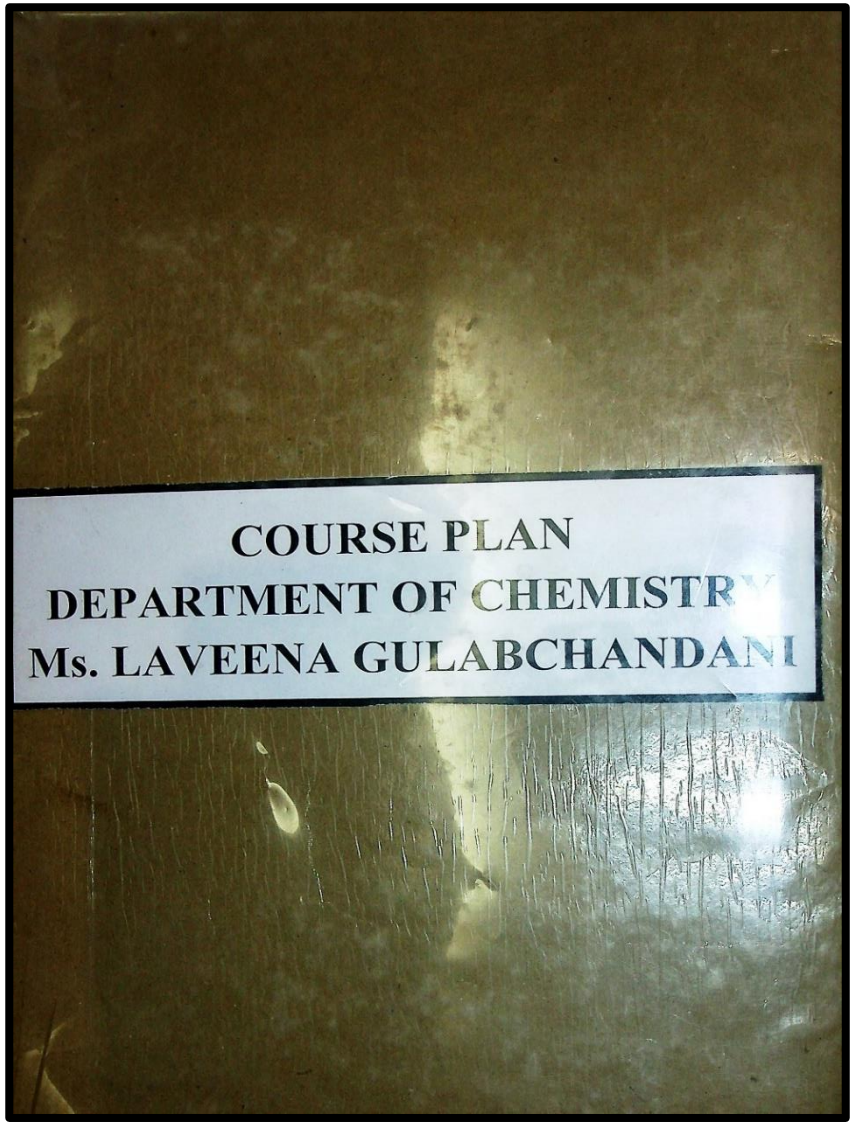
COURSE PLAN
DEPARTMENT OF CHEMISTRY
Ms. LAVEENA GULABCHANDANI

COURSE PLAN

U.G. & P.G. Programs

2021-22

ODD SEMESTER

SOPHIA GIRLS' COLLEGE (AUTONOMOUS), AJMER
B. Sc. I (SEMESTER I)

INORGANIC CHEMISTRY (CHE-101)

