TEACHING PLAN 2023-2024 (ODD SEMESTER)

(JULY 2023 TO NOVEMBER 2023)

Name of Assistant/Associate Professor: Sarita Devi

Class: B.Sc First Year

Semester : 1st

Subject : Inorganic Chemistry

Department: Chemistry

Month	Topics
July	ATOMIC STURCTURE • Idea of De Broglie's matter waves • Hesinberges uncertainly Principal • Atomic Orbitals • Quantam numbers
August	• Radial and Angular wave functions • Probability distribution curves • Shapes of s,p,d,f orbitals PERIODIC PROPERTIES • General principels of periodic table • Hund,s multiplicity rule • Electronic configuration of elements • Effective nuclear charge • Slater's rules • Atomic and Ionic radii • Ionization energy • Electronic affinity and electronegativity
September	PERIODIC PROPERTIES • Trends in periodic table(in sand p block elements) COVALENT BOND • VBT and its limitations • Dirational charaterstics of covalent bond • Various types of hybridisation and shapes of inorganic molecules and ions • Vespour theory of molecules • MOT of hetronuclear diatomic molecules

	• Bond strength and Bond energy • Percentage ionic character fron dipole moment and electronegativity difference
October	IONIC SOLIDES • Ionic sturctures • Radius ratio effect • Co-ordination number • Limitations of radius ratio rule • Lattice defects • Semi-Conducters • Lattice energy and Born-Haber cycle
November	IONIC SOLIDES • Solvation energy and its relation with solubility of ionic solides • Polarizing power and polarisability of ions • Fajan;s rule • Numerical problems of all units • Revision • Assignments • Class test

Teacher's Signature

TEACHING PLAN 2023-2024 (ODD SEMESTER)

(JULY 2023 TO NOVEMBER 2023)

Name of Assistant/Associate Professor: Sarita Devi

Class: B.Sc First Year

Semester : 1st

Subject : Physical Chemistry

Department: Chemistry

July	GASEOUS STATE • Maxwell's distribution of velocities and energies • Calculation of root mean square, average velocity and most probable velocity • Collision number,Collision diameter, Collision frequency and mean free path • Derivation of freal gases for ideal behaviour
August	GASEOUS STATE • Derivation of vander waal,s equation of state and its applications in calculation of Boyle,s temperature • Crtical temperature, Crtical pressure, Crtical volume • PV isotherm of real gases • Relationship between crtical constants and vander waal,s constants
September	CRITICAL PHENOMENON • Critical compressibility factor • Law of corresponding states • Liquification of gases LIQUID STATE • Sturcture of liquids • Properties of liquids-surface tension,Viscosity and vapour pressure

	• Optical rotations and their determination
October	SOLID STATES • Classification of solides • Law of crystallography • Symmetry elements of crystals • Defination of unit cell,space lattice, bravis lattice • Crystal system • X-rays diffraction by crystals • Derivation of bragg,s equation • Determination of crystal sturecture of NaCl,KCl
November	SOLID STATES • Liquid crystals • Differnce between solid, liquid and liquid crystals • Types of liquid crystals • Apllications of liquid crystals • Revision • Assignment • Class test

Teacher's Signature

TEACHING PLAN 2023-2024 (ODD SEMESTER)

(JULY 2023 TO NOVEMBER 2023)

Name of Assistant/Associate Professor: Sarita Devi

Class: B.Sc Second Year
Semester : 3rd
Subject : Inorganic Chemistry
Department: Chemistry

Month	Topics
January	CHEMISTRY OF ELEMENTS OF FIRST TRANSITION SERIES • Defination of transition elements • Position in Periodic table • General charatersties and their properties • Sturcture and properties of some compounds of first transition series elements
February	CHEMISTRY OF ELEMENTS OF SECOND AND THIRD TRANSITION SERIES ELEMENTS • General charaterstics and properties • Comparision of properties od 3d elements with 4d and 5d elements • Oxidation states • Magnetic and spectral properties and stereochemistry
March	Co-Ordination Compounds • Werner Co-ordination theory • Effective atomic number concept • Chelates • Nomenclature of Co-0rdinaton Compounds • Isomerism in Co-ordination compounds • VBT of Transition metal complexes
April	NON-AQUOEUS SOLVENTS • Physical properties of solvents • Tupes of solvents and and their general charaterstics • Reaction in Non-Aqueous solvents w.r.t NH3 and SO2 • Revision • Assignment • Class test

Sarita

Teacher's Signature

TEACHING PLAN 2023-2024 (ODD SEMESTER)

(JULY 2023 TO NOVEMBER 2023)

