B.Sc. Chemistry Programme Outcomes (POs)

After completing B.Sc. degree programme, the students will be able to	
PO1:	Offer theoretical as well as practical knowledge about different special subject areas.
PO2:	Understand the academic field to pursue multi and interdisciplinary science careers in future that include Chemistry, Physics, Botany, Zoology, Mathematics, Microbiology and Computer Science.
PO3:	Plan and execute experiments or investigations, analyse and interpret data information collected using appropriate methods.
PO4:	Develop scientific temper and attitude which is more beneficial for the society as the scientific developments and make a nation or society to grow at a rapid pace through research.
PO5:	Think critically, follow innovations and developments in science and technology.
PO6:	Understand the issues of environmental contexts and sustainable development.
PO7:	Acquire the skills and ability to engage in independent and life-long learning in the broadest context socio technological changes.
PO8:	Demonstrate professional and ethical attitude with enormous responsibility to serve the society.

Programme Specific Outcomes (PSOs)	
PSO1:	Use the knowledge of Chemistry through theory and practicals.
PSO2:	Identify the structure-activity relationship.
PSO3:	Explain good laboratory practices and safety.
PSO4:	Create the research-oriented skills.
PSO5:	Use of sophisticated instruments/equipment's.

Course Outcomes (COs)

After completion of these course students should be able to

B. Sc. I Semester I

DSC-3A- Chemistry paper I (Inorganic Chemistry)	
CO1	Explian the Bohr's theory of hydrogen atom and its limitations, Wave particle quality, Heisenberg uncertainty principle, Quantum numbers and their significance, Shape of s, p and d atomic orbitals.
CO2	Describe a) Aufbau's principle b) Hunds rule of maximum multiplicity c) Pauli's exclusion principle.
CO3	Predict the Periodicity of the elements.
CO4	Relate the Chemical Bonding and Molecular structure.
CO5	Discuss Valence bond theory (VBT).
CO6	Compare the Molecular orbital theory (MOT) and Valence bond theory (VBT).
DSC-4A- Chemistry paper II (Organic Chemistry)	
CO7	Desribe Curved arrow notations, Cleavage of Bonds: Homolysis and Heterolysis Organic molecular species: Nucleophiles and electrophiles. Electronic Displacements: Inductive Effect, Electromeric Effect, Resonance and Hyperconjugation effect.
CO8	Explain Reactive Intermediates: Generation, Structure, Stability and Reactions of Carbocations, Carbanions and carbon free radicals.
CO9	Predict the Nomenclature of stereoisomers: D and L, erythro and threo, R and S, E and Z.
CO10	Discuss the Aromaticity concept and predict the Aromatic, non-aromatic, Antiaromatic, Pseudoaromatic compounds.
CO11	Relate the Cycloalkanes, cycloalkanes and alkadienes.
CO12	Describe a) Photohalogenation b) Catalytic halogenations c) Catalytic hydrogenation d) Effect of heat e) Reaction with hydrogen halide.