Max. Marks: 75 (50 Ext; 25 Int) Min. Marks: 30(20 Ext; 10 Int) Credit: 03

COURSE PLAN

SEM/ Month	UNIT/TOPIC	Concepts/facts	Teaching Pedagogy	Learning Outcomes	Questions	Marks Weightage (%)
SEM I NOVEMBER	**UNIT II** **Chemical Bonding** Valence bond theory and its limitations, various types of hybridization. Valence shell electron pair repulsion (VSEPR) theory to NH_3, H_3O^+, SF_4, ClF_3, ICl^-_2, and H_2O. MO theory, homonuclear and heteronuclear diatomic molecules, Comparison of VB and MO approaches.	Nature of Bonding according to VBT and MOT	PPT, Audio Visual Tutorials Visual 3- D Models	Summarize nature of covalent bonds and properties of ionic solids.	*Knowledge Based* -Define Electronegativity. - State Fajan's rule. *Understanding Based* -Compare VB and MO approach of bonding. - Illustrate hybridization in ammonia molecule *Higher Order Thinking Skills Based* - Explain why Hg^{+1} ion are of larger size than Hg^{+2}ion. -Discuss application of VSEPR Theory for deciding the shape of H_2O molecule.	Knowledge--60 Understanding-30 Higher Order-10
	Ionic Solids Lattice defects, semiconductors, lattice energy and Born-Haber cycle, solvation energy and solubility of ionic solids, polarizing power and polarisability of ions, Fajan's rule.	Characteristics of Ionic Solids	Diagrams, PPT, E-Content			

Sr. Pearl
PRINCIPAL
SOPHIA GIRLS' COLLEGE
(AUTONOMOUS)
AJMER

Head
Department of Chemistry
Sophia Girls' College
(Autonomous), Ajmer

SOPHIA GIRLS' COLLEGE (AUTONOMOUS), AJMER
B.Sc. I (SEMESTER I)
PRACTICAL (CHE-103)

Max. Marks: 50(40Ext; 10 Int) Min Marks: 20(16 Ext;4 Int) Credit: 02

COURSE PLAN

SEM/ Month	UNIT/TOPIC	Concepts/facts	Teaching Pedagogy	Learning Outcomes	Questions	Marks Weightage (%)
SEM I OCTOBER-NOVEMBER	**Inorganic Chemistry** Semi-micro Analysis- separation and identification of four ions, cation analysis from Groups I, II, III, IV, V and VI, anion analysis including interfering radicals.	Separation and identification of ions in Inorganic Mixture	Laboratory Experiments	Understand the practical applications of various aspects of chemistry	*Knowledge Based* Practical File Work *Understanding Based* - To Separate and identify cations and anions of an Inorganic Mixture. -To determine the boiling point of the given organic compound.	Knowledge--30 Understanding-50 Higher Order-20
DECEMBER-JANUARY	• Calibration of Thermometer • Determination of Melting Point • Determination of boiling points	Laboratory Techniques	Demonstration using different apparatus and glasswares,			

	• Crystallization • Decolorisation and crystallization using charcoal • Sublimation (Simple and Vacuum)				*Higher Order Thinking Skills Based* -Viva Voce	

Laveena

Sr. Pearl
PRINCIPAL
SOPHIA GIRLS' COLLEGE
(AUTONOMOUS)
AJMER

Tara
Head
Department of Chemistry
Sophia Girls' College
(Autonomous), Ajmer

SOPHIA GIRLS' COLLEGE (AUTONOMOUS), AJMER
B.Sc. II (SEMESTER III)

INORGANIC CHEMISTRY (CHE-301)

Max. Marks: 75 (50Ext; 25 Int) Min. Marks: 30(20 Ext; 10 Int) Credit: 03

COURSE PLAN

SEM/ Month	UNIT/TOPIC	Concepts/facts	Teaching Pedagogy	Learning Outcomes	Questions	Marks Weightage (%)
SEM III SEP - Oct	**UNIT II** **Coordination Compounds** Werner's coordination theory and its experimental verification, effective atomic number concept, chelates, nomenclature of coordination compounds, isomerism in coordination compounds, valence bond theory of transition metal complexes. Inner and outer orbital complexes of Cr, Fe, Co, Ni and Cu (coordination numbers 4 and 6), limitations of VBT	Basic Concepts and Theories of bonding in Coordination Compounds	PPT, Visual 3D Models, Audio visual tutorials	Predict chemical properties of Coordination compounds, Lanthanides and Actinides.	*Knowledge Based* - Which element is the hardest transition metal? - List two ambidentate ligands. *Understanding Based* - Classify acids and bases according to Bronsted Lowry	Knowledge--50 Understanding-35 Higher Order-15
	Chemistry of Lanthanides Electronic structure, oxidation states and ionic radii and lanthanide contraction, complex formation, separation of lanthanides (ion-exchange method only).	Extraction and Properties of lanthanides	Flow Charts, Diagrams			

