

Name of the Department: Chemistry
System: CBCS/Part

Programme Outcome:

PO 1 : Disciplinary knowledge and skill: A graduate student is expected to be capable of demonstrating comprehensive knowledge and understanding both theoretical and practical knowledge in all disciplines of Chemistry. Students can solve their subjective problems very methodically, independently and finally draw a logical conclusion. Further, the student will be capable of applying modern technologies, handling advanced instruments and Chemistry related soft-wares for chemical analysis, characterization of materials and in separation technology.

PO-2: Skilled communicator: The course curriculum incorporates basics and advanced training in order to make a graduate student capable of expressing the subject through technical writing as well as through oral presentation.

PO-3: Critical thinker and problem solver: The course curriculum also includes components that can be helpful to graduate students to develop critical thinking and to design, carryout, record and analyze the results of chemical reactions. Students will be able to think and apply evidence based comparative chemistry approach to explain chemical synthesis and analysis.

PO-4: Sense of inquiry: It is expected that the course curriculum will develop an inquisitive characteristics among the students through appropriate questions, planning and reporting experimental investigation.

PO-5: Team player: The course curriculum has been designed to provide opportunity to act as team player by contributing in laboratory, field based situation and industry.

PO-6:Skilled project manager: The course curriculum has been designed in such a manner as to enabling a graduate student to become a skilled project manager by acquiring knowledge about chemistry project management, writing, planning, study of ethical standards and rules and regulations pertaining to scientific project operation.

PO-7: Digitally literate: The course curriculum has been so designed to impart a good working knowledge in understanding and carrying out data analysis, use of library search tools, use of chemical simulation software and related computational work.

PO-8: Ethical awareness: A graduate student requires understanding and developing ethical awareness or reasoning which is adequately provided through the course curriculum. Students can also create an awareness of the impact of chemistry on the environment, society, and also make development outside the scientific community.

PO-9: Environmental Awareness: As an inhabitant of this green planet a Chemistry graduate student should have many social responsibilities. The course curriculum is designed to teach a Chemistry graduate student to follow the green routes for the synthesis of chemical compounds and also find out new greener routes for

sustainable development. The course also helps them to understand the causes of environmental pollution and thereby applying environmental friendly policies instead of environmentally hazardous ones in every aspect.

PO-10: Lifelong learner: The course curriculum is designed to inculcate a habit of learning continuously through use of advanced ICT technique and other available e-techniques, e-books and e-journals for personal academic growth.

PO -11 : Analytical skill development and job opportunity: The course curriculum is designed in such a way that Chemistry graduate students can handle many Chemistry based software, decent instruments and advanced technologies to synthesize, characterize and analyze the chemical compounds very skillfully. Such a wonderful practice in the graduate level will bring a good opportunity to the students for getting job in industries besides academic and administrative works.

Programme Specific Outcome:

PSO 1: Core competency: The chemistry graduates are expected to gain knowledge of the fundamental concepts of chemistry and applied chemistry through theory and practical. These fundamental concepts would be reflected in the latest understanding of the field to keep continuing its progression.

PSO-2: Communication skills: Chemistry graduates are expected to possess minimum standards of communication skills to read and understand documents so that they can solve their problems very methodically, independently and with logical argument. Graduates are expected to build good communication skill so that they can easily share their idea/finding/concepts to others.

PSO-3: Critical thinking: Chemistry graduates are expected to achieve critical thinking ability to design, carry out, record and analyze the results of chemical reactions. They can have that much potential and confidence that they can overcome many difficulties with the help of their sharp scientific knowledge and logical approaches. Performing, observing and giving conclusion of a particular reaction. It is also important for self-compassion, self-reflection, interpersonal relationships, and emotional management.

PSO-4: Psychological skills: Chemistry graduates are expected to possess basic psychological skills so that they can deal with individuals and students of various socio-cultural, economic and educational levels. Psychological skills are very important for proper mind setting during performing, observing and giving conclusion of a particular reaction. It is also important for self-compassion, self-reflection, interpersonal relationships, and emotional management.

PSO-5: Problem solving: Graduates are expected to be well trained with problem philosophical approaches that are pertinent across the disciplines.

