

Chemistry	
Name of Course	Course Outcomes
CC-1-2-TH & CC-1-2-P	<p>CO-1 Concept of ideal and real gas and importance of kinetic theory in explaining their properties.</p> <p>CO-2 Idea of mass transport</p> <p>CO-3 Complex and elementary reactions along with catalysis</p> <p>CO-4. Details of viscosity, solubility and chemical kinetics including data analysis using Excel</p>
CC-3-5-TH & CC-3-5-P	<p>CO-1 Conceptual understanding and application of the laws of thermodynamics</p> <p>CO-2 Microenvironment of solutions (mainly aqueous) including different thermodynamic equilibrium</p> <p>CO-3 Details of conductometric and potentiometric experiments including data analysis using Excel</p>
CC-4-9-TH & CC-4-9-P	<p>CO-1 Application of thermodynamic principles in governing behaviour of ideal and non-ideal solutions</p> <p>CO-2 Basic quantum mechanical postulates, operator algebra and simple quantum mechanical systems like particle in a box.</p> <p>CO-3 Preliminary idea of real lattice and physical properties like specific heat</p> <p>CO-4 Idea based on pH-metry, polarimetry, phase diagram and partition coefficient</p>
CC-5-11-TH & CC-5-11-P	<p>CO-1 Application of statistical analysis for understanding of the concept of entropy and arrival of the third law of thermodynamics</p> <p>CO-2. Understanding Quantum mechanical treatment of SHO, rigid rotator, H-like atom and bonding and application</p>

	<p>CO-3. Basic treatment of numerical analysis</p> <p>CO-4. Writing of small programs in FORTRAN to solve chemical problems</p>
DSE A2	<p>CO-1 Small programs using FORTRAN</p> <p>CO-2 Creating spreadsheet, basic functions, tables and graphs, Goalseek function, solver, Linest function</p> <p>CO-3 Analysis of set of data in different contexts.</p>
CC-6-14-TH & CC-6-14-P	<p>CO-1 Structure determination using molecular spectroscopy. Basic theoretical and reactions related to qualitative analysis of radicals</p> <p>CO-2 Theoretical understanding of rates of reaction driven by light or otherwise</p> <p>CO-3 Application of thermodynamic principles to surface properties of liquids</p> <p>CO-4 Performing hands-on experiments of chemical kinetics and data analysis using Excel</p>
DSE-B-3-Th & DSE-B-3-P	<p>CO-1 The introduction and history of polymeric materials, kinetics of polymers, nature and structure of polymers, determination of molecular weight of polymers, polymer solution, glass transition.</p> <p>CO-2 How to synthesize, characterize and analyze polymers.</p>
CC-1-1-TH	<p>CO-1 Electronic structure of elements</p> <p>CO-2 Theories and different aspects of acid base reactions including titrations</p> <p>CO-3 Different aspects of redox reactions and titrations including redox diagrams</p>
CC-1-1-P	<p>CO-1 Quantitative estimation of different metal ions by acid-base titrations</p>

	CO-2 Quantitative estimation of different metal ions by oxidation-reduction titrations
CC-2-4-TH	CO-1 Different aspects of ionic bonding and covalent bonding including properties CO-2 MO diagram formation and bond properties in inorganic and metals, hydrogen and halogen bonds CO-3 Nuclear structure and reactions
CC-2-4-P	CO-1 Quantitative estimation of different metal ions by Iodo-/Iodimetric titrations CO-2 Quantitative estimation of different metal ions by oxidation-reduction titrations
CC-3-6-TH	CO-1 Fundamental Properties of Elements CO-2 Several properties of compounds of s- and p-block Elements, Noble Gases, Inorganic Polymers CO-3 Coordinate bonding, structure, naming and isomerism of the complex
CC-3-6-P	CO-1 Quantitative estimation of different metal ions by complex formation and gravimetry, separation of mixture of metal ions by chromatography
CC-4-10-TH	CO-1 Formation and stabilization of coordination compounds, Magnetic properties, and origin of colour of coordination complexes, Electronic spectral transition CO-2 Properties of d- and f-block elements related compounds CO-3 Inorganic reaction mechanism and stability of coordination complexes
CC-4-10-P	CO-1 Synthesis of metal ion complexes with different metal ions and ligands

	CO-2 Spectrophotometric determination of different parameters of spectra of complexes
DSE B1	CO-1 Properties and preparation of glass, cements and ceramic materials and their industrial applications CO-2 Preparation, properties and application of fertilizers CO-3 How to give a coat on different surfaces, several properties of paints CO-4 Different components, their roles, types and implementation of batteries CO-5 Classification, properties, composition and different metal alloys CO-6 General principles and properties of different catalysts of industrial uses CO-7 Origin, preparation, properties of explosive compounds
DSE B1-Practicals	CO-1 To estimate the components of ores, alloys or fertilizers quantitatively, Employ metallic coatings on ceramic or plastic material and how to prepare pigment
CC-6-13-TH	CO-1 Basic theoretical and reactions related to qualitative analysis of radicals CO-2 Role of different metal ions in our biological world CO-3 Definition, classification, reactions, structure and catalytic properties of organometallic compounds
CC-6-13-P	CO-1 Proceed methodically to detect radicals in any mixture through qualitative semi-micro analysis.
CC-1-1A TH	CO-1 Basic concept of bonding and physical