Name of Assistant/Associate Professor: Sarita Devi

Class: B.Sc Second Year

Semester : 3rd

Subject : Physical Chemistry

Department: Chemistry

Month	Topics
January	THERMODYNAMICS-I • Defination of System and surrounding • Types of system • Intensive and Extensive properties • State and path functions and their differentials • Thermodynamis processes • Concept od heat and work • Zeroth law of thermodynamics • First law of thermodynamics • Internal energy and enthalpy
February	THERMODYNAMICS-I • Heat capcity at constant V and P and their relationship • Joule's law • Joule Thomson Co-efficient for ideal gases and real gases • Inversion temperature • Calculation of W and Q for ideal gases under isothermal and adiabatic conditions for reversible processes • Temperature dependence of enthalphy • Kirchoff's law
March	THERMODYNAMICS-II • Bond energies and applications of bond energies CHEMICAL EQULIBRIUM • Equlibrium constant and free energy • Concept of chemical potential

	• Thermodynamic derivation of law of chemical equilibrium • Temperature dependence of enthalphy • Von't Hoff reaction isochore • Von't Hoff reactionisotherm • Le-chattetier's principal and its applications clapeyroanand clausieus equation
April	Distribution Law • Nernest Disrtibution Law-its thermodynamics derivation • Modification of distribution law • Applications of distribution law • Revision • Assignment • Class Test

Sarita

Teacher's Signature

TEACHING PLAN 2023-2024 (ODD SEMESTER)

(JULY 2023 TO NOVEMBER 2023)

Name of Assistant/Associate Professor: Sarita Devi

Class: B.Sc Third Year

Semester : 5th

Subject : Inorganic Chemistry

Department: Chemistry

Month	Topics
January	METAL LIGAD BONDING IN TRANSITION METAL COMPLEXES • Limitations of VBT • Elementary idea of CFT • Crystal fielf splitting in octahedral and tetrahedral complexes • Crystal field splitting in square planar complexes
February	THERMODYNAMIC AND KINETIC ASPECTS OF METAL COMPLEXES • Thermodynamic stability of metal complexes • Factors affecting the stability • Substitution reactions of square planar complexes of Pt(II) MAGNETIC PROPERTIES OF METAL COMPLEXES • Types of magnetic behaviour • Methodes of determining magnetic susceptibility
March	MAGNETIC PROPERTIES OF METAL COMPLEXES • Spin only formula • L-s coupling • Orbital contribution of magnetc moments • Applications of magnetic moment ELECTRONIC SPETRA OF TRANSITION OF TRANSITION METAL COMPLEXES • Types of electronic transitions • Selection rule of d-d transitions • Spectrographic ground states

April	ELECTRONIC SPETRA OF TRANSITION OF TRANSITION METAL COMPLEXES • Spetrochemical Series • Orgel energy level diagram of d anf f states • Discussion of the electronic spectrum of [Ti(H2O)6]3 compex ion • Revision • Assignment • Class test

Teacher's Signature

TEACHING PLAN 2023-2024 (ODD SEMESTER)

(JULY 2023 TO NOVEMBER 2023)

Name of Assistant/Associate Professor: Sarita Devi

Class: B.Sc Third Year

Semester : 5th

Subject : Physical Chemistry

Department: Chemistry

Month	Topics
January	QUANTUAM MECHANICS-I • Black Body Radiations • Plank's radiation law • Photoelectric effect • Heat capacity of solids • Compton effect • Wave functions and its significance of postulates of quantum mechanics • Quantum mechanical operator • Hamiltonial operators • Hermition operator • Quantum mechanics and position and momentum
February	QUANTUAM MECHANICS-I • Determination of wave function and energy of a particle in one dimensional box PHYSICAL PROPERTIES AND MOLECULAR STURCTURE • Optical activity • Polarization • Orientation of dipoles in electric field • Dipole moment and methods of determination of dipole moment • Dipole moment and structure of molecules • Magnetic permeability and magnetic susceptibility and its determination • Applcatoins of susceptibility • Magnetic properties-Paramagnetic,Dimagnetism and Ferromafnetism

March	SPECTROSCOPY • Electromagnetic radiation • Region of spectrum • Basic of spectroscopy • Statementof Born Opppenhemier approximation • Degree of freedom • Diatomic molecules • Energy levels of rigid rotators • Selection rules
April	SPECTROSCOPY • Maxwell Boltzmann distribution • Determination of bond length • Qualitative description of non rigid rotator • Isotope-effect • Revision • Assignment • Class test

Teacher's Signature

TEACHING PLAN 2023-2024 (EVEN SEMESTER)

(JULY 2023 TO NOVEMBER 2023)

