

COURSE TYPE: CC-1

Session: 2023-24			
Part A - Introduction			
Subject	Chemistry		
Semester	I		
Name of the Course	Chemistry-I		
Course Code	B-23-CHE-101		
Course Type: (CC/MDC/CC- M/DSEC/VOC/DSE/PC/AEC/VA C)	CC		
Level of the course (As per Annexure-I)	100-199		
Pre-requisite for the course (if any)	4.0		
Course Learning Outcomes(CLO):	<p>After completing this course, the learner will be able to:</p> <ol style="list-style-type: none">1. Enable to understand the basis of quantum mechanics and structural idea and relevance in describing shapes of s, p and d orbitals.2. To learn about role of temperature and pressure to establish the state of gases and describe the concept of critical constants of real gases.3. Get knowledge about the electrophile/nucleophile and its role in mechanism of preparation of organic compounds.4. To know the physical properties, morphology and crystalline study of liquid and different type of solids. <hr/> <p>5*. Hand on practice in preparation of solutions, compounds, estimation and determination of physical properties of some compounds.</p>		
Credits	Theory	Practical	Total
	3	1	4
Contact Hours	45	30	75
Max. Marks:70+30* Internal Assessment Marks:20+10* End Term Exam Marks:50+20*		Time:03 + 03*	

Part B- Contents of the Course

Instructions for Paper- Setter

Note: The examiner is requested to set nine questions in all, selecting two questions from each SECTION and one question (Question No.1 based on entire syllabus will consist of short answer type). All questions carry equal marks. The candidate is required to attempt five questions in all selecting one from each SECTION. Question No.1 is compulsory. Log table and non-programmable calculator is allowed.

Unit	Topics
I	<p>Atomic Structure Contact Hours 12</p> <p>Dual behaviour of matter and radiation, de Broglie's relation, Heisenberg's uncertainty principle, concept of atomic orbitals, significance of quantum numbers, radial and angular wave functions, normal and orthogonal wave functions, significance of Ψ and Ψ^2, shapes of s, p, d, f orbitals, Rules for filling electrons in various orbitals, effective nuclear charge, Slater's rules.</p> <p>Periodic table and atomic properties</p> <p>Classification of periodic table, definition of atomic and ionic radii, ionisation energy, electron affinity and electronegativity, trend in periodic table (in s and p-block elements), Pauling, Mulliken, Allred Rachow and Mulliken Jaffe's electronegativity scale, Sanderson's electron density ratio.</p>
II	<p>Gaseous State Contact Hours 11</p> <p>Kinetic theory of gases, Maxwell's distribution of velocities and energies (derivation excluded) Calculation of root mean square velocity, average velocity, and most Probable velocity. Collision diameter, collision number, collision frequency and mean free path (Derivations excluded), Deviation of Real gases from ideal behaviour, Derivation of Van der Waal's Equation of State, its application in the calculation of Boyle's temperature (compression factor)</p> <p>Critical Phenomenon</p> <p>Concept of Critical temperature, critical pressure, critical volume, relationship Between critical constants and Van der Waal's constants (Derivation excluded).</p>
III	<p>Structure and Bonding Contact Hours 11</p> <p>Localized and delocalized chemical bond, Van der Waals interactions. Concept of resonance and its applications, hyperconjugation, inductive effect, Electromeric effect and their comparison.</p>

