

**VIDHYADEEP UNIVERSITY**  
**Syllabus of B.Sc. Chemistry**  
**DCS Subject (According to NEP)**  
**Effective from 2023-2024**  
**SEMESTER-I**

**Teaching & Evaluation Scheme**

Course name: Discipline core			Semester I						
Grade System:									
Subject			Teaching Scheme		Examination Scheme		Passing Scheme		Total Marks
Subject Code	Paper No.	Paper Title	Hours/week	Credit	Theory		Passing Head		
					Internal	External	Internal	External	
004301101	Chem.-I	Fundamental of Chemistry-I	3	3	50	50	17	17	100
004391241	Chem.-II	Introduction of chemistry - I	3	3	50	50	17	17	100
004301102	Practical	Practical -I	4	2	50	50	17	17	100

Course name: : Discipline core			Semester II						
Grade System:									
Subject			Teaching Scheme		Examination Scheme		Passing Scheme		Total Marks
Subject Code	Paper No.	Paper Title	Hours/week	Credit	Theory		Passing Head		
					Internal	External	Internal	External	
004301201	Chem.-I	Fundamental of Chemistry-II	3	3	50	50	17	17	100
004391242	Chem.-II	Introduction of chemistry - II	3	3	50	50	17	17	100
004301202	Practical	Practical-II	4	2	50	50	17	17	100

Program Outcome	<p>PO1: The aim is to augment one's knowledge in the various domains of chemistry and attain mastery in the chosen branch of the field, while also fostering clear and effective communication within and across disciplinary boundaries.</p> <p>PO2: Develop entrepreneurial skills by leveraging the industrial hub situated in the vicinity of our university.</p> <p>PO3: Establish a research centre with the support of interdisciplinary subjects offered at the university.</p> <p>PO4: Pursue a doctoral degree in the Organic Chemistry and continue further studies.</p> <p>PO5: Develop short-term courses relevant to the demanded subject to enhance knowledge and its practical application.</p> <p>PO6: Provide training/internship opportunities to students for employment in public and private sectors, as well as national laboratories.</p> <p>PO7: Engage in scientific discourse with a respectful demeanor and take the lead in interdisciplinary &amp; multidisciplinary collaborations with experts from diverse fields.</p> <p>PO8: Acquire knowledge and implement best safety practices in chemical research &amp; Industry.</p>
-----------------	--

Objective of Program	The primary goal of the M.Sc. organic chemistry program is to equip students with the skills and knowledge necessary to pursue dynamic careers in industry and academia by offering a superb teaching and research environment in both core and emerging areas of the discipline.
----------------------	---

Program Specific Outcomes	<p><b>PSO1:</b> Demonstrate a comprehensive understanding of the fundamental principles, concepts, and theories in various branches of chemistry.</p> <p><b>PSO2:</b> Apply theoretical knowledge and practical skills to analyze and solve complex chemical problems.</p> <p><b>PSO3:</b> Utilize advanced laboratory techniques and instrumentation for chemical analysis and experimentation.</p> <p><b>PSO4:</b> Apply mathematical and statistical methods to analyze and interpret experimental data in chemistry.</p> <p><b>PSO5:</b> Communicate scientific information effectively through written reports, presentations, and scientific discussions.</p> <p><b>PSO6:</b> Demonstrate awareness of safety protocols and ethical considerations in chemical research and laboratory practices.</p> <p><b>PSO7:</b> Apply critical thinking and scientific reasoning to evaluate and interpret scientific literature and research findings in chemistry.</p> <p><b>PSO8:</b> Exhibit teamwork, leadership, and interpersonal skills in collaborative scientific projects and research.</p> <p><b>PSO9:</b> Adapt to emerging trends and advancements in chemistry, demonstrating a commitment to lifelong learning and professional development.</p> <p><b>PSO10:</b> Apply chemical knowledge and skills to contribute to the development of sustainable practices and solutions in various industries and societal challenges.</p>
---------------------------	--