PSO-6: Analytical skill development and job opportunity: Chemistry graduates are expected to possess sufficient knowledge how to synthesize a chemical compound and perform necessary characterization and analysis in support of the formation of the product by using modern analytical tools and advanced technologies. Because of this course curriculum chemistry graduates have lot of opportunity to get job not only in academic and administrative field but also in industry.

PSO-7: Research motivation: Chemistry graduates are expected to be technically well trained with modern devices and Chemistry based software and has powerful knowledge in different disciplines of Chemistry so they can easily involve themselves in theory and laboratory based research activities.

PSO-8: Team work: Graduates are expected to be team players, with productive co operations involving members from diverse socio-cultural backgrounds.

PSO -9: Digital Literacy: Graduates are expected to be digitally literate for them to enroll and increase their core competency via e-learning resources such as MOOC and other digital tools for lifelong learning. **PSO-10: Social Awareness:** As an inhabitant of this green world it is our duty to make our planet clean and suitable for living to all. In this context Chemistry graduates are expected to be more aware about finding green chemical reaction routes for sustainable development. They are expected to maintain good laboratory practices and safety

Course Outcome (Chemistry Hons)

Semester /Part	Course Type	Paper Description	Course Outcome	
SEM-1	CC-1	<i>Bonding and Physical Properties</i>	CO-1: To understand Valence Bond Theory	
			CO-2: To know Electronic displacements	
			CO3: To study the modern approaches of chemical bonding MO theory	
			CO4: To learn Physical properties for example BDE, bond angles; melting point/boiling point and solubility of common organic; polarity of molecules and dipole moments	
		<i>General Treatment of Reaction Mechanism I</i>	CO-1: To know the concept, types, reaction mechanism and examples of elimination, free-radical and nucleophilic substitution reactions	
			CO-2: To understand about the formation and stability of reaction intermediates and their electrophilic and nucleophilic behaviour	
			<i>Stereochemistry-I</i>	CO-1: To learn Bonding geometries of carbon compounds
				CO-2: To understand the Concept of chirality and symmetry
		CO-3: To study Relative and absolute configuration		
		CC-2	<i>Kinetic Theory and Gaseous state</i>	CO-4: To learn the Optical activity of chiral compounds, different rotation, racemic compounds, racemisation
CO-1: To understand the basic concept of kinetic theory of gases and know how to solve numerical problems related to that topic				
CO-2: To study Maxwell's distribution of speed and energy				
			CO-3: To understand the behavior of Real gas and virial	

			equation, Intermolecular forces	
		<i>Chemical Thermodynamics</i>	CO-1: To study Zeroth and 1 st law of Thermodynamics calculations of q, w, U and H for reversible, irreversible and free expansion of gases	
			CO-2: To learn Thermochemistry	
			CO-3: To study Second Law, Entropy and Auxiliary state functions (G and A) and their variation with T, P and V. Criteria for spontaneity and equilibrium	
			CO-4: To understand the calculations of q, w, U and H for reversible, irreversible and free expansion of gases	
		<i>Chemical kinetics</i>	CO-1: To study Rate law, order and molecularity	
			CO-2: To understand Role of Temperature and theories of reaction rate	
			CO-3: To learn the role of Homogeneous catalysis	
			CO-4: To understand Autocatalysis; periodic reactions	
SEM-2	CC-3	<i>Extra nuclear Structure of atom</i>	CO-1: To learn the basic concept, terms and equations of Atomic Structure	
		<i>Chemical periodicity</i>	CO-1: To study Chemical Periodicity, Group trends and periodic trends in these properties in respect of s-, p- and d-block elements	
		<i>Acid-Base reactions</i>	CO-1: To understand the Acid-Base concept, pH, buffer. Acid-base neutralisation curves; indicator	
		<i>Redox Reactions and precipitation reactions</i>	CO-1: To learn Ion-electron method of balancing equation of redox reaction, Solubility product principle	
	CC-4	<i>Stereochemistry II</i>		CO-1: To understand Chirality arising out of stereoaxis
				CO-2: To study Concept of prostereoisomerism
				CO-3: To know about the conformational nomenclature
				CO-4: To learn conformation of conjugated systems
		<i>General Treatment of Reaction Mechanism II</i>		CO-1: To understand Reaction thermodynamics
				CO-2: To learn the Concept of organic acids and bases
				CO-3: To study Tautomerism of organic compounds
				CO-4: To know Reaction kinetics of organic compounds, principle of microscopic reversibility.
		<i>Substitution and Elimination Reactions</i>		CO-1: To understand Free-radical substitution reaction, halogenation of alkanes, mechanism and stereochemical features
			CO-2: To study Nucleophilic substitution reactions, role of crown ethers and phase transfer catalysts;	
	CO-3: To know Elimination reactions, regioselectivity (Saytzeff/Hofmann) and stereoselectivity			
SEM-3	CC-5	<i>Transport Processes</i>	CO-1: To understand Fick's law: Flux, force different examples of transport properties	
			CO-2: To study Viscosity of liquids and Comparison with that of gases.	
			CO-3: To know Conductance, Conductometric titrations	
			CO-4: To learn Transport number	