<p>CC-1-1A-P</p> <p>CC-1-1B TH</p> <p>CC-1-1B-P</p>	<p>properties of organic compounds.</p> <p>CO-2 Concept of reaction mechanism I.</p> <p>CO-3 Separation of solid compounds from a binary mixture.</p> <p>CO-4 About stereochemistry.</p> <p>CO-5 Concept of reaction mechanism II.</p> <p>CO-6 Determination of boiling point of liquid compounds.</p>
<p>CC-2-3-TH</p> <p>CC-2-3-P</p>	<p>CO-1 Chirality, prostereoisomerism and conformation of organic molecules.</p> <p>CO-2 Tautomerism, reaction kinetics and thermodynamics.</p> <p>CO-3 Free radical substitution, nucleophilic substitution and elimination reactions.</p> <p>CO-4 About the preparation of some organic compounds and calculate percentage yield.</p>
<p>CC-3-7-TH</p> <p>CC-3-7-P</p>	<p>CO-1 About unsaturated hydrocarbons.</p> <p>CO-2 Aromatic substitution reaction</p> <p>CO-3 About carbonyl compounds.</p> <p>CO-4 On organomagnesium, organolithium, organocopper and organozinc compounds.</p> <p>CO-5 Identification of pure organic solid and compound.</p> <p>CO-6 Estimation of different organic compounds.</p>
<p>CC-4-8-TH</p>	<p>CO-1 About amines, nitro, nitrile, isonitrile, diazonium salts and their related compounds.</p>

CC-4-8-P	<p>CO-2 Synthesis of organic compounds by retrosynthetic analysis.</p> <p>CO-3 Identification of organic compounds by UV, IR and NMR spectra.</p> <p>CO-4 Detection of functional groups in organic compounds.</p>
CC-5-12-TH	<p>CO-1 The preparation of carbocycles and heterocycles</p> <p>CO-2 About stereochemistry of cyclohexane and their derivatives.</p> <p>CO-3 Electrocyclic, cycloaddition and sigmatropic reactions.</p> <p>CO-4 About properties and preparation of carbohydrate molecules.</p> <p>CO-5 About properties and preparation of amino acids.</p> <p>CO-6 Chromatographic separation in a mixture of organic compounds</p> <p>CO-7 Identification of organic compounds by spectroscopic analysis</p>
DSE-A-3	<p>CO-1 About introduction of Green Chemistry</p> <p>CO-2 Principles and designing of green synthesis.</p> <p>CO-3 Green synthesis and reactions.</p> <p>CO-4 About the future trends in Green Chemistry.</p> <p>CO-5 About isolation, structure elucidation and synthesis of some common alkaloids.</p> <p>CO-6 Occurrence, classification and structure elucidation.</p>

DSE-A-3P	CO-7 Green synthesis of some organic compounds.
Chemistry General Course	
CC/GE-1-TH & CC1/GE 1-P	<p>CO-1 Concept of ideal and real gas and importance of kinetic theory in explaining their properties</p> <p>CO-2 Concept of surface tension and viscosity and principle of its determination using stalagmometer, and Ostwald viscometer.</p> <p>CO-3 Order of a chemical reactions and Arrhenius equation.</p> <p>CO-4 Bohr's theory and atomic spectra of hydrogen atom and quantum numbers.</p> <p>CO-5 General characteristics of s-,p-,d- and f- block elements and properties.</p> <p>CO-6 Concept of acids and bases</p> <p>CO-7 Concept of inductive effect, resonance and hyperconjugation, nucleophiles, electrophiles, carbocations, carbanions, and free radicals.</p> <p>CO-8. Concept of different types of isomerism, chirality and optical activity, CIP rules and R/S and E/Z nomenclature</p> <p>CO-9. Concept of SN1, SN2, E1 and E2 reaction with mechanistic aspects, Saytzeff & Hofmann eliminations.</p> <p>CO-10 Quantitative estimation of salts by redox titrations</p>
CC2/GE 2 –TH	<p>CO-1 Conceptual understanding and application of the laws of thermodynamics</p> <p>CO-2 Thermodynamic conditions for equilibrium and Le Chatelier's principle.</p> <p>CO-3 Concept of ideal and non-ideal solutions</p>

<p>CC2/GE2-P</p>	<p>CO-4 Concept of phase equilibrium and its criteria phase diagram of one component systems.</p> <p>CO-5 Preliminary idea of crystal lattice and lattice planes.</p> <p>CO-6 Preparations and reactions of Alkanes, Alkenes, Alkynes up to 5 carbons</p> <p>CO-7 Concept of accuracy, precision standard deviations, and errors of quantitative analysis, Concept of hardware, software, input and output devices.</p> <p>CO-8 Concept of redox reaction, redox potential redox indicator.</p> <p>CO-9 Determination of rate constant of chemical reaction, measurement of surface tension and viscosity of unknown liquid, solubility of sparingly soluble salt in water, pH of an unknown solution</p>
<p>CC3/GE3-TH</p>	<p>CO-1 Concept of ionic, covalent and coordinate bonding, molecular approach for LCAO method</p> <p>CO-2 Degree of ionization, salt hydrolysis, buffer solution, solubility product</p> <p>CO-3 Conductance, Equivalent and molar conductance and transport number</p> <p>CO-4 Faraday's law, EMF, Nernst equation</p> <p>CO-5 Reaction of electrophilic substitution, nitration, halogenation</p> <p>CO-6 Grignard reagent, preparation, Reformatsky reaction</p> <p>CO-7 Sandmeyer reactions and effect of nitro substituent</p>

DSE A-2-P	<p>catalysts of industrial uses</p> <p>CO-7 Origin, preparation, properties of explosive compounds</p> <p>CO-8 To estimate the components of ores, alloys or fertilizers quantitatively, Employ metallic coatings on ceramic or plastic material and how to prepare pigment</p>
DSE-B1-TH DSE-B1-P	<p>CO-1 The importance and principles of green chemistry.</p> <p>CO-2 Green synthesis of some common reactions.</p> <p>CO-3 Future trends in green chemistry.</p> <p>CO-4 Students will be able to learn green synthesis of some organic compounds</p>