Mapping between POs and PSOs		PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
	PO1	✓	✓		✓		✓	✓	✓	✓	✓
	PO2	✓	✓			✓			✓		
	PO3			✓	✓	✓				✓	
	PO4	✓	✓	✓			✓	✓	✓	✓	✓
	PO5	✓			✓	✓		✓			
	PO6		✓	✓			✓		✓	✓	✓
	PO7	✓			✓			✓			
PO8		✓				✓		✓		✓	

## SEMESTER - I

### CHEMISTRY - I

#### Fundamentals of chemistry – I

Course Objectives:	<b>CO-1:</b> distinguish between atomic and molecular orbitals, bonding and antibonding molecular orbitals, different theories of co-ordination chemistry. <b>CO-2:</b> understand basic concepts of organic qualitative analysis : elements equation ,solubility of organic compound . <b>CO-3 :</b> study of IUPAC ,nomenclature, rules of nomenclature ,nomenclature of organic compounds examples. <b>CO-4:</b> understand Second law of thermodynamics (in detail), Carnot cycle and its efficiency, Entropy concept, Change of entropy for reversible isothermic, isobaric, isochoric and adiabatic processes. Entropy change for ideal gases (T & V as variables, P & T as variables), Numerical.
--------------------	---

Course Outcome : After finishing this course, the student will be	
1.	To analyze and explain the atomic and molecular arrangements in solids, comprehend the relationships between structure and properties, and apply their knowledge to predict and interpret the behaviour of solid materials in various fields such as materials science, solid-state physics, and crystallography.
2.	Able to analyze and interpret the coordination behaviour of metal complexes, comprehend acid-base theories and their applications in chemical reactions, and apply their knowledge to predict and explain the reactivity and properties of coordination compounds and acid-base systems in various areas such as inorganic chemistry, catalysis, and bioinorganic chemistry.
3.	Able to analyze and interpret the rates of chemical reactions, understand the factors affecting reaction rates, comprehend the periodic trends in atomic and molecular properties, and apply their knowledge to predict and explain the behavior of chemical reactions and the properties of elements across the periodic table in various fields such as physical chemistry, environmental chemistry, and materials science.

Mapping between CO and PSO		PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
	CO1	✓			✓	✓	✓			✓	✓
	CO2	✓	✓				✓		✓		✓
	CO3			✓		✓	✓	✓		✓	✓
	CO4	✓			✓						
	CO5		✓	✓		✓		✓		✓	
CO6	✓				✓					✓	

## Course content

Course name: Bachelor of Science (Fundamentals of Chemistry- I )	Semester I	hrs
Unit-1	<b>ATOMIC STRUCTURE</b> Historical Perspective Of Atomic Structure : RuatherFord's Atomic Model, Bohr's Theory And Its Limitation, Spectrum Of Hydrogen Atom (Lyman, Balmer, Paschem, Brackett & P Fund(, Quantum Numbers, Auf Bau, Hund And Pauli Exclusion Principles, Penetration And Shielding, Effective Nuclear Charge (Slater Rule)	11
Unit - 2	<b>ORGANIC QUALITATIVE ANALYSIS</b> Introduction, Elemental Analysis(Lessing's Test With Equation),Solubility of Organic Compound (Ref.Vogel's Qualitative Organic Analysis),Chemical Method: Solubility In NaHCO <sub>3</sub> ,NaOH - HCl, Acid – Base, Phenol, Amphoteric Compound (Sulphanic Acid and Anthranilic Acid)	12
Unit -3	<b>IUPAC NOMENCLATURE OF ORGANIC COMPOUND</b> Introduction, Functional Group, Homologous Series, Nomenclature, Rules For Nomenclature, Nomenclature Of Organic Compounds ,Examples, Exercise.	11
Unit -4	<b>THERMODYNAMICS</b> Introduction, sign convention, system ( open,close and isolated), first law of thermodynamics, work done in isothermal and adiabatic changes, Heat content (Euthalpy), molar heat, mechanical work, heat , temperature and energy Heat, work and thermodynamics. Heat capacities., joule Thomson effect.	12