		<i>Application of Thermodynamics – I</i>	CO-1: To know Partial properties and Chemical potential CO-2: To study Chemical Equilibrium CO-3: To learn Nernst's distribution law CO-4: To understand Chemical potential and other properties of ideal substances- pure and mixtures, Condensed Phase
		<i>Foundation of Quantum Mechanics</i>	CO-1: To understand the Beginning of Quantum Mechanics CO-2: To know the concept of Wave function CO-3: Helps to understand the Concept of Operators CO-4: To learn Particle in a box: CO-5: To understand Simple Harmonic Oscillator
	CC-6	<i>Chemical Bonding-I</i>	CO-1: To understand about Ionic bonding CO-2: To know about Covalent bonding
		<i>Chemical Bonding-II</i>	CO-1: To learn Molecular orbital concept of bonding CO-2: To study Metallic Bonding CO-3: To know basic concept of Weak Chemical Forces
		<i>Radioactivity</i>	CO-1: To understand about the concept of radioactivity and radioactive compounds, nuclear stability CO-2: To study nuclear reactions, artificial radioactivity CO-3: Helps to understand radio carbon dating, hazards of radiation and safety measures.
	CC-7	<i>Chemistry of alkenes and alkynes</i>	CO-1: To understand in detail about the synthesis, properties, chemical reactions and reaction mechanisms of alkenes CO-2: To study about the synthesis, properties, chemical reactions and reaction mechanisms of alkynes CO-3: To know
		<i>Aromatic Substitution</i>	CO-1: To understand about different types of electrophilic aromatic substitution reactions, reaction intermediates and their mechanisms CO-2: To study different types of nucleophilic aromatic substitution reactions, reaction intermediates and their mechanisms
		<i>Carbonyl and Related Compounds</i>	CO-1: To learn addition reactions of carbonyl compounds CO-2: To understand about Exploitation of acidity of α -H of C=O: CO-3: To know about Aldol reactions CO-4: To understand about Nucleophilic addition to α,β -unsaturated carbonyl system CO-5: To study the Substitution at sp^2 carbon
		<i>Organometallics</i>	CO-1: To study different types of <i>Organometallics</i> reactions
	SEC-1	IT skill in Chemistry	CO-1: To learn mathematical Fundamentals, Uncertainty in measurement, Algebraic operations on real scalar