	<p>Mechanism of Organic Reactions Curved arrow notation, homolytic and heterolytic bond fission. Types of reagents: electrophiles and nucleophiles. Types of organic reactions: Substitution, Addition, Condensation, Elimination, Rearrangement, Isomerization and Pericyclic reactions. Reactive intermediates: Carbocations, carbanions, free radicals, carbenes (structure & stability).</p>	
IV	<p>Liquid State Structure of liquids, Properties of liquids – surface tension, refractive index, viscosity, vapour pressure and optical rotation.</p> <p>Solid State Classification of solids, Law of constancy of interfacial angles, law of rational indices, Miller indices, elementary ideas of symmetry and symmetry elements, seven crystal systems and fourteen Bravais lattices; X-ray diffraction, Bragg's law, a simple account of Laue method, rotating crystal method and powder pattern method.</p>	Contact Hours 11
V*	<ol style="list-style-type: none"> Acid/Base titration: Determination of strength of oxalic acid using NaOH. Redox titrations: Determination of Fe^{2+} ions using KMnO_4. To determine the surface tension of given liquid using Stalagmometer by drop no. methods. Preparation of <i>m</i>-Dinitrobenzene from Nitrobenzene (use 1:2 conc. HNO_3-H_2SO_4 mixture if fuming HNO_3 is not available) Preparation of <i>p</i>-Bromoacetanilide from Acetanilide 	Contact Hours 30
Suggested Evaluation Methods		
<p>Internal Assessment: 20+10*</p> <p>➤ Theory</p> <ul style="list-style-type: none"> Class Participation: 5 Seminar/presentation/assignment/quiz/class test etc.: 5 Mid-Term Exam: 10 <p>➤ Practicum</p> <ul style="list-style-type: none"> Class Participation: NA Seminar/Demonstration/Viva-voce/Lab records etc.: 10 Mid-Term Exam: NA 		<p>End Term Examination:</p> <p>50+20*</p>
Part C-Learning Resources		

Recommended Books/e-resources/LMS:

1. Lee, J.D.; (2010), **Concise Inorganic Chemistry**, Wiley India.
2. Kapoor, K.L. (2015), **a Textbook of Physical Chemistry**, Vol 1, 6 th Edition, McGraw Hill Education.
3. Clayden, J.; Greeves, N.; Warren, S. (2012), **Organic Chemistry**, Oxford.
4. Morrison, R. N.; Boyd, R. N. **Organic Chemistry**, Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
5. Khosla, B.D.; Garg, V.C.; Gulati, A. (2015), **Senior Practical Physical Chemistry**, R. Chand & Co, New Delhi.
6. Jeffery, G.H.; Bassett, J.; Mendham, J.; Denney, R.C. (1989), **Vogel's Textbook of Quantitative Chemical Analysis**, John Wiley and Sons.

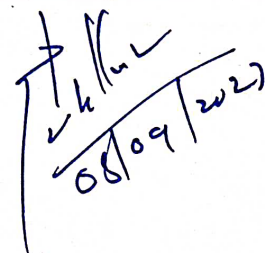
*Applicable for courses having practical component.

CC-M1

Session: 2023-24

Part A - Introduction

Subject				Chemistry							
Semester				I							
Name of the Course				Minor Chemistry-I							
Course Code				B-23-CHE-102							
Course Type: (CC/MCC/MDC/CC- M/DSEC/VOC/DSE/PC/AEC/VA C)				CC-M							
Level of the course (As per Annexure-I)				100-199							
Pre-requisite for the course (if any)				4.0							
Course Learning Outcomes(CLO):				<p>After completing this course, the learner will be able to:</p> <ol style="list-style-type: none"> 1. To understand the basics of Covalent bonding in simple molecules. 2. To get the basics of rates of chemical reactions and factors affecting it. 3. To learn about the nomenclature, classification and methods of preparation of alkenes. 4. To learn about qualitative knowledge of conductors, semiconductors and insulates. <hr/> <p>5*. Hand on practice in preparation of solutions, compounds, estimation and determination of physical properties of some compounds.</p>							
Credits				Theory		Practical		Total			
				1		1		2			
Contact Hours				15		30		45			
Max. Marks:30 + 20*						Time: 03+ 03* hrs					
Internal Assessment Marks:10 + 05*											
End Term Exam Marks: 20 + 15*											



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Part B- Contents of the Course

Instructions for Paper- Setter

Note: The examiner is requested to set nine questions in all, selecting two questions from each SECTION and one question (Question No.1 based on entire syllabus will consist of short answer type. All questions carry equal marks. The candidate is required to attempt five questions in all selecting one from each SECTION. Question No.1 is compulsory. Log table and non-programmable calculator is allowed.