<b>REFERENCE BOOKS :</b>	<ol style="list-style-type: none"> <li>1- Essentials Of Physical Chemistry by A.S. Bahl And G.D. Tuli, Pub :S. Chand</li> <li>2-Inorganic Chemistry by Wahid Malik, G.D. Tuli, R.D. Madam : Pub. S. Chand</li> <li>3-Advance Inorganic Chemistry (Vol.2) by G.D.Tuli, R.D. Madam: Pub.S. Chand</li> <li>4-Physical Chemistry by Arunbahl, B.S. Bahl And G.D. Tuli, Pub: S. Chand</li> <li>5-Advance Physical Chemistry by D.N. Bajpai, Pub: S. Chand.</li> </ol>
--------------------------	--

## SEMESTER - I

### CHEMISTRY - II

#### INTRODUCTION OF CHEMISTRY - I

Course Objectives:	<p><b>CO 1 :</b> understand basic concepts Arrhenius theory, Lowry Bronsted theory, Lewis theory, Solvent – Solute concept of acid base, Soft-Hard acid base and its application.</p> <p><b>CO 2:</b> understand basic concepts of organic qualitative analysis : elements equation ,solubility of organic compound.</p> <p><b>CO 3:</b> Study definition of space lattice, Unit cell, Difference between crystalline and amorphous state, types of crystals with illustrations, Law of crystallography. Steno's law and laws of symmetry, lattice planes, Miller indices, Bravais indices, type of cubic system, diagrammatic representation of cubic system and d100, d110, d111 planes, Bragg's equation (X-ray diffraction), Crystal structure of NaCl, KCl.(Numerical based on Bragg's equation and Miller indices)</p> <p><b>CO 4:</b> to develop skills for quantitative estimation using the different branches of volumetric analysis</p>
--------------------	--

Mapping between CO and PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CO1	✓			✓	✓	✓			✓	✓
CO2	✓	✓		✓				✓		
CO3			✓		✓	✓	✓		✓	✓
CO4	✓				✓			✓		

Course Outcome : After finishing this course, the student will be	
1.	To analyze and explain the atomic and molecular arrangements in solids, comprehend the relationships between structure and properties, and apply their knowledge to predict and interpret the behaviour of solid materials in various fields such as materials science, solid-state physics, and crystallography.
2.	Able to analyze and interpret the coordination behaviour of metal complexes, comprehend acid-base theories and their applications in chemical reactions, and apply their knowledge to predict and explain the reactivity and properties of coordination compounds and acid-base systems in various areas such as inorganic chemistry, catalysis, and bio inorganic chemistry.
3.	Able to analyze and interpret the rates of chemical reactions, understand the factors affecting reaction rates, comprehend the periodic trends in atomic and molecular properties, and apply their knowledge to predict and explain the behaviour of chemical reactions and the properties of elements across the periodic table in various fields such as physical chemistry, environmental chemistry, and materials science.

## Course Content

Course name: Introduction of Chemistry	Semester I	hrs
Unit-1	<b>ACID-BASE THEORIES</b> Introduction, Definition Of Acid and Base, Arrhenius Theory, Lowry Bronsted Theory, Lewis Theory , Solvent – solute concept of acid –base , Soft – Hard acid base and it's application .	11
Unit – 2	<b>ALKANES AND CYCLOALKENES</b> A) Alkane: Introduction, Nomenclature, Sources, Methods Of formation with special reference To Wurts Reaction ,Kolbe reaction And decarboxylation of carboxylic acid , physical properties and chemicals Reaction. B) Cycloalkenes: Introduction, Nomenclature, methods of formation chemical reactions, Baeyer's strain theory and It's limitation ,theory of strain less Ring.	12
Unit-3	<b>SOLID STATE</b> Definition Of Space Lattice, Unit Cell, Difference Between Crystalline And Amorphous State, Types Of Crystals With Illustrations, Law Of Crystallography. Steno's Law And Laws Of Symmetry, Lattice Planes, Miller Indices, Bravais Indices, Type Of Cubic System, Diagrammatic Representation Of Cubic System And $D_{100}$ , $D_{110}$ , $D_{111}$ , Planes, Bragg's Equation. (X-Ray Diffraction), Crystal Structure Of NaCl, KCl, (Numerical Based On Bragg's Equation And Miller Indices)	12
Unit - 4	<b>Titrimetric methods of analysis</b> Introduction, type of volumetric titration A) Acid-base titration: definition , indicator used, standard solutions, definition of $P^H$ B) Redox titration : principle, types of redox titration (external and internal), indicator used standard solutions C) Precipitation titration : theory, indicators, standard solution D) Complexometric titration : theory, standard solution, EDTA structure and its equilibria related to $p^H$ , metallochromic indicators.	11

