQ,PT ,P10**
II	**Unit II. Saturated Hydrocarbons (Alkanes and Cycloalkanes)** General methods of preparation of alkanes- Wurtz and Wurtz Fittig reaction, Corey House synthesis, physical and chemical properties of alkanes, Conformational analysis of alkanes (Conformations, relative stability and energy diagrams of Ethane, Propane and butane). General molecular formulae of cycloalkanes and relative stability, Baeyer strain theory, Cyclohexane conformations with energy diagram, Conformations of monosubstituted cyclohexane.	**P1,P5,P3,P2**	**PT,PQ ,P10**
III	**UNIT-III Unsaturated Hydrocarbons (Alkenes and Alkynes)** General methods of preparation, physical and chemical properties, Saytzeff and Hoffmann eliminations (with mechanism), Electrophilic Additions, (H_2, HX) mechanism (Markownikoff/ Antimarkownikoff addition) with suitable examples-syn and anti-addition;	**P1,P5,P3,P2**	**PT,PQ ,P10**

	addition of X_2, HX. Oxymercuration demercuration, ozonolysis, hydroxylation, Diels Alder reaction, 1,2- and1,4-addition reactions in conjugated dienes. Reactions of alkynes; acidity, electrophilic and nucleophilic additions, hydration to form carbonyl compounds, Alkylation of terminal alkynes.		
IV	**UNIT-IV Benzene and its reactivity** Structure of Benzene – Preparation - polymerisation of acetylene and decarboxylation Properties -mechanism of electrophilic aromatic substitution of Friedel- Craft's alkylation and acylation. halogenation and nitration,	**P1,P5,P3,P2**	**PT,PQ ,P10**
V	**UNIT-V Orientation of aromatic substitution** Concept of aromaticity, Huckel's rule - application to Benzenoid (Benzene, Naphthalene) and Non - Benzenoid compounds (cyclopropenylcation, cyclopentadienyl anion and tropylium cation) Orientation of aromatic substitution - ortho, para and meta directing groups. Ring activating and deactivating groups with examples (Electronic interpretation of various groups like NO_2 and Phenolic). Orientation of (i) Amino, methoxy and methyl groups (ii) Carboxy, nitro, nitrile, carbonyl and sulphonic acid groups (iii) Halogens.	**P1,P5,P3,P2**	**PT,PQ ,P10**

SEMESTER - III

COURSE : B.SC HONOURS	YEAR : II	SEMESTER:III
Subject	**Course VI: ORGANIC CHEMISTRY** (Halogen and Oxygen containing organic compounds)	
Name of the faculty	**T.V.N.KISHORE**	
Units	1. Halogen compounds 2. Alcohols and Phenols 3. Carbonyl Compounds 4. Carboxylic acid and Active methylene Compounds 5. Carbohydrates	
Duration	45 hours	
Learning Objectives	**At the end of SEMESTER the student will be able to** 1. . Understand the concept of $SN_1$and$SN_2$and SN_i mechanisms. 2. Describe the reactivity of alcohols and phenols. 3. Achieve the skills required to propose various mechanisms 4. Apply the concepts for synthesising various oxygen containing organic compounds 5. Interconvert the monosaccharides.	

Units	UNIT-1	UNIT-2	UNIT-3	UNIT-4	UNIT-5
Total HOURS: 45	9	9	9	9	9

Resource Material:	**List of Reference Books** 1. 1.Morrison, R. N. & Boyd, R. N. Organic Chemistry, Dorling Kindersley (India) Pvt. Ltd. (Pearson Education). 2.Finar, I. L. Organic Chemistry (Volume 1), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education). 3. Guide book to Mechanism in Organic Chemistry by Peter Sykes 6th edition,1985.