Unit	Topics
I	Covalent Bond Contact Hours 4 Shapes of simple inorganic molecules and ions based on valence shell electron pair repulsion (VSEPR) theory and hybridization with suitable examples of linear, trigonal planar, square planar, tetrahedral arrangements.
II	Chemical Kinetics Contact Hours 4 Concept of reaction rates, factors influencing the rate of reaction, Order and molecularity of a reaction, integrated rate expression for zero and first order reactions.
III	Alkanes (upto 5 carbon atoms) Contact Hours 4 Alkanes, nomenclature, classification of carbon atoms in alkanes. Isomerism in alkanes, methods of formation: Wurtz reaction, Kolbe reaction, Corey-House reaction and decarboxylation of carboxylic acids.
IV	Metallic Bond and semiconductors Contact Hours 3 Metallic bond – Qualitative idea of Band theory of metallic bond (conductors, semiconductors, insulators).
V	Contact Hours 30 1. To determine the melting point of given organic compound. 2. To prepare a pure sample of dibenzalacetone from benzaldehyde. 3. Acid/Base Titration: Determination of strength of HCl using NaOH. 4. To determine the refractive index of given liquid. 5. To study the process of sublimation of camphor or phthalic acid.

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Suggested Evaluation Methods	
Internal Assessment: 10 + 05* > Theory <ul style="list-style-type: none"> • Class Participation: 3 • Seminar/presentation/assignment/quiz/class test etc.: 3 • Mid-Term Exam: 4 > Practicum <ul style="list-style-type: none"> • Class Participation: NA • Seminar/Demonstration/Viva-voce/Lab records etc.: 05 • Mid-Term Exam: NA 	End Term Examination: 20 + 15*
Part C-Learning Resources	
Recommended Books/e-resources/LMS: <ol style="list-style-type: none"> 1. Dhawan S.N., Organic Chemistry, Vol 1 Pardeep Publication. 2. Kapoor, K.L. (2015), A Textbook of Physical Chemistry, Vol 1, 6th Edition, McGrawHill Education. 3. Khosla, B.D.; Garg, V.C.; Gulati, A. (2015), Senior Practical Physical Chemistry, R. Chand & Co, New Delhi. 4. Lee, J.D.; (2010), Concise Inorganic Chemistry, Wiley India. 	

*Applicable for courses having practical component.

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COURSE TYPE: MDC-1

Session: 2023-24			
Part A - Introduction			
Subject	Chemistry		
Semester	I		
Name of the Course	Introductory Chemistry-I		
Course Code	B-23-CHE-103		
Course Type: (CC/MCC/MDC/CC- M/DSEC/VOC/DSE/PC/AEC/VA C)	MDC		
Level of the course (As per Annexure-I)	0-99		
Pre-requisite for the course (if any)	Higher secondary other than science discipline		
Course Learning Outcomes(CLO):	After completing this course, the learner will be able to: 1. To get knowledge about structure and bonding. 2. To learn about hydrocarbons and their applications. 3. To get aware about different polymers. 4. To get knowledge about preservative. 5* To get knowledge about experiments related to daily life.		
Credits	Theory	Practical	Total
	2	1	3
Contact Hours	30	30	60
Max. Marks:50+25* Internal Assessment Marks:15+5* End Term Exam Marks: 35+20*		Time:03 + 03 hrs	

Part B- Contents of the Course

Instructions for Paper- Setter

Note: The examiner is requested to set nine questions in all, selecting two questions from each SECTION and one question (Question No.1 based on entire syllabus will consist of short answer type. All questions carry equal marks. The candidate is required to attempt five questions in all selecting one from each SECTION. Question No.1 is compulsory. Log table and non-programmable calculator is allowed.