<b>REFERENCE BOOKS:</b>	<ol style="list-style-type: none"> <li>Essentials of physical chemistry by A.S. Bhal and Pub. S. Chand, G.D. Tuli.</li> <li>Advance physical chemistry by D.N. Bajpai, Sub: S. Chand</li> <li>Numerical problems by Dogra And Dogra (For Numerical)</li> <li>Concise inorganic chemistry (5<sup>th</sup> Ed) by J.D. Lee.</li> <li>Basic inorganic chemistry by Cotton &amp; Wilkinson.</li> <li>Organic chemistry Vol. I &amp; Vol. II by I.L. Finar</li> <li>Organic chemistry by P.L. Soni</li> <li>Organic chemistry by B.K. Sharma</li> <li>Organic chemistry by Bahl and Bahl</li> <li>Organic reaction mechanism by Mukharji &amp; Singh</li> <li>Fundamentals of organic chemistry by Solomon John Wiley</li> </ol>
-------------------------	---

## CHEMISTRY PRACTICAL – I

Course Objectives:	<p>CO1: To provide students with hands-on experience and skills in conducting qualitative tests to identify organic compounds based on their functional groups and chemical properties, as well as understanding the principles and techniques of organic qualitative analysis.</p> <p>CO2: To provide students with practical skills and knowledge in performing volumetric analysis, including the principles, techniques, and calculations involved in accurate titrations.</p>
--------------------	--

Course Outcome : After finishing this course, the student will have	
1.	able to perform a range of qualitative tests to identify organic compounds, interpret the results of these tests to determine functional groups and compound identities, apply their knowledge of organic reactions and properties to conduct appropriate tests, and develop critical thinking and analytical skills in organic compound identification.
2.	Able to perform various volumetric titrations, accurately measure volumes of solutions and perform calculations to determine the concentration of analyses, understand the principles of different types of titrations, analyze experimental data, and apply their knowledge and skills in quantitative analysis and titration-based experiments.

Mapping between CO and PSO		PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
	CO1	✓	✓		✓	✓		✓		✓	
	CO2		✓	✓		✓	✓		✓	✓	✓

<b>ORGANIC SPOTTING</b>	<ul style="list-style-type: none"> <li>- Primary Tests, Ignition Test, Detection Of Elements Nature Of The Substance (Solubility Test), Functional Group Tests, C.T., Molecular Formula, Structural Formula &amp; M.P. / B.P. Of The Given Substance.</li> <li>- <b>ACID</b> – Benzoic Acid, Phthalic Acid, Salicylic Acid</li> <li>- <b>BASE</b> – Aniline, P&amp;O Nitro Aniline</li> <li>- <b>PHENOL</b> – <math>\alpha</math>-Naphthol, <math>\beta</math>-Naphthol</li> <li>- <b>NEUTRAL</b> –</li> <li>- <b>CARBOHYDRATE</b> – Glucose, Fructose</li> <li>- <b>KETONE</b> – Acetone, Acetophenone</li> <li><b>ALCOHOL</b> – Methanol, Ethanol</li> <li><b>HALOGENATED HYDROCARBON</b> -Chlorobenzene</li> <li><b>NITRO HYDROCARBON</b> - Nitrobenzene</li> <li><b>AMIDE</b> – Urea</li> <li>- <b>ANILIDE</b> – Acetanilide</li> </ul> <p style="text-align: center;">N.B. Candidate Should Perform At Least 08 Organic Exercises.</p>
-------------------------	---