Name of Assistant/Associate Professor: Sarita Devi

Class: B.Sc First Year

Semester : 2nd

Subject : Inorganic Chemistry

Department: Chemistry

Month	Topics
January	HYDROGEN BONDING AND VANDER WAAL FORCES • Hydrogen Bonding definition and types • Effect of hydrogen bonding on properties of substances • Apllications of various types of vander waal's forces METALLIC BOND AND SEMICONDUCTORS • Metallic bond brief discussion • Band theory of metallic bond • Semiconductors,types and applications
February	S-BLOCK ELEMENTS • Comparative study of elements and diagonal relationship • Silent features of hydrides • Solvations and complexations tendencies of elements NOBLE GASES • Chemistry of noble gases and chemical properties • Chemistry of Xenon • Sturcture and Bonding of fluorides • Oxides and oxyfluorides of xenon P-BLOCK ELEMENTS • Comparative study and properties of p- block elements • Boron family-Diborane,Borazene and chemical properties and structure of them • Trihalides of Boron

March	CARBON FAMILY • Catenation • P-pi d-pi bonding of carbon • Carbides • Flurocarbones • Silicates,Silicones general methods of preparation and properties of them NITROGEN FAMILY • Oxides and oxyacids of N,P and their structure • Sturcture of White,Yellow and red phosphorous OXYGEN FAMILY • Acidic strength and structure of H2O2 • Properties and uses of them
April	HALOGEN FAMILY • Basic properties of Halogens and Interhalogens • Hydroxy and oxyacidsof Chlorine • Sturcture and comparision of acidic strength of halogens • Revision • Assignment • Class test

Teacher's Signature

TEACHING PLAN 2023-2024 (EVEN SEMESTER)

(JULY 2023 TO NOVEMBER 2023)

Name of Assistant/Associate Professor: Sarita Devi

Class: B.Sc First Year

Semester : 2nd

Subject : Physical Chemistry

Department: Chemistry

Month	Topics
January	KINETICS-I • Rate of reaction • Rate Equation • Factors influencing the rate of reaction • Order of the reaction • Integrated rate expression for zero order ,first ,second and third order reaction • Half life period of a reaction • Methods of determination of order of reaction • KINETICS-II • Effect of temperature on the rate of reaction • Arrhenius equation • Simple collision theory of unimolecular and bimolecular collisions • Transition state theory of Bimolecular collisions
February	ELECTROCHEMISTRY-I • Electrolytic conduction • Factors affecting electrolytiv conduction • Specific conductance, molar conductance, equivalent conductance and relationship among them • Arrehnius theory of ionization • Ostwald,s dilution law

	• Debye –Huckel onsagar equation for strong electrolytes
March	Electrochemistry- I • Transport number • Transport number determination methods Electrochemistry-II • Kohlarausch,s law • Calculation of molar and ionic conductance and effect of tempuratue and viscocity on it • Apllication of Kohlarausch's in calculation of candactance of weak electrolyte at infinite dilution • Determination of degree of dissociation •
April	ELECTROCHEMISTRY-II • Determination of solubility product of sparingly soluble salts • Determination of Ph and pKa • Buffer solution and Buffer action • Henderson hazel equation • Revision • Assignment Class Test

Teacher's Signature

TEACHING PLAN 2023-2024 (EVEN SEMESTER)

(JULY 2023 TO NOVEMBER 2023)

Name of Assistant/Associate Professor: Sarita Devi

Class: B.Sc Second Year

Semester : 4th

Subject : Physical Chemistry

Department: Chemistry

Month	Topics
January	THERMODYNAMICS-III • Second law of thermodynamics • Need of second law of thermodynamics and different statements • Carnot cycle and its efficiency • Carnot theoram • Thermodynamic scale of temperature • Concept of entropy • Entropy as a function of P,V and T • Entropy as a criteria of spontenity and equilibrium • Entropy change in ideal gases and mixing of gases THERMODYNAMICS-IV • Third law of thermodynamics- Nernest heat theorm • Concept of Residual entropy • Gibb's and Helmholtz functions as thermodynamic quantities
February	THERMODYNAMICS-III • Advantage over entropy change • Variation of G and A with P,V and ELECTROCHEMISTRY-III • Electrolytic and Galvanic cells • Reversible and Irreversible cells • Conventional representation of electrochemical cell • EMF of the cell and its mesearments • Activity and activity co-efficient

	• Types of reversible electrodes • Electrode reaction,Nernest equation • Derivation of cell EMF and single electrode potential
March	ELECTROCHEMISTRY-III • Standard hydrogen electrode, Refrence electrodes • Electrochemical series and its applications ELECTROCHEMISTRY-IV • Concentration cells with and without transference • Liquid junction potential • Applications of EMF mesuerments • Solubility product • Activity co-efficient
April	ELECTROCHEMISTRY-IV • Potentiometric titrations • Determination of pH using H-electrode • Quinhydronal electrode and glass electrode by potentiometric methods • Revision • Assignment • Class test