	Chemistry of Actinides General features and chemistry of actinides, chemistry of separation of Np, Pu and Am from U, similarities between the later actinides and the later lanthanides. Comparison of actinides with lanthanides.	General features of Actinides	Group discussions, E-Content		concept. -Compare ionic radii of 3d and 4d transition series. *Higher Order Thinking Skills Based* -Justify that tetrahedral complexes are high spin complexes. - Elaborate the Hybridization of Fe in $K_4[Fe(CN)_6]$.	
NOVEMBER	**UNIT I** **Chemistry of Elements of First Transition Series** Characteristic properties of d-block elements. General group trends with special reference to electronic configuration, variable valency, colour, magnetic and catalytic properties, ability to form complexes and stability of various oxidation states.	Characteristic properties of first and second transition series	PPT, Quiz	Assess the chemistry of the first, second and third transition series.		
	Chemistry of Elements of Second and Third Transition series General characteristics, comparative treatment with their 3d-analogues in respect of ionic radii, oxidation states, magnetic behaviour, spectral properties and stereochemistry	Comparative Periodic trends in properties of 3d, 4d and 5d series.	PPT, Demonstration, Flipped Classroom.			

DECEMBER-JANUARY	**UNIT III** **Acids and Bases** Arrhenius, Bronsted-Lowry, the Lux-Flood, solvent system and Lewis concepts of acids and bases.	Classification of Acids and Bases	PPT, Flow Charts, E-Content	Illustrate oxidation reduction behaviour and aqueous and non - aqueous solvents.		
	Non-aqueous Solvents Physical properties of a solvent, types of solvents and their general characteristics reactions in non-aqueous solvents with reference to liquid NH_3 and liquid SO_2.	Chemical reactions in non aqueous solvents	Group discussions, Flipped Classroom			
	Oxidation and Reduction Use of redox potential data-analysis of redox cycle, redox stability in water-Frost, Latimer and Pourbaix diagrams. Principles involved in the extraction of the elements.	Analysis of Redox potential data	Diagrams, Assignments, Quiz			

Sr. Pearl

PRINCIPAL
SOPHIA GIRLS' COLLEGE
(AUTONOMOUS)
AJMER

Laveena

Tars

Head
Department of Chemistry
Sophia Girls' College
(Autonomous), Ajmer

SOPHIA GIRLS' COLLEGE (AUTONOMOUS), AJMER
M.Sc. CHEMISTRY (PREVIOUS)
SEMESTER I
PHYSICAL CHEMISTRY- I (CHEM-103)

Max. Marks: 100 (70 Ext; 30 Int) **Min. Marks:** 40 (28 Ext; 12 Int) **Credit:** 06

COURSE PLAN

SEM/ Month	UNIT/TOPIC	Concepts/facts	Teaching Pedagogy	Learning Outcomes	Questions	Marks Weightage (%)
SEM I NOVEMBER-DECEMBER	**UNIT III** Collision theory of reaction rates, activated complex theory, ionic reactions, kinetic salt effects, steady state kinetics, kinetic and thermodynamic control of reactions, methods of determining mechanism, isotope effects, Dynamic chain, photochemical (hydrogen-bromine reaction), acid base catalysis, kinetics of enzyme reactions, general features of fast reactions, study of fast reactions by flow method, flash	Kinetics of various chemical reactions	Quizzes, E-content, PPT Flipped Classroom	Assess the kinetics of various chemical reactions.	*Knowledge Based* -Define Kinetic salt effect. - What are degrees of Freedom? *Understanding Based* -Discuss Freezing point method for determination of activity	Knowledge--25 Understanding-45 Higher Order-30

	photolysis, dynamics of unimolecular reactions (Lindemann Theory, Hinshelwood Modifications).				coefficient. - Summarize postulates of Huckel theory of conjugated systems. *Higher Order Thinking Skills Based* - Deduce the Ionic Strength of a mixture of 0.2 M $AlCl_3$ and 0.1 K_2SO_4. - Calculate the Charge density on C-1 Carbon atom of butadiene.	
JANUARY	**UNIT II** Concept of fugacity and determination of fugacity, Non-ideal systems, Excess functions for non-ideal solutions, Activity, Activity coefficient and their determinations, Debye Huckel theory for activity coefficient for electrolytic solution; ionic strength, Application of phase rule to three component system – acetic acid + chloroform + water.	Thermodynamics of non- ideal systems	PPT , Problem Solving activities	Summarize various concepts of thermodynamics and phase rule.		
FEBRUARY	**UNIT I** Schrodinger equation, harmonic oscillator, the rigid rotor, the hydrogen atom. Applications of variation method and perturbation theory to the Helium atom.	Quantum Chemistry	Presentations by Students, E-content	Predict aspects of Quantum Chemistry		