## VOLUMETRIC EXERCISE

1.	To given solution of 0.1 N HNO <sub>3</sub> by using this solution to find out Normality and concentration of NaOH and H <sub>2</sub> C <sub>2</sub> O <sub>4</sub> .2H <sub>2</sub> O
2.	To given solution of 0.1 N H <sub>2</sub> SO <sub>4</sub> by using this solution to find out Normality and concentration of NaHCO <sub>3</sub> and HNO <sub>3</sub>
3.	To given solution of 0.09 N KMnO <sub>4</sub> by using this solution to find out Normality and concentration of H <sub>2</sub> C <sub>2</sub> O <sub>4</sub> and KOH
4.	To given solution of 0.1 N KMnO <sub>4</sub> by using this solution to find out Normality and concentration of FeSO <sub>4</sub> and K <sub>2</sub> Cr <sub>2</sub> O <sub>7</sub>
N.B. Candidate Should Perform At Least 2 Volumetric Exercises.	



**SEMESTER-II**  
**CHEMISTRY - I**  
**Fundamentals of chemistry – II**

Course Outcome : After finishing this course, the student will have	
1.	Be able to perform qualitative analysis experiments to identify the presence of various ions and functional groups in chemical samples, interpret experimental observations to determine compound identities, understand the fundamental principles of atomic structure and spectroscopic techniques, and apply their knowledge in qualitative analysis and atomic structure to solve analytical and theoretical problems in chemistry.
2.	Able to perform experimental procedures to investigate and analyze chemical bonding in different compounds, apply spectroscopic techniques to study molecular structures, measure thermodynamic parameters such as enthalpy and entropy changes, and apply their practical skills in understanding the principles of chemical bonding and thermodynamics, as well as interpreting experimental data in these areas.
3.	Able to measure and analyze conductance values of electrolytic solutions, investigate and understand the behaviour of ionic equilibrium, perform experiments to determine physical properties of organic compounds and relate them to their chemical constitution, and apply their practical skills to analyze and interpret experimental data, enhancing their understanding of these fundamental concepts in chemistry.

Course Objectives:	<p><b>CO-1:</b> describe and identify the isomerism to structures of organic compounds.</p> <p><b>CO-2:</b> understand basic concepts Arrhenius theory, Lowry Bronsted theory, Lewis theory, Solvent – Solute concept of acid-base, Soft-Hard acid base and its application</p> <p><b>CO-3:</b> understand basic concepts of organic qualitative analysis : elements equation ,solubility of organic compound. Define chemical bonds (covalent, co-ordinate covalent, ionic, metallic, H-bond, Vander wal's forces of attraction), Polarisability (Fajan's rule), Molecular Orbital theory ; LCAO method, Bonding molecular orbital, non-bonding molecular orbital, anti-bonding molecular orbital, bond order, magnetic properties and molecular orbital energy level diagram of hetero diatomic molecule : CO and NO, VSEPR theory.</p> <p><b>CO-4:</b> Chemical kinetics and its scope, rate of reaction, factors affecting rate of reaction : temperature, concentration, pressure, solvent, light and catalyst, Molecularity of reaction, Classification of chemical reaction, Order of reaction with illustration (first order, second order, third order, zero order, pseudo first order) reaction, : second order (a=b), half life and mean life.</p>
--------------------	---

Mapping between CO and PSO		PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
	CO1	✓	✓		✓	✓		✓		✓	
	CO2		✓	✓		✓	✓		✓	✓	✓
	CO3	✓			✓		✓	✓	✓		✓
	CO4		✓		✓				✓		
	CO5	✓	✓				✓	✓			✓
CO6			✓	✓				✓			