			variables, Differential calculus, Numerical integration
			CO-2: To learn basic Computer Programming, Handling numeric data
SEM-4	CC-8	<i>Application of Thermodynamics – II</i>	CO-1: To know the applications of Thermodynamics in Colligative Properties
			CO-2: To study Phase rule and Phase Equilibrium
			CO-3: To understand First order phase transition and Clapeyron equation
			CO-4: To learn Three component systems
			CO-5: To know about Binary solutions
		<i>Electrical Properties of molecules</i>	CO-1: Ionic equilibria, Chemical potential, Activity and activity coefficients of ions in solution
			CO-2: To study Electromotive Force, oxidation/reduction of ions based on half-cell potentials, Chemical cells, Nernst equation
			CO-3: To understand Concentration cells, potentiometric titrations
		<i>Quantum Chemistry</i>	CO-1: To learn Helps to understand the fundamental concept, basic terms, derivation and application of Quantum Mechanics
			CO-2: To know Qualitative treatment of hydrogen atom and hydrogen-like ions
	CO-3: To study LCAO and HF-SCF method		
	CC-9	<i>Inorganic Chemistry III</i>	CO-1: To understand General Principles of Metallurgy
			CO-2: To learn Chemistry of s and p Block Elements
			CO-3: To know preparation, Structure, properties and nature of bonding of Noble Gases
CO-4: To study synthesis, structural aspects and applications of inorganic polymers			
<i>Coordination Chemistry-I</i>		CO-1: To understand the science of Double and complex salts	
CC-10	<i>Nitrogen compounds</i>	CO-1: To learn in detail about the preparation, properties, chemical reactions and mechanisms of amines	
		CO-2: To know in detail about the preparation, properties, chemical reactions and mechanisms of Nitro compounds (aliphatic and aromatic):	

			CO-3: To study in detail about the preparation, properties, chemical reactions and mechanisms of Alkyl nitrile and isonitrile
			CO-4: To understand the preparation, properties, chemical reactions and mechanisms of Diazonium salts and their related compounds
		<i>Rearrangements</i>	CO-1: To learn Mechanism with evidence and stereo chemical features for Rearrangement to electron-deficient carbon
			CO-2: To know Mechanism with evidence and stereo chemical features for Rearrangement to electron-deficient nitrogen
			CO-3: To study Mechanism with evidence and stereo chemical features for Rearrangement to electron-deficient oxygen
			CO-4: To understand Aromatic rearrangements
			CO-5: To learn the science of Migration from nitrogen to ring carbon
			CO-6: To know Rearrangement reactions by green approach
		<i>The Logic of Organic Synthesis</i>	CO-1: To study Retrosynthetic analysis
			CO-2: To understand Strategy of ring synthesis
			CO-3: To learn Asymmetric synthesis
		<i>Organic Spectroscopy</i>	CO-1: To study UV-Visible spectroscopy in detail
			CO-2: To study IR Spectroscopy in detail
			CO-3: To understand NMR Spectroscopy in detail
			CO-4: To learn Applications of IR, UV and NMR spectroscopy for identification of simple organic molecules
	SEC-2	Drugs & Pharmaceuticals	CO-1: To know Drug discovery, design and development
			CO-2: To study about Aerobic and anaerobic fermentation
SEM-5	CC-11	<i>Coordination Chemistry-II</i>	CO-1: To know in detail about Crystal Field Theory
			CO-2: To study about General comparison, Chemical bonding and Molecular structure, Transition Elements
			CO-3: To understand General comparison, Chemical bonding and Molecular structure of Lanthanoids and

		Actinoids
CC-12	Carbocycles and Heterocycles	CO-1: To learn in detail about Polynuclear hydrocarbons and their derivatives
		CO-2: To know in detail about Heterocyclic compounds
	Cyclic Stereochemistry	CO-1: To study the science of Alicyclic compounds
	Pericyclic reactions	CO-1: To understand Mechanism, stereochemistry, regioselectivity of Electrocyclic reactions
		CO-2: To learn Mechanism, stereochemistry, regioselectivity of Cycloaddition reactions
		CO-3: To know Mechanism, stereochemistry, regioselectivity of Sigmatropic reactions
	Carbohydrates	CO-1: To study in detail about the preparation, properties, chemical reactions and mechanisms of Carbohydrates
	Biomolecules	CO-1: To understand in detail about the preparation, properties, chemical reactions mechanisms of Amino acids
		CO-2: To learn in detail about the preparation, properties, chemical reactions mechanisms of Peptides
		CO-3: To know in detail about the preparation, properties, chemical reactions mechanisms of Nucleic acids
Alkaloids and Terpenoids	CO-1: Depicts General studies on terpenoids and alkaloids	
DSE-1	Crystal Structure	CO-1: Helps to know the Bravais Lattice and Laws of Crystallography
		CO-2: To learn Crystal Planes
		CO-3: To know Determination of crystal structure
	Statistical Thermodynamics	CO-1: To know about the necessary laws, rules, terms, expressions and derivations statistical thermodynamics
CO-2: To understand Boltzmann distribution		
		CO-3: To learn about Partition function
	Special selected topics	CO-1: To know Specific heat of solid
		CO-2: To study 3rd law of thermodynamics
CO-3: To understand the nature and structure of polymers, determination of molecular weight of		