	Huckel theory of conjugated systems, bond order and charge density calculations. Applications to ethylene, butadiene, cyclopropenyl radical, cyclobutadiene etc.	Application of Molecular Orbital Theory to Conjugated Systems	Quizzes, Problem Solving, Flipped Classroom			

Laveena

Sr. Pearl

PRINCIPAL
SOPHIA GIRLS' COLLEGE
(AUTONOMOUS)
AJMER

Tara

Head
Department of Chemistry
Sophia Girls' College
(Autonomous), Ajmer

SOPHIA GIRLS' COLLEGE (AUTONOMOUS), AJMER
M.Sc. CHEMISTRY (PREVIOUS)
SEMESTER I
Practicals (CHEM-105)

Max. Marks: 100 (70 Ext; 30 Int) **Min. Marks:** 40 (28 Ext; 12 Int) **Credit:** 06

COURSE PLAN

SEM/ Month	UNIT/TOPIC	Concepts/facts	Teaching Pedagogy	Learning Outcomes	Questions	Marks Weightage (%)
SEM I JANUARY- FEBRUARY	**PHYSICAL** • Determination of solubility and solubility product of sparingly soluble salts (e.g. $PbSO_4$, $BaSO_4$) conductometrically. • Determination of the strength of strong and weak acids in a given mixture conductometrically. • To construct the phase diagram for three component system (e.g., chloroform-acetic acid-water). • Determination of the dissociation constant of monobasic/dibasic acid • Determination of the dissociation constant of acetic acid in DMSO, DMF acetone and dioxane by titrating it with KOH.	Laboratory Techniques and Use of Various Instruments	Demonstration using different apparatus and instruments like pH meter, Conductivity meter, Laboratory Experiments	Understand the practical applications of various aspects of Chemistry	*Knowledge Based* - Practical File Work *Understanding Based* -To Determine the dissociation constant of monobasic/dibasic acid *Higher Order Thinking Skills Based* - Viva Voce	Knowledge--20 Understanding-40 Higher Order-40

PRINCIPAL
SOPHIA GIRLS' COLLEGE
(AUTONOMOUS)
AJMER

Head
Department of Chemistry
Sophia Girls' College
(Autonomous), Ajmer

SOPHIA GIRLS' COLLEGE (AUTONOMOUS), AJMER
M.Sc. CHEMISTRY (FINAL)
SEMESTER III

PHOTOCHEMISTRY AND SOLID STATE CHEMISTRY (CHEM-302)

Max. Marks: 100 (70 Ext; 30 Int) **Min. Marks:** 40 (28 Ext; 12 Int) **Credit:** 06

COURSE PLAN

SEM/ Month	UNIT/TOPIC	Concepts/facts	Teaching Pedagogy	Learning Outcomes	Questions	Marks Weightage (%)
SEM III DEC	**Unit-I** Metals, insulators and semiconductors, electronic structure of solids- band theory. Intrinsic and extrinsic semiconductors, doping semiconductors, p-n junction.	Mechanism of conduction in various solids	Diagrams, Quiz, Flipped Classroom	Illustrate solid state chemistry	*Knowledge Based* - Define Semiconductors. *Understanding Based* - Classify Superconductors on the basis of critical temperature. *Higher Order Thinking Skills Based* - Elaborate BCS theory of superconductivity.	Knowledge-25 Understanding-45 Higher Order-30
	Definition, types and BCS theory, Optical properties- photoconduction- photoelectric effects. Magnetic Properties- Classification of materials- magnetic domains, hysteresis.	Basics of Super conductors and magnetic properties of various materials.	PPT, Group Discussion, Quiz			

Dr. Pearl
PRINCIPAL
SOPHIA GIRLS' COLLEGE (AUTONOMOUS)
AJMER

Laveena

Tary
Head
Department of Chemistry
Sophia Girls' College
(Autonomous), Ajmer

COURSE PLAN

U.G. & P.G Programs

2021-22

EVEN SEMESTER

SOPHIA GIRLS' COLLEGE (AUTONOMOUS), AJMER
B. Sc. I (SEMESTER II)

PHYSICAL CHEMISTRY (PAPER I) (CHE-201)