## Course content

Course name: Bachelor of Science ( Fundamentals of Chemistry- II )	Semester II	hrs
Unit-1	<b>EMPIRICAL FORMULA ,MOLECULAR FORMULA AND STRUCTURAL FORMULA</b> Introduction, Empirical Formula, Molecular Weight, Department Of Empirical Formula Determination Of Molecular Weight Of: (A)Organic Acid By Titration And Silver Salt Method (B)Organic Base By Chloroplatinate Method Determination Of Molecular Formula Of Gaseous, Hydrocarbons By Explosion Method , Numerical.	11
Unit – 2	<b>INORGANIC QUALITATIVE ANALYSIS</b> Introduction, A) <b>Dry test:</b> 1- Color of the substance 2- State of the substance 3- Solubility 4- Theory of borex bead test and flame test 5- Proximate interpretation from dry test B) <b>Analysis of cation :</b> Group anion of sequence, importance of solubility product constant of each group, common ion effect, cation confirmative test with suitable reagent, $\text{Cu}^{++}$ , $\text{Fe}^{++}$ , $\text{Fe}^{+++}$ , $\text{Ni}^{++}$ C) <b>Analysis of anion :</b> Based on precipitation or gas evolved, making in Cd & Cu, separation of ion pair such as Ag & Hg, Zn & Mn	12
Unit -3	<b>CHEMICAL BONDING</b> Definition Of Chemical Bonds (Covalent, Co-Ordinate Covalent, Ionic, Metallic, H-Bond, van der Waals Forces Of Attraction), Polarisability (Fajan's Rule), Molecular Orbital Theory, Lcao Method, Bonding Molecular Orbital, Non-Bonding Molecular Orbital, Anti-Bonding Molecular Orbital, Bond Order, Magnetic Properties And Molecular Orbital Energy Level Diagram Of Hetero Diatomic Molecule : CO And NO and $\text{O}_2$ Vsper Theory.	12
Unit -4	<b>CHEMICAL KINETICS</b> Chemical kinetics and it's scope, rate of reaction ,factors affecting, rate of reaction: temperature, concentration ,pressure, solvent, light and catalyst, molecularity of reaction, classification of chemical reaction, order of reaction with Illustration. second order (a=b) Half life and mean life.	11

<b>REFERENCE BOOKS :</b>	<b>1-</b> Essentials of physical chemistry by A.S. Bahl and G.D. Tuli, Pub :S. Chand <b>2-</b> Inorganic chemistry by Wahid Malik, G.D. Tuli, R.D. Madam : Pub. S. Chand <b>3-</b> Advance inorganic chemistry (Vol.2) by G.D.Tuli, R.D. Madam: Pub.S. Chand <b>4-</b> Physical chemistry by Arun bahl, B.S. Bahl and G.D. Tuli, Pub: S. Chand <b>5-</b> Advance physical chemistry by D.N. Bajpai, Pub: S. Chand
--------------------------	---

## SEMESTER-II

### CHEMISTRY - II

#### Introduction of chemistry – II

Course Objectives:	<p><b>CO-1 :</b> identify Alkenes: Nomenclature, method of preparation, properties and uses of ethylene and propylene Markownikoffs rule and Saytzeff rule, polymerization of ethylene styrene and vinyl chloride.</p> <p><b>CO-2:</b>determine empirical formula and its relation with molecular formula determination of molecular weight of organic acid by titration and silver salt method and organic base by chloroplatinate method and its limitations.</p> <p><b>CO-3 :</b> Define of atomic and ionic radii, ionisation energy, electron affinity and electron negativity, S-Block elements: Comparative study, diagonal relationship, salient features of hydrides.</p> <p><b>CO-4:</b> define the term carbohydrate, its classification, structure of glucose and fructose, conversion of glucose to fructose and fructose to glucose, step up, step down and kilyani synthesis</p>
--------------------	---

Course Outcome : After finishing this course, the student will be	
1.	To analyze and explain the atomic and molecular arrangements in solids, comprehend the relationships between structure and properties, and apply their knowledge to predict and interpret the behaviour of solid materials in various fields such as materials science, solid-state physics, and crystallography.
2.	Able to analyze and interpret the coordination behaviour of metal complexes, comprehend acid-base theories and their applications in chemical reactions, and apply their knowledge to predict and explain the reactivity and properties of coordination compounds and acid-base systems in various areas such as inorganic chemistry, catalysis, and bioinorganic chemistry.
3.	Able to analyze and interpret the rates of chemical reactions, understand the factors affecting reaction rates, comprehend the periodic trends in atomic and molecular properties, and apply their knowledge to predict and explain the behaviour of chemical reactions and the properties of elements across the periodic table in various fields such as physical chemistry, environmental chemistry, and materials science.