Academic-Pedagogical-Evaluation :Unit-wise Pedagogy

UNIT	DESCRIPTION	PEDAGOGY	INTERNAL EVALUATION
I	**Unit – I Halogen compounds** Alkyl halides: Preparation of alkyl halides from i) alkanes, ii) alkenes and iii) alcohols. Properties - nucleophilic substitution reactions–$SN_1$and SN_2 and SN_i mechanisms with energy profile diagrams, stereo chemical aspects and effect of solvent. Williamson's synthesis. **Aryl halides:** Preparation i) from phenols ii) Sandmeyer's reaction, nucleophilic aromatic substitution (Benzyne mechanism);relative reactivity of alkyl, allyl, vinyl and benzyl, aryl halides towards nucleophilic substitution reactions.	**P1,P3,P2,P6**	**PQ,PT ,P10**
II	**Unit II Alcohols and Phenols** **Alcohols:** Preparation of 1^0,2^0,3^0alcohols from Grignard's reagent, Bouveault–Blanc Reduction; Chemical properties – substitution of –OH by using PCl5, PCl3, PBr3, SOCl2 and with HX / ZnCl2, Oxidation of alcohols with PCC, PDC; Oxidation of diols by HIO4 and Pb(OAc)4, Pinacol Pinacolone arrangement with mechanism, relative reactivity of 1°, 2°, 3°alcohols. **Phenols :**Preparation from diazonium salt and Cumene. Reactions and mechanism–Reimer–Tiemann**,**Kolbe–Schmitt Reactions, Fries and Claisen rearrangements.	**P1,P5,P3,P2**	**PT,PQ ,P10**
III	**Unit III Carbonyl Compounds** Preparation from-Acid chlorides,1,3-dithiane and nitriles; Structure and reactivity of carbonyl group, Nucleophilic addition reactions with HCN, NaHSO3 and alcohols. addition	**P1,P5,P3,P2**	**PT,PQ ,P10**

	elimination reactions with hydroxylamine, hydrazine, phenyl hydrazine, 2,4DNP, semicarbazide. Oxidations and reductions (Clemmensen's, Wolf–Kishner's, withLiAlH4 & NaBH4). **Reaction & Mechanism**- Aldol condensation, Cannizzaro reaction, Perkin reaction, Benzoin condensation, Claisen-Schmidt reaction, Haloform reaction		
IV	**Unit-IV Carboxylic acid and Active methylene Compounds** **Carboxylic Acids:** Preparation from Grignard reagent and hydrolysis of nitriles, Reactions of monocarboxylic acids- Reactions involving -H, -OH and-COOHgroups, formation of salts, esters, acidchlorides, amides and anhydrides. Degradation of carboxylic acids by Huns Diecker's reaction, decarboxylation by Schmidt reaction, Arndt-Eistert synthesis, halogenation by Hell- Volhard- Zelinsky reaction. Mechanisms of acidic and alkaline hydrolysis of esters, Reformatsky reactions, Curtius rearrangement. **Active methylene compounds**: Ketoenol tautomerism, preparation of Aceto Acetic Ester(AAE) by Claisen condensation with mechanism,synthetic applications of AAE in the preparation of mono carboxylic acids, di carboxylic acids, α,β-unsaturated acids and heterocyclic compounds.	**P1,P5,P3,P2**	**PT,PQ ,P10**
V	**Unit V : Carbohydrates** Classification and their biological importance, Monosaccharides: Structural elucidation of glucose and fructose, epimers and anomers, mutarotation, determination of ring size of glucose and fructose, Haworth projections and conformational structures; Interconversions of aldoses and ketoses; Killiani-Fischer synthesis and Ruff degradation; Disaccharides– Haworth structure of maltose, lactose and sucrose.	**P1,P5,P3,P2**	**PT,PQ ,P10**

SEMESTER - III

COURSE : B.SC HONOURS	YEAR : II	SEMESTER:III
Subject	**Course VII: PHYSICAL CHEMISTRY - I** **(Solutions & Electro Chemistry)**	
Name of the faculty	**M.PRASHANTHI**	
Units	1. Solutions 2. Colligative Properties 3. Photochemistry 4. Electrochemistry-I 5. Electrochemistry-II	
Duration	45 hours	
Learning Objectives	**At the end of SEMESTER the student will be able to** 1. Understand the ideal and non ideal behaviour of solutions. 2. Determine the molecular mass of non-volatile solutes. 3. Discuss the basic concepts of Photochemistry. 4. Apply the principles of electrical conductivity. 5. Explain the importance of emf and its applications.	

