Course Outcomes

B. Sc. -I (Chemistry)	
Course	**Outcomes**
Paper No. I (Inorganic Chemistry)	**After completion of these courses, students should be able to,** 1. Able to write electronic configuration of elements, fill electrons in different orbitals, draw energy level sequence of different orbitals, differentiate between electronegativity and electron affinity. 2. Differentiate between different types of bonds and able to identify the ionic bond in compounds. 3. Able to draw molecular orbital diagrams of homonuclear and heteronuclear diatomic molecules. 4. Able to find hybridization, geometry and magnetic properties of transition metal complexes
Paper No. II (Organic Chemistry)	1. Understand the basic concepts of Organic Chemistry. 2. Understand the concept of chirality, optical isomerism, and nomenclature. 3. Learn aromatic-non-aromatic compounds and to understand themechanism of electrophilic substitution reactions. 4. Understand method of formation and chemical reactions of cycloalkanes, cycloalkenes and alkadienes.
Paper No. III (Physical Chemistry)	1. Understand the Carnot cycle and its efficiency and concepts of enthalpy and entropy. 2. Understand the free energy and laws of chemical equilibrium. 3. Understand the Vander walls equations and Maxwell-Boltzman distribution law. 4. Understand the First and second order reaction.
Paper No. IV (Analytical Chemistry)	1. Understand the difference between qualitative and quantitative analysis, understand the terms error and accuracy in analytical experiments. Able to calculate the mean, median of analytical data. 2. Understand the importance of chromatography in analysis and the principles of separation of analyte from mixture using paper chromatography and thin layer chromatography. 3. Able to find out unknown concentration of analyte from sample by performing titration. 4. Understand the hardness, pH, alkalinity, acidity, BOD and COD of water. Understand the estimation of NPK from fertilizer.

B.Sc.-I (Chemistry Practical)	
Laboratory practical	1. To know the unknown compounds by Organic QualitativeAnalysis. To learn the preparation of organic and inorganic materials. 2. To learn kinetics of reaction. To learn equivalent weight of Magnesium, heat of ionization, heat capacity, enthalpy of hydration, solubility and enthalpy of neutralization of different chemicals. 3. To learn separation and identification of different cations by Paper Chromatographic technique. 4. To learn preparation of standard solution. To understand the estimation of metal ions.
B.Sc.-II (Chemistry)	
Paper No. V (Physical Chemistry)	1. Understand the basic terminologies, electrolytic conductivity and different of conductometric titrations. 2. Understand the different physical properties of liquids depend on density and viscosity. Understand the adsorption phenomenon and different adsorption isotherms and its applications. 3. Understand the types of nuclear radiations and their detection and measurements. 4. Understand the order of reaction and theories of reaction rate.
Paper No. VI (Industrial Chemistry)	1. Learn different concentration terms. Understand comparison between classical chemistry andindustrial chemistry. Understand concept of unit processes and unit operation. 2. Study basic principle of corrosion and electroplating. Learn different types of corrosion, applications of chromium electroplating 3. Learn manufacturing process of paper. 4. Study different types of soaps and their uses. Study cleansing action of soaps and detergents, saponification.

Paper No. VII (Inorganic Chemistry)	1. Understand the basic concepts of coordination chemistry. Able to find the geometries of different transition metalcomplexes using Valence bond theory. Study the concept of chelate formation. 2. Study the compounds of group 13, 14 and 15 of 'p-block' elements. 3. Understand the properties of elements of 3d series. 4. Learn the basic knowledge about inorganic semi-micro qualitative analysis
Paper No. VIII (Organic Chemistry)	1. Learn about the synthesis, reactivity and applications of carboxylic acids. 2. Study about classification, preparation and applications of amines and diazonium salts. 3. Understand the classification, configuration and structure of carbohydrates. Understand the nomenclature and reactivity of aldehydes andketones. 4. Study the basic knowledge of conformational analysis of organic compound.
B.Sc.-II (Chemistry Practical)	
Laboratory practical	1. Identification of organic compounds including acids, bases,phenols and neutrals. Preparation of organic compounds and their purification. Organic estimations such as acetone, Vitamin-C and ester. Separation, identification and determination of R_f values usingTLC. 2. Understand the gravimetric analysis of Fe and Ba. Preparation of inorganic complexes. Able to find out the unknown concentration by performingtitration. 3. Understand semi-micro analysis. Study the chemical kinetics of hydrolysis of ester. 4. Illustrate the experiment of instrumental methods such as conductometry, refractometry, polarimetry etc. Able to measure viscosities of different liquids.