Unit	Topics
I	Atomic Structure and Bonding Contact Hours 8 Introduction, Elementary introduction of atomic structure and chemical bonding, Representation of elements/ atoms, Lewis structure, electronic configurations (1-30)
II	Carbon and Its Compounds Contact Hours 8 Introduction, Tetravalency of Carbon, allotropes of carbon and their properties, hydrocarbons (1-5), nomenclature (linear compounds), Applications of hydrocarbons.
III	Polymers Contact Hours 7 Introduction, elementary idea of synthetic and natural polymers, Homo polymers and copolymers, uses and properties (Natural rubber, Vulcanized rubber, Polyethene, PVC, Styrene, Teflon, PAN, Nylon-66)
IV	Food Preservatives Contact Hours 7 Elementary idea of natural and synthetic food preservatives, rancidity, uses and properties, different food preservation processes (pickle, Jam), artificial sweeteners, uses and properties
V*	Practicals: Contact Hours 30 <ol style="list-style-type: none">1. Identify the pH of the given samples through pH strip.2. Experiments related to preserving food items.3. Preparation of Artificial Silk.4. To synthesize some polymers as per available resources.

Suggested Evaluation Methods	
<p>Internal Assessment: 15+5*</p> <p>➤ Theory</p> <ul style="list-style-type: none"> • Class Participation: 4 • Seminar/presentation/assignment/quiz/class test etc.: 4 • Mid-Term Exam: 7 <p>Practicum</p> <ul style="list-style-type: none"> • Class Participation: NA • Seminar/Demonstration/Viva-voce/Lab records etc.: 5 • Mid-Term Exam: NA 	<p>End Term Examination:</p> <p>35+20*</p>
Part C-Learning Resources	
<p>Recommended Books/e-resources/LMS:</p> <ol style="list-style-type: none"> 1. Dhawan S.N., Organic Chemistry, Vol 1 Pardeep Publication. 2. Subbulakshmi G, Food processing and preservation, New Age International Publishers. 3. Manas Chanda, 2013, Introduction to Polymer Science and Chemistry 2nd Edition, Making Rayon Fiber - Artificial silk, chemical experiment! How to make silk from cotton wool ("Artificial silk" experiment) Neelam Seedher, Basic Concepts: Physical Chemistry Experiments, Kindley Edition 	

*Applicable for courses having practical component.

COURSE TYPE: CC-2

Session: 2023-24			
Part A - Introduction			
Subject	Chemistry		
Semester	II		
Name of the Course	Chemistry-II		
Course Code	B-23-CHE-201		
Course Type: (CC/MCC/MDC/CC- M/DSEC/VOC/DSE/PC/AEC/VA C)	CC		
Level of the course (As per Annexure-I)	100-199		
Pre-requisite for the course (if any)	4.0		
Course Learning Outcomes(CLO):	<p>After completing this course, the learner will be able to:</p> <ol style="list-style-type: none"> 1. Able to understand the theories which governs the shape, structure and ionic behavior, polarizability, ionic structures and concept of Lattice energy of crystals of molecules. 2. To know the basics of rates of chemical reactions ,the laws and solubility behavior of solutes in different compositions of solvents 3. To know about alkanes, alkene, cycloalkanes and their chemical reactions. 4. To understand about weak interactions and bonding in metals. <hr/> <p>5*. Hand on practice for estimation and determination of viscosity, specific refractivity properties of some compounds.</p>		
Credits	Theory	Practical	Total
	3	1	4
Contact Hours	45	30	75
Max. Marks:70+30* Internal Assessment Marks:20+10* End Term Exam Marks: 50+20*		Time:03+03*	

Part B- Contents of the Course

Instructions for Paper- Setter

Note: The examiner is requested to set nine questions in all, selecting two questions from each SECTION and one question (Question No.1 based on entire syllabus will consist of short answer type. All questions carry equal marks. The candidate is required to attempt five questions in all selecting one from each SECTION. Question No.1 is compulsory. Log table and non-programmable calculator is allowed.