Units	UNIT-1	UNIT-2	UNIT-3	UNIT-4	UNIT-5
Total Hours: 45	9	9	9	9	9

Resource Material:	**List of Reference Books** 1) Principles of physical chemistry by Prutton and Marron 2) Solid State Chemistry and its applications by Anthony R. West 3) Text book of physical chemistry by K L Kapoor 4) Text book of physical chemistry by S Glasstone 5) Advanced physical chemistry by Bahl and Tuli 6) Advanced physical chemistry by Gurudeep Raj 7) Principles of physical chemistry by Puri, Sharma and Pathania.

Academic-Pedagogical-Evaluation :Unit-wise Pedagogy

UNIT	DESCRIPTION	PEDAGOGY	INTERNAL EVALUATION
I	**Unit I Solutions** Classification - Miscible, Partially miscible and Immiscible - Raoult's Law - Azeotropes HCl-H_2O system and ethanol-water system. Partially miscible liquids-phenol- water system. Critical solution temperature (CST), Effect of impurity on consulate temperature. Immiscible liquids and steam distillation. Nernst distribution law. Calculation of the partition coefficient. Applications of distribution law.	**P1,P3,P2,P6**	**PQ,PT ,P10**
II	**Unit II Colligative Properties** Relative lowering of Vapour Pressure, Elevation in boing point depression in freezing point and Osmotic pressure. Determination of molecular mass of non-volatile solute by Ostwald Walker method, Cottrell's method, Rast method and Barkeley-Hartley method. Abnormal colligative properties. Van't Hoff factor.	**P1,P5,P3,P2**	**PT,PQ ,P10**
III	**Unit III – Photochemistry** Difference between thermal and photochemical processes, Laws of photochemistry- Grothus- Draper's law and Stark-Einstein's law of photochemical equivalence, Quantum yield- Photochemical reaction mechanism- hydrogen-chlorine and hydrogen- bromine reaction. Qualitative description of fluorescence, phosphorescence, Jablonski diagram, chemiluminescence - Photosensitized reactions- energy transfer processes (simple example), quenching, Photo stationary state.	**P1,P5,P3,P2**	**PT,PQ ,P10**

IV	**Unit IV Electrochemistry-I** Conductance, Specific conductance, equivalent conductance and molar conductance - effect of dilution. Cell constant. Strong and weak electrolytes, Kohlrausch's law and its applications, Definition of transport number, determination of transport number by Hittorf's method. Debye-Huckel - Onsagar's equation for strong electrolytes (derivation excluded), Application of conductivity measurements-conductometric titrations.	**P1,P5,P3,P2**	**PT,PQ ,P10**
V	**Unit V Electrochemistry-II** Electrochemical Cells- Single electrode potential, Types of electrodes with examples: Metal metal ion, Gas electrode, Inert electrode, Redox electrode, Metal-metal insoluble salt- salt anion. Determination of EMF of a cell, Nernst equation, Applications of EMF measurements-Potentiometric titrations. Fuelcells – Basic concepts, examples and applications.	**P1,P5,P3,P2**	**PT,PQ ,P10**

SEMESTER - III

COURSE : B.SC HONOURS	YEAR : II	SEMESTER:III
Subject	**COURSE VIII: INORGANIC AND PHYSICAL CHEMISTRY**	
Name of the faculty	**CH.MALLIKA**	
Units	1. Coordination Chemistry-I 2. Coordination Chemistry II 3. Organo metallic compounds 4. Thermodynamics- I 5. Thermodynamics II	
Duration	45 hours	
Learning Objectives	**At the end of SEMESTER the student will be able to** 1) Apply IUPAC nomenclature for Coordination compounds 2) Understand the various theories, structure and stereo chemistry of coordination compounds. 3) Explain the reaction mechanism in complexes. 4) Apply the 18 electron rule. 5) Discuss the basic concepts of thermodynamics.	