			polymers and thermodynamics of polymer solution.
			CO-4: To learn about the fundamental concepts, important equations, properties and applications of polarizability and dipole moment.
	DSE-2	Qualitative and quantitative aspects of analysis	CO-1: To know Sampling, evaluation of analytical data, errors, accuracy and precision.
		Optical methods of analysis	CO-1: To study Origin of spectra, fundamental laws of spectroscopy and selection rules, validity of Beer-Lambert's law
			CO-2: To understand UV-Visible Spectrophotometry
			CO-3: To learn Basic principles of quantitative analysis
			CO-4: To know the Basic principles of instrumentation of Infrared Spectroscopy
			CO-5: To study Flame Atomic Absorption and Emission Spectroscopy
			Thermal methods of analysis
		Electroanalytical methods	CO-1: To learn Classification of electro analytical methods, basic principle of pH metric, potentiometric and conductometric titrations
		Separation techniques	CO-1: To know the method of Solvent extraction
			CO-2: To study Technique of extraction
			CO-3: To understand Qualitative and quantitative aspects of solvent extraction
			CO-4: To learn Chromatography
			CO-5: To know Development of chromatograms
			CO-6: To study Qualitative and quantitative aspects of chromatographic methods
			CO-7: To understand Stereoisomeric separation and analysis
			CO-8: To learn Role of computers in instrumental methods of analysis
	DSE-2	<i>Molecular spectroscopy</i>	CO-1: To know Infrared spectroscopy
			CO-2: To study UV-Visible and fluorescence spectroscopy

		Separation techniques	CO-1: To understand Chromatography
			CO-2: To learn Detection of Gas and liquid, Detection using IR and Mass spectroscopic techniques
		Elemental analysis	CO-1: To know Mass spectrometry
			CO-2: To study Atomic absorption, Atomic emission, and Atomic fluorescence
			CO-3: To understand Atomization techniques
		NMR spectroscopy	CO-1: To learn in detail Principle, Instrumentation, Applications of NMR spectroscopy
		Electro analytical Methods	CO-1: To know Elementary ideas Potentiometry & Voltammetry
		Elementary idea as advanced spectroscopic techniques	CO-1: To study X-ray analysis and electron spectroscopy
SEM-6	CC-13	Bioinorganic Chemistry	CO-1: To understand about Bioinorganic Chemistry, Elements of life
		Organometallic Chemistry	CO-1: To learn Definition and classification of organometallic compounds on the basis of bond type
		Catalysis by Organometallic Compounds	CO-1: To Study of industrial processes
		Reaction Kinetics and Mechanism	CO-2: To study the inorganic reaction mechanisms
	CC-14	Molecular Spectroscopy	CO-1: To understand the Interaction of electromagnetic radiation with molecules
			CO-2: To learn Principles, applications of Rotation spectroscopy
			CO-3: To know Principles, applications of Vibrational spectroscopy
		CO-4: To study Principles, applications of Raman spectroscopy	
			CO-5: To understand Principles, applications of Nuclear Magnetic Resonance (NMR) spectroscopy
		Photochemistry	CO-1: To learn Lambert-Beer's law
			CO-2: To know Photochemical Processes
	CO-3: To study Rate of Photochemical processes		
	Surface phenomenon	CO-1: To understand Surface tension and energy	
		CO-2: To learn Classification, Adsorption Isotherms and applications of Adsorption;	