Unit	Topics
I	<p>Covalent Bond Contact Hours 11</p> <p>Valence bond theory approach, shapes of simple inorganic molecules and ions based on valence shell electron pair repulsion (VSEPR) theory and hybridization with suitable examples of linear, trigonal planar, square planar, tetrahedral, trigonal bipyramidal and octahedral arrangements. Molecular orbital theory of homonuclear (N_2, O_2) and heteronuclear (CO and NO) diatomic molecules, dipole moment and percentage ionic character in covalent bond.</p> <p>Ionic Solids</p> <p>Ionic structures ($NaCl$, $CsCl$, ZnS (Zinc blende), CaF_2) size effects, radius ratio rule and its limitations, Concept of Lattice energy, Born- Haber cycle, Solvation energy and its relationship with solubility of Ionic solids, Polarizing power and Polarisability of ions, Fajan's rule.</p>
II	<p>Chemical Kinetics Contact Hours 12</p> <p>Concept of reaction rates, rate equation, factors influencing the rate of reaction, Order and molecularity of a reaction, integrated rate expression for zero, first, Half-life period of a reaction, Arrhenius equation.</p> <p>Distribution Law</p> <p>Nernst distribution law – its thermodynamic derivation, Nernst distribution law after association and dissociation of solute in one of the phases, of distribution law: (i) Determination of degree of hydrolysis and hydrolysis constant of aniline hydrochloride</p>
III	<p>Alkanes and Cycloalkanes Contact Hours 11</p> <p>Nomenclature, classification of carbon atoms in alkanes and its structure. Isomerism in alkanes, sources. Methods of formation: Wurtz reaction, Kolbe reaction, Corey- House reaction and decarboxylation of carboxylic acids, physical properties. Mechanism of free radical halogenation of alkanes: reactivity and selectivity.</p> <p>Nomenclature of Cycloalkanes, Baeyer's strain theory and its limitations, theory of strainless rings.</p>

	<p>Alkenes Nomenclature of alkenes and its structure. Methods of formation: dehydration of alcohols, dehydrohalogenation of alkyl halide, Hofmann elimination and their mechanism. The Saytzeff rule and relative stabilities of alkenes. Chemical reactions: electrophilic and free radical additions, addition of halogens, halogen acids, hydroboration-oxidation, oxymercuration-reduction, ozonolysis and hydration. Markownikoff's rule of addition.</p>
IV	<p>Hydrogen Bonding and Van der Waals forces Contact Hours 11 Hydrogen Bonding – Definition, types, effects of hydrogen bonding on properties of substances, application Brief discussion of various types of Van der Waals forces. Metallic Bond and semiconductors Metallic bond – Qualitative idea of valence bond and Band theories of metallic bond (conductors, semiconductors, insulators). Semiconductors – Introduction, types, and applications.</p>
V*	<p style="text-align: right;">Contact Hours 30</p> <ol style="list-style-type: none"> Complexometric titrations: Determination of Mg^{2+} by EDTA. Paper Chromatography: Qualitative Analysis of any one of the following Inorganic cations and anions by paper chromatography (Pb^{2+}, Cu^{2+}, Ni^{2+}, Cl^-, Br^-, and PO_4^{3-} and NO_3^-). To determine the viscosity of given liquid using Ostwald's Viscometer. To determine the specific refractivity of at least two liquids by Refractometer. Separation of mixture of two Organic Compounds by TLC.
Suggested Evaluation Methods	
<p>Internal Assessment: 20+10*</p> <ul style="list-style-type: none"> Theory Class Participation: 5 Seminar/presentation/assignment/quiz/class test etc.: 5 Mid-Term Exam: 10 Practicum Class Participation: NA Seminar/Demonstration/Viva-voce/Lab records etc.: 10 Mid-Term Exam: NA 	<p style="text-align: center;">End Term Examination:</p> <p style="text-align: center;">50+20*</p>

Part C-Learning Resources

Recommended Books/e-resources/LMS:

1. Lee, J.D.; (2010), **Concise Inorganic Chemistry**, Wiley India.
2. Kapoor, K.L. (2015), **A Textbook of Physical Chemistry**, Vol 1, 6 th Edition, McGraw Hill Education.
3. Clayden, J.; Greeves, N.; Warren, S. (2012), **Organic Chemistry**, Oxford.
4. Morrison, R. N.; Boyd, R. N. **Organic Chemistry**, Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
5. Khosla, B.D.; Garg, V.C.; Gulati, A. (2015), **Senior Practical Physical Chemistry**, R. Chand &Co, New Delhi.
6. Jeffery, G.H.; Bassett, J.; Mendham, J.; Denney, R.C. (1989), **Vogel's Textbook of Quantitative Chemical Analysis**, John Wiley and Sons.