B.Sc. I Semester II	
DSC-4B-Chemistry Paper IV (Analytical Chemistry)	
CO13	Explain Analytical processes (Qualitative and Quantitative), Methods of analysis (Only classification), Sampling of solids, liquids and gases, Errors.
CO14	Discuss the Basic Principle of Chromatography, Basic terms, Classification of Chromatography.
CO15	Comparison of paper chromatography and TLC
CO16	Outline of titrimetric Analysis such as Strong acid-strong base, Strong acid-weak base, Strong base-weak acid, Complexometric titrations. CO17: Use and Applications Water Analysis.
CO18	Explain the Analysis of Fertilizers.
Chemistry-DSC 3B: Chemistry Paper-III (Physical Chemistry)	
CO19	Expalin the First law of thermodynamics, Statements of second law of thermodynamics, Carnot's cycle and its efficiency, Statement of Third Law of thermodynamics.
CO20	Solve the Problem based on thermodynamics.
CO21	Discuss the Concept of standard state and standard enthalpies of formations, integral and differential enthalpies of solution and dilution.
CO22	Compare between ΔG and ΔGo, Le Chatelier's principle. Relationships between Kp, Kc and Kx for reactions involving ideal gases.
CO23	Relate Postulates of Kinetic Theory of Gases and derivation of the kinetic gas equation, Ideal and Non ideal gases.
CO24	Illustrate Deviation of real gases from ideal behaviour, compressibility factor, causes of deviation. Van der Waals equation of state for real gases.
CO25	Find the Derivation of Zero order reaction, first order reaction, Pseudounimolecular reactions, second order reaction.
B.Sc. Part II (CBCS) Sem III	
Paper No. DSC- C3 - Chemistry paper no. V (Physical Chemistry)	
CO26	Discuss Types of conductors, Conductivity, Equivalent and Molar conductivity and Their variation with dilution for weak and strong electrolytes in aqueous solution.
CO27	Illustrate the conductance by using Wheatstone bridge. Kolharausch law of independent migration of ions and its applications such as Ionic mobility, determination of degree of ionization of weak electrolyte, solubility and solubility products.
CO28	Describe all Physical Properties of Liquids and Third order reactions, derivation of rate constant.
CO29	Explain the Adsorption as a surface phenomenon, Definition of adsorption, adsorbent, adsorbate, absorbent. Factors affecting adsorption, Types of adsorptions.
CO30	Compare between physical and chemical adsorption, Adsorption isotherms: Freundlich adsorption isotherm, Langmuir adsorption isotherm.

CO31	Outline of Types of Nuclear radiation, properties of α, β and γ radiations, Detection and measurement of nuclear radiations by Scintillation and Geiger muller counter methods.
Paper No. DSC-C4- Chemistry paper no. VI (Industrial Chemistry)	
CO32	Explain the Basic Concepts in Industrial Chemistry.
CO33	Compare between classical chemistry and industrial chemistry.
CO34	Find the Normality, Equivalent weight, Molality, Molecular weight,Molarity, Molarity of mixed solution.
CO35	Describe the method of Size reduction- Principle, Jaw crusher, ball mill, Size Enlargement Principle, Pellet mill, tumbling agglomerators.
CO36	Discuss the Theory of Corrosion and Elecroplating.
CO37	Use and Manufacturing Paper Industry and Soaps and Detergent
B.Sc. Part II (CBCS) Sem IV	
Paper No. DSC-D3- Chemistry paper no. VII (Inorganic Chemistry)	
CO38	Describe the concept in Co-ordination chemistry
CO39	Compare between double salt and complex salt.
CO40	Find the IUPAC nomenclature of coordination compounds.
CO41	Explain the Chelation, classification and its applications.
CO42	Outline of P- Block elements and its characteristics.
CO43	Discuss the Characteristics of d-block elements with special reference to i) Electronic structure ii) Oxidation states, stability of oxidation states of Fe with respective to Latimer diagram iii) Magnetic character iv) Colored ions v) Complex formation.
CO44	Find the Application of complex formation.
Paper No. DSC- D4 - Chemistry paper no. VIII (Organic Chemistry)	
CO45	Explain the reaction and methods of Preparation of Carboxylic acids and their derivatives.
CO46	Describe the Classification, Nomenclature, structure, Methods of preparation and reactions of Amines and Diazonium Salts.
CO47	Compare the reducing and non-reducing sugars.
CO48	Discuss the Classification of carbohydrates.
CO49	Relate the Reactivity of Carbonyl group and categorize its reactions
CO50	Outline of Representation of conformations of ethane by using Saw- Horse, Fischer (dotted line wedge) and Newmann's projection formulae and ethane and n-butane by Newmann's Projection formula.
B. Sc III Chemistry Semester-V	
Paper XI Physical Chemistry	
CO51	Describe Heisenberg Uncertainty Principle, concept of energy operator, particle in one dimensional box.
CO52	Define Quantum theory, explain Schrodinger wave equation, emf measurement and its application.