			CO-3: To know Classification, rules and properties of Colloids
	DSE-3	Green Chemistry	CO-1: To study about green chemistry and its necessity.
			CO-2: To study about the principles of green chemistry and designing the green synthetic routes.
			CO-3: To understand about the examples of green reactions and future trends in green reaction.
			CO-4: To learn use of microwaves and ultrasonic energy in green processes
			CO-5: To know how to perform green synthesis of a number of organic compounds in the laboratory.
	DSE-4	Inorganic materials of industrial importance	CO-1: Helps to understand about the manufacture, properties, compositions, classes and applications of silicate materials such as glasses, ceramics, ceramics
			CO-2: To understand the manufacture, properties, compositions, classes and applications of industrially important materials such as fertilizers
			CO-3: To study the manufacture, properties, compositions, classes and applications of surface coating materials
			CO-4: To understand the manufacture, properties, compositions, classes and applications of batteries
			CO-5: To learn the manufacture, properties, compositions, classes and applications of alloys
			CO-6: To know the manufacture, properties, compositions, classes and applications of catalysis
			CO-7: To study the manufacture, properties, compositions, classes and applications of chemical explosives

Course Outcome (Chemistry General) :

Semester/Part	Course Type	Paper Description	Course Outcome
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SEM-1	CC-1A/GE-1	Atomic Structure	CO-1: To learn the basic concept, terms and equations of Atomic Structure
		Chemical Periodicity	CO-1: To study Chemical Periodicity, Group trends and periodic trends in these properties in respect of s-, p- and d-block elements
		Acids and Bases	CO-1: To understand the Acid-Base concept, pH, buffer. Acid-base neutralisation curves; indicator
		Redox Reactions	CO-1: To learn Ion-electron method of balancing equation of redox reaction, Solubility product principle
		Fundamentals Of Organic Chemistry	CO-1: Preliminary ideas of Organic Chemistry
		Stereochemistry	CO-1: To learn Bonding geometries of carbon compounds
			CO-2: To understand the Concept of chirality and symmetry
			CO-3: To study Relative and absolute configuration
			CO-4: To learn the Optical activity of chiral compounds, different rotation, racemic compounds, racemisation
		Nucleophilic Substitution and Elimination Reactions	CO-1: To understand Free-radical substitution reaction, halogenation of alkanes, mechanism
			CO-2: To study Nucleophilic substitution reactions
			CO-3: To know Elimination reactions, regioselectivity (Saytzeff/Hofmann) and stereoselectivity
		Aliphatic Hydrocarbons	CO-1: To learn preparation procedure and reactions of Aliphatic hydrocarbons
		Alkanes	CO-1: To learn preparation procedure and reactions of Aliphatic hydrocarbons
Alkenes	CO-1: To learn preparation procedure and reactions of Aliphatic hydrocarbons		
Alkynes	CO-1: To learn preparation procedure and reactions of Aliphatic hydrocarbons		
Reactions	CO 1: To study formation of metal acetylides and their reactions		
SEM 2	CC-1B/GE-2	Kinetic Theory Of Gases and	CO-1: To understand the basic concept of kinetic theory of gases and know how to solve numerical problems related to that topic

		Real Gases	CO-2: To study Maxwell's distribution of speed and energy		
			CO-3: To understand the behavior of Real gas and virial equation, Intermolecular forces		
		Liquids	CO-1: To study surface tension, viscosity and related topics		
		Solids	CO-1:		
		Chemical Kinetics	CO-1: To study Rate law, order and molecularity		
			CO-2: To understand Role of Temperature and theories of reaction rate		
		Chemical bonding and Molecular Structure	CO-1: To understand Valence Bond Theory		
			CO-2: To know Electronic displacements		
			CO-3: To study the modern approaches of chemical bonding MO theory		
		Comparative Study Of P-block Elements	CO-1: To learn about-block elements, inert pair effects.		
			CO-2: To study important compounds of P-block elements		
		SEM 3	CC-1C	Chemical Energetics	CO-1: To study thermodynamic parameters, laws of thermodynamics.
					CO-2: To study intensive and extensive properties, concept of heat, work, internal energy
CO-3: To study Carnot cycle, heat engines' Laws of thermochemistry					
Chemical Equilibrium	CO-1: To know thermodynamic conditions for equilibrium				
	CO-2: To study definitions of K_p , K_c , K_x and relations among them				
	CO-3: To understand Le Chatelier's principle				
Ionic Equilibria	CO-1: To study various types of electrolytes, degree of ionization				
	CO-2: To learn pH scale, common ion effect, Buffer solutions				
	CO-3: To know about solubility product and application				
Aromatic Hydrocarbons	CO-1: To know structure of Benzene and its reactions				