*Applicable for courses having practical component.

CC-M2

Session: 2023-24

Part A - Introduction

Subject	Chemistry		
Semester	II		
Name of the Course	Minor Chemistry-II		
Course Code	B-23-CHE-202		
Course Type: (CC/MCC/MDC/CC-M/DSEC/VOC/DSE/PC/AEC/VAC)	CC-M		
Level of the course (As per Annexure-I)	100-199		
Pre-requisite for the course (if any)	4.0		
Course Learning Outcomes(CLO):	<p>After completing this course, the learner will be able to:</p> <ol style="list-style-type: none"> 1. To know the basics of periodic properties and hybridization. 2. To learn about the ionic solids. 3. Understand about the semiconductors and metallic bonds. 4. Get the knowledge of stereochemistry of simple organic molecules. <hr/> <p>5*. Hand on practice in preparation of solutions, compounds, estimation and determination of physical properties of some compounds.</p>		
Credits	Theory	Practical	Total
	1	1	2
Contact Hours	15	30	45
Max. Marks:30 + 20* Internal Assessment Marks:10 + 05* End Term Exam Marks: 20 + 15*	Time:03+ 03* hrs		


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Part B- Contents of the Course

Instructions for Paper- Setter

Note: The examiner is requested to set nine questions in all, selecting two questions from each SECTION and one question (Question No.1 based on entire syllabus will consist of short answer type. All questions carry equal marks. The candidate is required to attempt five questions in all selecting one from each SECTION. Question No.1 is compulsory. Log table and non-programmable calculator is allowed.

Unit	Topics
I	Periodic table and atomic properties Contact Hours 4 Atomic properties: atomic and ionic radii, ionisation energy, electron affinity and electronegativity definition, trend in periodic table, effective nuclear charge, Slater's rules.
II	Ionic Solids: Contact Hours 4 Stoichiometric and Non-stoichiometric defects in crystals, Lattice energy and Born-Haber cycle, Solvation energy and its relationship with solubility of Ionic solids. Polarizing power and Polarisability of ions, Fajan's rule.
III	Structure and Bonding in Organic Compounds Contact Hours 4 Localized and delocalized chemical bond, Van der Waal's interactions, resonance: conditions and resonance effect, hyperconjugation, inductive effect, Electromeric effect & their comparison.
IV	Gaseous State Contact Hours 3 Kinetic theory of gases, Calculation of root mean square velocity, average velocity, and most probable velocity. Collision diameter, collision number, collision frequency and mean free path (derivations excluded).
V*	Contact Hours 30 1. Acid/Base titration: Determination of strength of oxalic acid using NaOH. 2. Redox titrations: Determination of Fe^{2+} ions using $KMnO_4$. 3. To determine the surface tension of given liquid using stalagmometer by drop no. method. 4. To prepare a sample of iodoform.

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Suggested Evaluation Methods

Internal Assessment: 10 + 05*

➤ **Theory**

- Class Participation: 3
- Seminar/presentation/assignment/quiz/class test etc.: 3
- Mid-Term Exam: 4

➤ **Practicum**

- Class Participation: NA
- Seminar/Demonstration/Viva-voce/Lab records etc.: 05*
- Mid-Term Exam: NA

End Term Examination:

20 + 15*

Part C-Learning Resources

Recommended Books/e-resources/LMS:

1. Huheey, J.E.; Keiter, E.A.; Keiter; R. L.; Medhi, O.K. (2009), **Inorganic Chemistry- Principles of Structure and Reactivity**, Pearson ducation.
3. Atkins, P.W.; Paula, J.de. (2014), **Atkin's Physical Chemistry Ed.**, 10th Edition, Oxford University Press.
4. Kapoor, K.L.(2015), **A Textbook of Physical Chemistry**, Vol 1, 6th Edition, McGraw Hill Education.
5. Khosla, B.D.; Garg, V.C.; Gulati, A. (2015), **Senior Practical Physical Chemistry**, R. Chand & Co, New Delhi.