Max. Marks: 75 (50 Ext; 25 Int) Min. Marks: 30(20 Ext; 10 Int) Credit: 03

COURSE PLAN

SEM II Month	UNIT/TOPIC	Concepts/facts	Teaching Pedagogy	Learning Outcomes	Questions	Marks Weightage (%)
FEBRUARY - MARCH	**UNIT II** **Gaseous States** Kinetic theory of gases, Deviation of real gases from ideal behaviour, causes of deviation, Vander Waals equation of state.	Behaviour of Real Gases and their deviation from ideal behaviour	Demonstration , PPT	Review various phenomenon of gaseous state.	*Knowledge Based* -Write the equation for calculating most probable velocity - Give Hardy Schulze Law *Understanding Based* -Compare Lyophillic and Lyophobic Colloids. -Summarize Law of Rational Indices. *Higher Order Thinking Skills Based* - Calculate the Millar Indices from the following Weiss indices- (-2a ,3b, ∞c).	Knowledge--60 Understanding-30 Higher Order-10
	PV isotherms of real gases, continuity of states, relationship between critical constant and Vander Waals constants, calculation of Vander Waal's constant.	Critical Phenomenon of real gases	Presentations, Quiz			
	Molecular velocities: Root mean square, average and most probable velocities, Maxwell's distribution of molecular velocities, collision number, mean free path and collision diameter, Liquifaction of gases (by various methods).	Velocity of gaseous molecules and Maxwell Boltzmann law	Group discussions. Diagrams			

SEM II MARCH – APRIL	**UNIT I** **Solid State** Space lattice, unit cell. Laws of crystallography, Symmetry elements in crystals. Weiss parameter system, Millar's indices. X-ray diffraction by crystals. Bragg's equation.	Laws of Crystallography, Symmetry in Crystals	3- D Models, PPT	Predict properties of solid state and colloidal states of matter.	-Explain why real gases deviate from ideal behaviour?	
	Colloidal State Definition and classification of colloids. Solids in liquids (sols): properties- kinetic, electrical, electrosmosis; stability of colloids, precipitation of colloid, protective action, Hardy-Schulze law, gold number. Emulsions; types of emulsions, preparation & application, deemulsification, Emulsifier. Gels: classification, properties and application, general applications of colloids.	Colloids: Basics, Types, Properties and their practical applications	Audio visual Tutorials, Flipped Classroom, Quiz			
APRIL - MAY	**UNIT III** Types of solution, Ideal solutions and Raoult's law, deviations from Raoult's law – non-ideal solutions, activity and activity coefficient. Dilute solution, colligative properties, relative lowering of vapour pressure, Osmosis, Elevation of boiling point and depression in freezing point. Experimental methods for determining various colligative properties. Abnormal molar mass, degree of dissociation and association of solutes.	Solutions, Dilute Solutions and Colligative Properties	Diagrams, Charts, E-Content	Summarize the properties of dilute solutions and explain colligative properties.		

Sr. Pearl
PRINCIPAL
SOPHIA GIRLS' COLLEGE
(AUTONOMOUS)
AJMER

Head
Department of Chemistry
Sophia Girls' College
(Autonomous), Ajmer

SOPHIA GIRLS' COLLEGE (AUTONOMOUS), AJMER

B.Sc. I (SEMESTER II)

PRACTICALS (CHE-203)

Max. Marks: 50(40Ext; 10 Int) Min Marks: 20(16 Ext;4 Int) Credit: 02

COURSE PLAN

SEM II Month	UNIT/TOPIC	Concepts/facts	Teaching Pedagogy	Learning Outcomes	Questions	Marks Weightage (%)
FEBRUARY –MARCH	**1. Organic Chemistry Qualitative Analysis** Detection of extra elements (N,S and halogens) and functional groups (phenolic, carboxylic, carbonyl, esters, carbohydrates, amines, amides, nitro and anilide) in simple organic compounds.	Identification of Functional Groups	Laboratory Experiments, Flow Chart	Understand the practical applications of various aspects of chemistry	*Knowledge Based* Practical File Work *Understanding Based* - To identify the functional group in the given organic compound. - To determine the percentage composition of a given mixture by Viscosity Method. *Higher Order Thinking Skills Based* Viva Voce	Knowledge—30 Understanding-50 Higher Order-20
MARCH	• To determine the specific reaction rate of the hydrolysis of methyl acetate/ ethyl acetate catalyzed by hydrogen ions at room temperature. • To study the effect of acid strength on the hydrolysis of an ester.	Kinetics of Chemical reactions.	Demonstration of experiments with use of different Apparatus and glasswares			