		Organometallic Compounds	CO-1: To study preparation and reactions of Grignard reagents
		Aryl Halides	CO-1: Preparation of Chloro, Bromo, Iodobenzene from phenol and their reactions
		Alcohols, Phenols, and Ethers	CO-1: To study their preparations and reactions
		Carbonyl Compounds	CO-1: To study their preparations and reactions
	SEC-1	Carbohydrates	CO-1: To know biological importance of carbohydrates, metabolism, alcoholic and lactic acid fermentation, Kerbs cycle
	Proteins	CO-1: To study biological importance of proteins, classification, structures	
	Structure of DNA and RNA	CO-1: To understand structures, generic code, Biological role	
	Enzymes	CO-1: To study Classification, effect of PH, temperature on enzyme activity	
	Biochemistry Of Disease: A diagnostic approach by blood/urine analysis	CO-1: To know composition and structure of blood, blood coagulation, blood collection and preservation of sample	
		CO-2: To study about collection and preservation of urine sample	

SEM 4	CC-1D	Solutions	CO-1: To understand the idea of Ideal solutions and Roul't's law, deviation from Ideal solutions –(non-ideal solution)
			CO-2: To study critical solution temperature, Nernst distribution law
		Phase Equilibria	CO-1: To study Phases, components, degrees of freedom
			CO-2: To study Gibbs Phase rule, Clausius-Clapeyron equation and its importance, Phase diagram.
		Conductance	CO-1: To know cell constant, specific conductance, molar conductance.
			CO-2: To understand Kohlrausch's law Ostwald's dilution law and application of conduction measurement
		Electromotive Force	CO-1: To know Faraday's laws of electrolysis, application of electrolysis in industry

			CO-2: To know electromotive force of a cell and Nernst equation
		Chemical Analysis	CO-1: To know gravimetric analysis, solubility product and common ion effect and gravimetric estimation
			CO-2: To know about volumetric analysis, acid-base oxidation, complexometric titrations.
			CO-3: Chromatographic methods of analysis, column and thin layer chromatography
		Environmental Chemistry	CO-1: To know composition and structure of atmosphere, troposphere, stratosphere, mesosphere, thermosphere
			CO-2: To know major air pollutants, their origin and harmful effects
			CO-3: To know about green house effect, acid rain, photochemical smokes
			CO-4: To know about natural water sources, water treatments, thermal pollution, radioactive pollution, water pollution and their harmful effects
			CO-5: To understand about DO, BOD, COD, TDS and hardness parameters
	SEC-2	Pharmaceutical Chemistry	CO-1: To know Drug discovery, drug design, to understand antibiotics (Chloramphenicol); antibacterial and antifungal agents
			CO-2: To understand Central Nervous System agents
SEM 5	SEC-3	Basics & Application of Computer in Chemistry:	CO-1: (Mathematics) To learn mathematical functions, polynomial expressions, logarithms, the exponential function, equation of a straight line, plotting graphs.
			CO-2: (Uncertainty in measurement) To learn Types of uncertainties. Statistical treatment: Mean, standard deviation, calculation of relative error.
			CO-3: (Differential calculus) To learn The tangent line and the derivative of a function, numerical differentiation
	DSE-1A	Transition Metal	CO-1: To know general group trends, variable valencies, color, magnetic properties of transition elements
			CO-2: To know Electronic configurations, oxidation states, colour, magnetic properties, lanthanide contraction, separation of lanthanides.

		Coordination Chemistry	CO-1: To know Werner's coordination theory, Valence Bond Theory
			CO-2: To learn drawbacks of VBT; IUPAC system of nomenclature.
		Crystal Field Theory	CO-3: To understand crystal field effect, octahedral symmetry. Crystal field stabilization energy (CFSE), Crystal field effects for weak and strong field ligands.
SEM 6	DSE-1B	Carboxylic acids and their derivatives	CO-1: To learn strength of organic carboxylic acids, comparative study with emphasis on factors affecting pK values and their Preparation procedures.
		Amines and diazonium salts	CO-1: To learn preparations and reactions
		Amino acids and Carbohydrates	CO-1: To learn preparations and reactions