Mapping between CO and PSO		PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
	CO1	✓	✓		✓	✓		✓		✓	✓
	CO2		✓	✓		✓	✓		✓	✓	✓
	CO3	✓		✓	✓			✓			
	CO4		✓		✓		✓			✓	

## Course Content

Course name: (Chemistry)	Semester II	hrs
<b>Unit-1</b>	<p><b>ALKENES, DIENES AND ALKYNES</b>            (A) Alkenes, Dienes And Alkynes: Nomenclature, Method Of Preparation, Properties And Uses Of Ethylene And Propylene, Markovnikov's And Saytzeff Rules. Alkenes Reaction, Hydroboration, Oxidation, Epoxidation, Ozonolysis.            (B) Dienes: Nomenclature, Classification Of Dienes Method Of Formation Of Butadiene, Chemical Reaction of 1,2 And 1,4 Addition.            (C) Alkynes: Nomenclature Method Of Formation Chemical, Reaction:- Hydroboration, Oxidation, Reduction, Polymerization.</p>	<b>11</b>
<b>Unit – 2</b>	<p><b>REACTION MECHANISM</b>            The General Nature, reaction mechanism of application of following reaction:            (1) Reimer-Tiemer reaction            (2) Aldol condensation            (3) Michael reaction            (4) Friedel craft reaction            (5) Perkin Reaction,</p>	<b>12</b>
<b>Unit-3</b>	<p><b>IONIC EQUILIBRIUM AND CONDUCTANCE.</b>            Electrical Conductance, Specific Conductance, Equivalent Conductance, Molar Conductance, Effect Of Dilution On Concentration, Cell Constant, Determination Of Cell Constant, Ostwald's Dilution Law And Its Limitations, Acid And Basic Buffer Actions (Henderson- Hasselbach Equation), Buffer Capacity, Numerical.</p>	<b>12</b>
<b>Unit-4</b>	<p><b>CARBOHYDRATES</b>            Modern Definition Of Carbohydrates, Classification Of Carbohydrates, Function Of Carbohydrates, Optical Isomers, Diastereoisomers, Enantiomers Racemates Of Glucose And Fructose Structure Of Glucose And Fructose Isomers, Mutarotation, Glycoside Linkage (Pyranose And Furanose) D &amp; L Isomers Of Glucose And FRUCTOSE, Derivatives Of Monosaccharide Step Up And Stepdown Synthesis, Kilyani Synthesis, Conversion Of Glucose To Fructose And Conversion Of Fructose To Glucose.</p>	<b>11</b>

<b>REFERENCE BOOKS:</b>	<ol style="list-style-type: none"> <li>1. Essentials of physical chemistry by A.S. Bhal and Pub. S. Chand, G.D. Tuli.</li> <li>2. Advance physical chemistry by D.N. Bajpai, Sub: S. Chand</li> <li>3. Numerical problems by Dogra and Dogra (For Numerical)</li> <li>4. Concise inorganic chemistry (5<sup>th</sup> Ed) by J.D. Lee.</li> <li>5. Basic inorganic chemistry by Cotton &amp; Wilkinson.</li> <li>6. Organic chemistry Vol. I &amp; Vol. II by I.L. Finar</li> <li>7. Organic chemistry by P.L. Soni</li> <li>8. Organic chemistry by B.K. Sharma</li> <li>9. Organic chemistry by Bahl and Bahl</li> <li>10. Organic reaction mechanism by Mukharji &amp; Singh</li> <li>11. Fundamentals of organic chemistry by Soloman John Wiley</li> </ol>
-------------------------	--

### Chemistry Practical-II

Course Objectives:	<p>CO1: To provide students with practical training and knowledge in the identification and characterization of inorganic compounds through systematic qualitative analysis techniques.</p> <p>CO2: to provide students with practical skills and knowledge in the accurate preparation of standard solutions of known concentration for use in quantitative analysis.</p>
--------------------	--

Course Outcome : After finishing this course, the student will have	
1.	Able to perform qualitative tests and analysis to identify the presence of various cations and anions in inorganic samples, interpret experimental observations to determine compound identities, apply knowledge of inorganic chemistry principles and reactions to conduct appropriate tests, and develop critical thinking and analytical skills in the field of inorganic qualitative analysis.
2.	Able to prepare standard solutions with precise concentrations, follow proper laboratory techniques and procedures for solution preparation, understand the principles and calculations involved in dilution and standardization, and apply their knowledge and skills in the preparation of standard solutions for various analytical techniques in chemistry.