	• To compare the strengths of HCI and H_2SO_4 by studying the kinetics of hydrolysis of ethyl acetate. • To study the distribution of iodine between water and CCI_4					
APRIL	• To study the distribution of benzoic acid between benzene and water. • To determine the percentage composition of a given mixture (non interacting systems) by viscosity method. • To determine the percentage composition of a given binary mixture by surface tension method (acetone & ethyl methyl ketone).	Methods to determine percentage composition of binary mixture.	Demonstration of experiments with use of different Apparatus and glasswares, Laboratory Experiments			

Sr. Pearl
PRINCIPAL
SOPHIA GIRLS' COLLEGE
(AUTONOMOUS)
AJMER

Head
Department of Chemistry
Sophia Girls' College
(Autonomous), Ajmer

SOPHIA GIRLS' COLLEGE (AUTONOMOUS), AJMER
B.Sc. II (SEMESTER IV)

PHYSICAL CHEMISTRY (CHE-401)

Max. Marks: 75 (50Ext; 25 Int) Min. Marks: 30(20 Ext; 10 Int) Credit: 03

COURSE PLAN

SEM IV Month	UNIT/TOPIC	Concepts/facts	Teaching Pedagogy	Learning Outcomes	Questions	Marks Weightage (%)
FEBRUARY	**UNIT II** **Electrochemistry-I** Electrical transport, specific and equivalent conductance, Kohlrausch law, Arrhenius theory of electrolyte dissociation and its limitations, weak and strong electrolytes, Ostwald's dilution law its uses and limitations. Debye-Huckel-Onsager's equation for strong electrolytes, Transport number, Applications of conductivity measurements in determination of degree of dissociation, Ka of acids, solubility product of a sparingly soluble salt, ionic product of water, hydrolysis constant of a salt, conductometric titrations.	Types of conductances their measurements and its Applications. Laws explaining Electrolyte behaviour.	Quiz, Diagrams, Group Discussions	Review the various types of conductance, factors affecting it and applications of Conductivity measurements.	*Knowledge Based* -Write Debye Huckel Onsagar equation. -State Kohlrausch law. *Understanding Based* - Describe Hydrogen Electrode and also calculate the electrode potential by using Nernst	Knowledge--50 Understanding-35 Higher Order-15
MARCH	**UNIT III** **Electrochemistry-II** Electrolytic and Galvanic cells-	Understanding of various types of electrodes and	E-content, PPT, Audio Visual Tutorials	Discuss various phenomena related to Cells		

	reversible and irreversible cells, Notations and sign conventions, EMF of a cell and its measurements, Calculation of thermodynamic quantities of cell reactions, Nernst equation, derivation of cell E.M.F. , single electrode potential, standard electrode potential, electrochemical series and its significance. Types of reversible electrodes, standard hydrogen electrode, polarization, over potential. Concentration cell with and without transport, liquid junction potential, application of concentration cells. Potentiometric titrations- qualitative treatment (acid-base and oxidation reduction only), Other Applications of Cell potential. Corrosion- Types, theories & methods of combating it	electrolytic and galvanic cells and their applications and concept of corrosion		and Corrosion.	Equation. - Discuss the Significance of Electrochemical series. *Higher Order Thinking Skills Based* - Why Li is a stronger reducing agent than Na? -Derive the equation giving relationship between C_p and C_v	
APRIL-MAY	**UNIT I** **Thermodynamics-I** First Law of Thermodynamics: Statement, internal energy and enthalpy, heat capacities at constant volume and constant pressure and their relationship. Joule's law, Joule Thomson coefficient and inversion temperature.	Basic concepts of thermodynamics	Assignments, PPT	Summarize the First, Second and third law of thermodynamics and their applications.		

	Thermochemistry Standard state, standard enthalpy of formation-Hess's Law, Heat of reaction at constant pressure and at constant volume, Enthalpy of neutralization, Kirchhoff's equation.	Fundamentals of thermochemistry	Flipped Classroom, Laboratory Experiments			
	Thermodynamics-II Second law of thermodynamics, Carnot cycle, Carnot theorem, Concept of entropy: entropy as a state function, Entropy change in ideal gases and mixing of gases. **Third law of thermodynamics:** Nernst heat theorem, Gibbs and Helmholtz functions; Gibbs function (G) and Helmholtz function (A) as thermodynamic quantities, Variation of G with A with P, V and T.	Concepts of second and third law of thermodynamics	Diagrams, Demonstration			