*Applicable for courses having practical component.

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COURSE TYPE: MDC-2**Session: 2023-24****Part A - Introduction**

Subject	Chemistry		
Semester	II		
Name of the Course	Introductory Chemistry-II		
Course Code	B-23-CHE-203		
Course Type: (CC/MCC/MDC/CC- M/DSEC/VOC/DSE/PC/AEC/VA C)	MDC		
Level of the course (As per Annexure-I)	0-99		
Pre-requisite for the course (if any)	Higher secondary other than science discipline		
Course Learning Outcomes(CLO):	After completing this course, the learner will be able to: 1. To learn about role of Indian scientists in the upliftment of research 2.To learn about classification of elements with their properties 3.To learn about three states of matter 4.To get more knowledge about role of fertilizers in fertility of soil <hr/> 5*.To learn about acid- base reaction in daily life		
Credits	Theory	Practical	Total
	2	1	3
Contact Hours	30	30	60
Max. Marks:50+25* Internal Assessment Marks:15+5* End Term Exam Marks:35+20*	Time:03+03*		



Part B- Contents of the Course

Instructions for Paper- Setter

Note: The examiner is requested to set nine questions in all, selecting two questions from each SECTION and one question (Question No.1 based on entire syllabus will consist of short answer type. All questions carry equal marks. The candidate is required to attempt five questions in all selecting one from each SECTION. Question No.1 is compulsory. Log table and non-programmable calculator is allowed.

Unit	Topics
I	Renowned Indian Scientists Contact Hours 8 Brief Biography of Renowned Indian Scientists (Hargobind Khurana, Dr. P.C. Ray, Sir C.V. Raman, Dr. A.P.J. Abdul Kalam, C. N. R. Rao, Dr. Vikram Sara Bhai, Dr. Homi Jahangir Bhabha, Dr. J.C. Bose, Dr. S. N. Bose)
II	Metal and Non-Metals Contact Hours 8 Periodic table, classification of elements, physical and chemical aspects of metals and non-metals, Ore and Minerals of Iron, Copper, Aluminium, alloys
III	Physical Properties of Matter Contact Hours 7 Classification of matter, properties, uses, ideal gas equation, real gas equation, some important compounds (baking soda, washing soda, plaster of Paris, gypsum,, glass)
IV	Soil and fertilizers Contact Hours 7 Green revolution, soil: types of soil and their components for fertility, grow condition, pH, irrigation, biofertilizers, chemical fertilizers and their uses, acid rain.
V*	Practicals: Contact Hours 30 1. To prepare Plaster of Paris 2. To prepare Potash Alum 3. To study the effect of acid on Baking and washing soda 4. To perform the action of water on quick lime and identify the nature of reaction (Exo/Endothermic)

Suggested Evaluation Methods

Internal Assessment: 15+5***Theory**

- Class Participation: 4
- Seminar/presentation/assignment/quiz/class test etc.: 4
- Mid-Term Exam: 7

Practicum

- Class Participation: NA
- Seminar/Demonstration/Viva-voce/Lab records etc.: 5
- Mid-Term Exam: NA

End Term Examination:**35+20***

Part C-Learning Resources

Recommended Books/e-resources/LMS:

1. Chemistry In Daily Life : Third Edition by Kirpal Singh , PHI Learning
2. General Chemistry: Principles, Patterns, and Applications, Bruce Averill, Strategic Energy Security Solution, Patricia Eldredge, R.H. Hand, LLC, Copyright Year: 2011
3. The Great Indian Scientists Paperback – 1 January 2017, Cengage Learning India

*Applicable for courses having practical component.