B.Sc.-III (Chemistry)	
Paper No. IX (Inorganic Chemistry)	1. Study the theoretical concepts of hard and soft acids and bases. 2. Understand the metal-ligand bonding in transition metal complexes. 3. Study basic concepts and classification of inorganic polymers. Study classification of conductors, insulators and semiconductor 4. Study synthesis and structures of organo-metallic compounds.
Paper No. X (Organic Chemistry)	1. Study the basic concept of spectroscopy. Understand factors affecting UV-absorption spectra. Understand factors affecting vibrational frequency. 2. Interpret IR-spectra on basic values of IR-frequencies. 3. Learn basic principles of NMR spectroscopy, chemical shift, shielding and deshielding. 4. Study instrumentation of Mass Spectroscopy and fragmentation pattern. Solve the combined problems of UV, IR, NMR and MASS
Paper No. XI (Physical Chemistry)	1. Learn and understand quantum Chemistry, Heisenberg's uncertainty principle, concept of energy operators (Hamiltonian), learning of Schrodinger wave equation. Physical interpretation of the ψ and ψ2. Particle in a one- dimensional box. Gain Knowledge about spectroscopy. 2. Learn and understand photochemical laws, reactions and various photochemical phenomena. 3. Learn the various types of solutions, vapour pressure, temperature relations. 4. Learn and understand the knowledge of emf measurements, types of electrodes, different types of cells, various applications of emf measurements.
Paper No. XII (Analytical Chemistry)	1. Understand the basic concepts of Gravimetric Analysis and learns different types of precipitations. 2. Understand the flame photometry, colorimetry and spectrophotometry, its applications and limitations. 3. Understand the different types of electrodes, titrations and their applications. 4. Understand the different types of chromatographic techniques and their applications.

Paper No. XIII (Inorganic Chemistry)	1. Understand the thermodynamic and kinetic aspects of metal complexes. 2. Study the nuclear reactions and role of radio isotopes. 3. Understand properties and classification of lanthanides and actinides. Study techniques involved in extraction of iron from its ore. 4. Understand role of metals and non-metals in our health.
Paper No. XIV (Organic Chemistry)	1. Study the various Name reaction and reagents with examples. Learn mechanism of rearrangement reaction. 2. Understand basic terms used in retrosynthetic analysis. Solve electrophilic and nucleophilic addition reactions problems 3. Study analytical and synthetic evidences of natural products such as citral and nicotine. 4. Learn different types of drugs, their synthesis and uses.
Paper No. XV (Physical Chemistry)	1. Learn and understand phase rule. Learn and understand One component, Two component and Three component system phase diagrams with suitable examples. 2. Gain Knowledge about basic concepts of Thermodynamics, free energy, Gibbs-Helmholtz equation and its applications, Able to solve problem related with it. 3. Understand basic concept of solid state chemistry, learn basic terms, Laws of crystallography, learn crystal structure analysis using X-rays. Understand kinetics of Simultaneous reactions. 4. Learn and understand the knowledge of distribution law, its modifications, applications of distribution laws, process of extraction etc.
Paper No. XVI (Industrial Chemistry)	1. Understand the methods of manufacturing of sugar. Understand the mechanism of manufacture of industrial heavychemicals. 2. Understand the different types of polymers and their applications. 3. Understand the different types of hydrocarbons and applications of petrochemicals. 4. Understand the different methods for nano-material preparations and their applications.

B.Sc.-III (Chemistry Practical)	
Laboratory practical	1. Understand the gravimetric estimation such as Fe, Ba, Ni. Study different types of inorganic preparations. Understand percentage purity of different types of analysamples. 2. Separate binary mixture and identify an individual compound. Prepare organic compounds and purify them. Prepare organic derivatives. Estimate amount of organic content from mixture, tablets etc. 3. Understand the kinetic reactions and their mechanisms, energy ofactivation, partial molar volume. 4. Understand different instruments such as pH Meter, potentiometer, refractometer, colorimeter etc.