Teacher's Signature

TEACHING PLAN 2023-2024 (EVEN SEMESTER)

(JULY 2023 TO NOVEMBER 2023)

Name of Assistant/Associate Professor: Sarita Devi
Class: B.Sc Second Year
Semester : 4th
Subject : Inorganic Chemistry
Department: Chemistry

Month	Topics
January	CHEMISTRY OF F- BLOCK ELEMENTS(LANTHANIDES) • Electronic structure of Lanthanides • Oxidation state and ionic radii • Lanthanide compounds • Lanthanide contraction
Febuary	CHEMISTRY OF ACTINIDES • General features and chemistry of actinides • Chemistry of separation of NP,PU and AM from uranium • Comparision of properties of lanthanides and actinides with transition elements THEORY OF QUALITATIVE ANDQUANTITATIVE ANALYSIS-I • Chemistry of analysis of varius acidic radicals • Chemistry of identification of acid radicals in typical combinations • Chemistry of interference of acid radicals inculadind the removal in analysis of basic radicals
March	THEORY OF QUALITATIVE ANDQUANTITATIVE ANALYSIS-II • Theory of Precipitation • Theory of co-precipitation • Theory of post precipitation
April	THEORY OF QUALITATIVE ANDQUANTITATIVE ANALYSIS-II • Purification of precipitates • Revision • Assignments • Class test

Sarita

Teacher's Signature

TEACHING PLAN 2023-2024 (EVEN SEMESTER)

(JULY 2023 TO NOVEMBER 2023)

Name of Assistant/Associate Professor: Sarita Devi

Class: B.Sc Third Year

Semester : 6th

Subject : Inorganic Chemistry

Department: Chemistry

Month	Topics
Janbuary	QRGANOMETALLIC CHEMISTRY • Defination,nomenclature,and classification of organometallic compounds • Prepration,properties and bonding of alkali of Li,Al Hg and Sn brief account of metal-ethylene complexes • Mono nuclear compleses • Nature and bondingin metal carbonyls ACID AND BASE HSAB CONCEPT • Arrehnius concept • Bronsted-Lowery concept • Lux-flood concept
Febuary	ACID AND BASE HSAB CONCEPT • Solvent system • Lewis concept of acid and base • Relative strength of acid and base • Concept of hard and soft acid and base • Symbosis • Electronegativity • Hardness and softness BIOINORGANIS CHEMISTRY • Essential and trace elements in biological processes
March	BIOINORGANIS CHEMISTRY • Metalophorphyrins with special reference to haemoglobin • Metalophorphyrins with special reference to myoglobin

	• Biological rolr of alkali and alkalineearth metal ion • Nitrogen fixation
April	SILICONS AND PHOSPHOSAZENE • Explaenation of silicones and phisphosazene • Prepration of silicones and phosphosazene • Structure of silicones and their uses • Sturecture of phosphosazen and their uses • Revision • Assignment • Class test

Teacher's Signature

TEACHING PLAN 2023-2024 (EVEN SEMESTER)

(JULY 2023 TO NOVEMBER 2023)

Name of Assistant/Associate Professor: Sarita Devi

Class: B.Sc Third Year

Semester : 6th

Subject : Physical Chemistry

Department: Chemistry

Month	Topics
January	SPETROSCOPY-II • Electronic Sepactrum • Concept of potential energy curve for bonding and antibonding orbitals • Qualitative description of sigma and pi and n molecular orbital and their energy level and respective transitions PHOTOCHEMISTRY • Intraction of radiation with matter • Difference between thermal and photochemical processes
Febraury	PHOTOCHEMISTRY • Law of photochemistry –Growths drapper law • Stark Einstein law • Jablonski diagram describing various processes occurring in excited state • Qualitative description of fluroscence,phosphorescence • Non-radiative processes • Quantam yield • Photosenstizied reactions-energy transfer processes SOLUTIONS AND COLLIGATIVE PROPERTIES • Ideal and non ideal solutions • Methodes of expressing concentrations of solutions • Activity and activity co-efficient • Dilute solutions and colligative properties • Raoult's law

	• Relative lowering of vapour pressure,Molecular weight determination • Osmosis law of osmatic pressureand its mesurements
March	SOLUTIONS AND COLLIGATIVE PROPERTIES • Elevation of Boiling point and depression of freezinf point • Abnormal molar mass • Degree od dissociation and association of solutes PHASE EQULIBRIUM • Statement and meaning of term- phase component and degree of freedom • Thrmodynamic deviation of Gibbes phase rule • Phase equilibrium of one component system example-water and sulphur system
April	PHASE EQULIBRIUM • Phase equilibrium of two component system solid-liquid equlibrium • Simple eutecatic example Pb-Ag system • Desileration of lead • Revision Assignment • Class test

Teacher's Signature