Sr. Pearl
PRINCIPAL
SOPHIA GIRLS' COLLEGE
(AUTONOMOUS)
AJMER

Head
Department of Chemistry
Sophia Girls' College
(Autonomous), Ajmer

SOPHIA GIRLS' COLLEGE (AUTONOMOUS), AJMER
M.Sc. CHEMISTRY (PREVIOUS)
SEMESTER II

PHYSICAL CHEMISTRY- II (CHEM-203)

Max. Marks: 100 (70 Ext; 30 Int) **Min. Marks:** 40 (28 Ext; 12 Int) **Credit:** 06

COURSE PLAN

SEM/ Month	UNIT/TOPIC	Concepts/ Facts	Teaching Pedagogy	Learning Outcomes	Questions	Marks Weightage (%)
SEM II APRIL-MAY	UNIT I **Electrochemistry** Electrochemistry of solutions, Debye-Huckel-Onsager treatment and its extension, ion solvent interactions. Debye-Huckel-Bjerrum model. Semiconductor interfaces-theory of double layer at semiconductor, structure of double layer interfaces. Effect of light at semiconductor solution interface. Overpotential, exchange current density, derivation of Butler-Volmer equation, Tafel Plot.	Concepts related to Double layer interfaces, Polarography, Over potential and Corrosion.	PPT, E-content, Diagrams, Assignments	Explain the electrochemistry.	*Knowledge Based* - Write any two advantages of using Dropping Mercury Electrode. - Give any two differences between Physisorption and Chemisorption.	Knowledge--25 Understanding-45 Higher Order-30

	Polarography theory, Ilkovic equation; half wave potential and its significance. Corrosion – Types, mechanism and inhibition.				*Understanding Based* -Describe the Sacrificial Anode Method and Impressed Current Method of Corrosion Prevention. - Discuss the Langmuir Rideal Mechanism for Bimolecular Surface Catalytic Reactions *Higher Order Thinking Skills Based* -Calculate the number average molar mass of a polymer containing 10	
MAY-JULY	**UNIT II** **Adsorption** Pressure difference across curved surface (Laplace equation), vapour pressure of droplets (Kelvin equation), Gibbs adsorption isotherm, estimation of surface area (BET equation without derivation), mechanism of surface catalytic reactions.	Phenomenon of adsorption, Adsorption isotherms and pressure changes as result of curved interfaces.	E-content, Flipped Classroom	Summarize the concepts of adsorption and micelles.		
	Micelles Surface active agents, classification of surface active agents, micellization, hydrophobic interaction, critical micellar concentration (CMC), factors affecting the CMC of surfactants, counter ion binding to micelles, thermodynamics of micellization, solubilization, microemulsion, reverse micelles.	Micellization and its applications	Audio Visual Tutorials, PPT, Student Presentations			
JULY	**UNIT III**	Kinetics and	Flow Charts, Problem	Assess the chemistry of		

	Macromolecules: Polymer- definition, types of polymers, kinetics and mechanism of polymerisation. Number and mass average molecular mass, molecular mass determination (osmometry, viscometry, diffusion, sedimentation), chain configuration of macro molecules, calculation of average dimensions of various chain structures. electrically conducting, Fire resistant, liquid crystal polymers,	Mechanism of Polymerisation and Molar mass determination of polymers,	Solving, Assignments	macromolecules.	molecules with a mass of 10,000 and 15 molecules with a mass of 20,000. -Derive Laplace equation for pressure difference across curved surface.	

Sr. Pearl
PRINCIPAL
SOPHIA GIRLS' COLLEGE
(AUTONOMOUS)
AJMER

Head
Department of Chemistry
Sophia Girls' College
(Autonomous), Ajmer

SOPHIA GIRLS' COLLEGE (AUTONOMOUS), AJMER
M.Sc. CHEMISTRY (PREVIOUS)
SEMESTER II

PRACTICALS (CHEM-205)

Max. Marks: 100 (70 Ext; 30 Int) **Min. Marks:** 40 (28 Ext; 12 Int) **Credit:** 06