Units	UNIT-1	UNIT-2	UNIT-3	UNIT-4	UNIT-5
Total Hours: 45	9	9	9	9	9

Resource Material:	**List of Reference Books** 1) Concise coordination chemistry by Gopalan and Ramalingam 2) Coordination Chemistry by Basalo and Johnson 3) Text book of physical chemistry by SGlasstone 4) Concise Inorganic Chemistry by J.D.Lee 5) Advanced Inorganic Chemistry Vol-I by Satyaprakash, Tuli, Basu and Madan 6) A Text Book of Physical Chemistry by K.L.Kapoor Vol 2, 6th edition, 2019.

Academic-Pedagogical-Evaluation :Unit-wise Pedagogy

UNIT	DESCRIPTION	PEDAGOGY	INTERNAL EVALUATION
I	**Unit I Coordination Chemistry-I** IUPAC nomenclature of Coordination compounds, structural and stereo isomerism in complexes with coordination numbers 4 and 6. Valence Bond Theory(VBT):Postulates magnetic properties- Inner and outer orbital complexes. Limitations of VBT, CFT-Postulates - Splitting in Octahedral, tetrahedral, tetragonal and square planar fields. Crystal field stabilization energy(CFSE), Crystal field effects for weak and strong fields. Factors affecting the magnitude of crystal field splitting energy, Spectro chemical series, Tetragonal distortion of octahedral geometry, Jahn-Teller distortion.	**P1,P3,P2,P6**	**PQ,PT ,P10**
II	**UNIT–II Coordination Chemistry II** **1. Inorganic molecular Reaction Mechanism**: Introduction to inorganic reaction mechanisms. Concept of reaction pathways, transition state, intermediate and activated complex. Labile and inert complexes, ligand substitution reactions – SN_1 and SN_2,Substitution reactions in square planar complexes, Trans-effect, theories of trans effect and its applications **2. Stability of metal complexes:** Thermodynamic stability and kinetic stability, factors affecting the stability of metal complexes, chelate effect, determination of composition of complex by Job's method and mole ratio method.	**P1,P5,P3,P2**	**PT,PQ ,P10**

III	**Unit III Organo metallic compounds** Definition and classification of organo metallic Compounds on the basis of bond type, Metalcarbonyls:18electron rule, electron count of mononuclear, poly nuclear and substituted metal carbonyls of 3d series. General methods of preparation of mono and binuclear carbonyls of 3d series. π-acceptor behaviour of CO (MO diagram of CO to be discussed), synergic effect and use of IR data to explain extent of back bonding.	**P1,P5,P3,P2**	**PT,PQ ,P10**
IV	**Unit IV Thermodynamics- I** Concept of heat(q), work(w), internal energy(U), State function and Path function- statement of first law; enthalpy(H), relation between heat capacities, calculations of q, w, U and H for reversible, irreversible processes, Joule-Thomson effect- coefficient, Calculation of work for the expansion of perfect gas under isothermal and adiabatic conditions for reversible processes. Temperature dependence of enthalpy of formation- Kirchoff's equation.	**P1,P5,P3,P2**	**PT,PQ ,P10**
V	**Unit V Thermodynamics II** Second law of thermodynamics Different Statements of the law, Carnot cycle and its efficiency, Carnot theorem, Concept of entropy, entropy as a state function, entropy changes in reversible and irreversible processes. Entropy changes in spontaneous and equilibrium processes. Third law of thermodynamics, Nernst heat theorem, Spontaneous and non spontaneous processes, Helmholtz and Gibbs equation - Criteria for spontaneity.	**P1,P5,P3,P2**	**PT,PQ ,P10**