Mapping between CO and PSO		PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
	CO1		✓		✓		✓	✓		✓	✓
	CO2		✓	✓		✓			✓	✓	

<b>INORGANIC QUALITATIVE ANALYSIS</b>	<b>List Of Inorganic Chemicals :</b>  <b>CHLORIDES :</b> $\text{Cu}^{+2}$ , $\text{Fe}^{+3}$ , $\text{Mn}^{+2}$ , $\text{Co}^{+2}$ , $\text{Ni}^{+2}$ , $\text{Ca}^{+2}$ , $\text{Sr}^{+2}$ , $\text{Na}^{+}$ , $\text{K}^{+}$ , $\text{NH}_4^{+}$ , $\text{Ba}^{+2}$ <b>BROMIDE :</b> $\text{Na}^{+}$ , $\text{K}^{+}$ , $\text{NH}_4^{+}$ <b>IODIDE :</b> $\text{K}^{+}$ <b>NITRATE :</b> $\text{Pb}^{+2}$ , $\text{Co}^{+2}$ , $\text{Ni}^{+2}$ , $\text{Ba}^{+2}$ , $\text{Sr}^{+2}$ , $\text{Na}^{+}$ , $\text{K}^{+}$ <b>SULPHIDE :</b> $\text{Zn}^{+2}$ <b>SULPHATE :</b> $\text{Cu}^{+2}$ , $\text{Al}^{+3}$ , $\text{Fe}^{+2}$ , $\text{Zn}^{+2}$ , $\text{Mn}^{+2}$ , $\text{Ca}^{+2}$ , $\text{Ni}^{+2}$ , $\text{Mg}^{+2}$ , $\text{Na}^{+}$ , $\text{K}^{+}$ , $\text{NH}_4^{+}$ <b>CHROMATE :</b> $\text{Na}^{+}$ , $\text{K}^{+}$ <b>CARBONATE :</b> $\text{Cu}^{+2}$ , $\text{Zn}^{+2}$ , $\text{Mn}^{+2}$ , $\text{Co}^{+2}$ , $\text{Ni}^{+2}$ , $\text{Ca}^{+2}$ , $\text{Ba}^{+2}$ , $\text{Sr}^{+2}$ , $\text{Mg}^{+2}$ , $\text{Na}^{+}$ , $\text{K}^{+}$ , $\text{NH}_4^{+}$ <b>PHOSPHATE :</b> $\text{Cu}^{+2}$ , $\text{Al}^{+3}$ , $\text{Fe}^{+3}$ , $\text{Zn}^{+2}$ , $\text{Mn}^{+2}$ , $\text{Mg}^{+2}$ , $\text{Na}^{+}$ , $\text{K}^{+}$ , $\text{NH}_4^{+}$  N.B. Candidate should perform the analysis of atleast 08 compounds.
---	--

<b>PREPARATION OF STANDARD SOLUTION (BY STUDENT) OF FOLLOWING :</b>	<ol style="list-style-type: none"> <li>1. 0.1 N Succinic acid against NaOH</li> <li>2. 0.1 N KHP against NaOH / KOH</li> <li>3. 0.01 N <math>\text{Na}_2\text{S}_2\text{O}_3</math> against <math>\text{I}_2</math> solution</li> <li>4. 0.1N <math>\text{H}_2\text{C}_2\text{O}_4 \cdot 2\text{H}_2\text{O}</math> against <math>\text{KMnO}_4</math> solution</li> <li>5. 0.1 N <math>\text{K}_2\text{Cr}_2\text{O}_7</math> against <math>\text{FeSO}_4 \cdot 7\text{H}_2\text{O}</math> (OR) <math>\text{FeSO}_4(\text{NH}_4)_2\text{SO}_4 \cdot 10\text{H}_2\text{O}</math> solution</li> </ol> <p>N.B. Candidate should perform atleast 02 volumetric exercises.</p>
---	--