SEM/ Month	UNIT/TOPIC	Concepts/facts	Teaching Pedagogy	Learning Outcomes	Questions	Marks Weightage (%)
SEM II JULY	**PHYSICAL CHEMISTRY** (i) Determination of strengths of halides in a mixture potentiometrically. (ii) Determination of the strengths of strong and weak acids in a given mixture using a potentiometer/pH meter. (iii) Determination of partition coefficient of I_2 between water and CCl_4. (iv) Determination of equivalent conductance of a strong electrolyte such as KCl,AgNO3 etc. at several concentrations and hence verify the Onsagar's Equation. (v) To construct the phase diagram for three component system(e.g., chloroform-acetic acid-water).	Laboratory Techniques and Use of Various Instruments	Demonstration using different Apparatus and instruments like pH meter, conductivity meter	Understand the practical applications of various aspects of chemistry	*Knowledge Based* -- Practical File Work *Understanding Based* -To determine the partition coefficient of I_2 between water and CCl4. *Higher Order Thinking Skills Based* -Viva- Voce	

Sr. Pearl
PRINCIPAL
SOPHIA GIRLS' COLLEGE
(AUTONOMOUS)

Laveena

Head
Department of Chemistry
Sophia Girls' College
(Autonomous), Ajmer

SOPHIA GIRLS' COLLEGE (AUTONOMOUS), AJMER
M.Sc. CHEMISTRY (FINAL)
GROUP-A INORGANIC CHEMISTRY
SEMESTER IV

INORGANIC POLYMERS - CHEM – 403(A)

Max. Marks: 100 (70 Ext; 30 Int) **Min. Marks:** 40 (28 Ext; 12 Int) **Credit:** 06

COURSE PLAN

SEM/ Month	UNIT/TOPIC	Concepts/facts	Teaching Pedagogy	Learning Outcomes	Questions	Marks Weightage (%)
SEM IV FEBRUARY	**Unit-I** **Basics Concepts** Definition, Classifications by Connectivities, Classifications by Dimensionality, the Metal/Backbone Classification of Metal-Containing Polymers.	Introduction and Classification of Inorganic Polymers	3D diagrams, Flow charts	Elaborate basic concepts and synthesis of Inorganic polymers.	*Knowledge Based* - Give one example of Metal Enmeshed Polymers. -Write any two	Knowledge--25 Understanding-45 Higher Order-30

	Inorganic Polymer Synthesis Step Growth synthesis, Chain Polymerization, ring opening polymerization, Reductive coupling and other · Redox Polymerisation reactions.	Synthesis of Inorganic polymers.	Diagrams, PPT, Flipped Classrooms		differences between step growth and chain growth polymerization *Understanding Based* - Summarize the cryoscopic method for determination of molecular weight of polymers. - Discuss Differential Thermal Analysis for Polymers. *Higher Order Thinking Skills Based* - Calculate Degree of polymerization if ρ= 98%. - Deduce the polydispersity index of a polymer	
MARCH - APRIL	**Unit-II** **Inorganic Polymer Characterization** Average Molecular Masses and Degrees of Polymerization, Methods of Characterizing Average Molecular Masses- Gel Permeation Chromatography, Viscosity, Universal Calibration, Colligative Properties (Vapor Pressure Lowering, Boiling Point Elevation, Melting Point Lowering, and Osmotic Pressure), End-Group Analysis, Mass Spectroscopy, Ultracentrifugation.	Determination of molecular weight of Inorganic Polymers	Audio Visual Tutorials, Problem Solving	Analyse the Chemical nature of polymers		
	Analysis and. testing of polymers Chemical analysis of polymers, spectroscopic methods. X-ray diffraction study, microscopy. thermal analysis and physical testing-tensile strength. Fatigue, impact, tear resistance. hardness and abrasion	Various methods for analysis of Polymers	Demonstration, Diagrams, E-content			

	resistance.				in which number average and weight average molar mass is 1, 00,000 and 1, 20,000.	
APRIL - MAY	**Unit-III** **Polymers based on Boron –** Borides, Carborane Polymers, Borazine, Boron Nitride	Chemistry of Boron polymers	PPT, Flipped Classrooms	Summarize the Properties of Inorganic Polymers.		
	Polymers based on Silicon-Silicones- Preparation and properties of Silicones, Modification of Silicones **Polysilanes and related polymers-** Structure, Synthesis, Physical and electronic properties of polysilanes, Chemical modification of Polysilanes.	Preparation, properties and structure of Silicon Polymers	Assignments, Quiz, Diagrams			

Sr. Pearl
PRINCIPAL
SOPHIA GIRLS' COLLEGE
(AUTONOMOUS)
AJMER

Sr Pearl
PRINCIPAL
SOPHIA GIRLS' COLLEGE
(AUTONOMOUS)
AJMER

Head
Department of Chemistry
Sophia Girls' College
(Autonomous), Ajmer