CO53	Analyze electromagnetic spectrum, Raman Spectra compare and contrast rotational spectra, vibrational spectra, vibrational Raman spectra and rotational Raman spectra of diatomic molecule.
CO54	Write Photochemical Law's, reactions and various Photochemical Phenomena.
CO55	Classify solutions, relation vapour pressure temperature relations.
CO56	Compare between electrodes and cells.
Paper IX Inorganic Chemistry	
CO57	Find the meaning of various terms involved in Acids and Bases.
CO58	Describes the shapes of d-orbitals.
CO59	Discuss the Applications of Semiconductor and Superconductors.
CO60	Predict the mechanism involved in Organometallic Chemistry.
CO61	Expalin the homogenous catalysis and heterogeneous catalysis.
CO62	Predict the degeneracy of d-orbitals.
Paper X Organic Chemistry	
CO63	Describe the principle of UV Spectroscopy.
CO64	Impart the concept of vibrational Transitional region of IR Spectrum.
CO65	Illustrate the Structure of Unknown Organic compounds.
CO66	Compare between UV and NMR.
CO67	Explain the principle of mass spectroscopy.
CO68	Solve the problem based on UV, NMR and IR.
Paper XII Analytical Chemistry	
CO69	Explain the Precipitation Techniques.
CO70	Discuss the applications of organic precipitants.
CO71	Explain the Principle of flame photometry.
CO72	Design the experimental set up for flame photometry.
CO73	Describe the theory of Colorimetry and spectrophotometry.
CO74	Identify the concept of Quality control.
CO75	Categorised the different functional group based on Chromatography.
B. Sc III Chemistry Semester-VI	
Paper XIII Inorganic Chemistry	
CO75	Explain SN 1 and SN 2 reactions for inert and labile complexes.
CO76	Describe the Thermodynamic and Kinetic aspects of metal complexes.
CO77	Discuss the Nuclear reactions and energetic of nuclear reactions.
CO78	Use of Thorium, Uranium and Plutonium in atomic energy.
CO79	Compare between lanthanide and actinides.
CO80	Predict Biological role of alkali and alkaline earth metal ions with special reference to Na+, K+ and Ca2+.

Paper No. XIV Organic Chemistry	
CO81	Use and application Lithium aluminium hydride LiAlH4, Raney Nickel, Osmium tetraoxide, Selenium dioxide (SeO2), Dicyclohexyl Carbodiimide (DCC), Diazomethane.
CO82	Explain the Diels -Alder reaction, Meerwein –Pondorff-Verley reduction, Hofmann rearrangement, Wittig reaction, Wagner- Meerwein rearrangement, Baeyer Villiger oxidation.
CO83	Discuss the Retrosynthesis of different Molecules.
CO84	Describe Electrophilic addition to >C=C< and −C≡C− bonds.
CO85	Solve the problem based on addition reaction.
CO86	Impart the concept of Anti-Markovnikoff's addition.
CO87	Explain Synthesis and uses of ethambutal, phenobarbitone, isoniazide, benzocaine, Chloramphenicol, paludrine.
CO88	Outline the biogenesis of Alkaloids, Terpenoids.
Chemistry Paper No. XV (Physical Chemistry)	
CO89	Discuss Gibbs phase rule, Phase diagram, true and metastable equilibria.
CO90	Compare one component systems and two component systems.
CO91	Describe the concept of Thermodynamics and its applications
CO92	Explain the different State of solid, Laws of crystallography, Weiss indices and Miller indices.
CO93	Solve the Numerical problems based on Derivation of Bragg's equation.
CO94	Predict the Simultaneous reactions such as Opposing reaction, Side reaction, Consecutive reactions, Chain reaction, Explosive reaction.
Paper No. XVI (Industrial Chemistry)	
CO95	Discuss Manufacture of cane sugar in India: Extraction of juice, Clarification, Concentration, crystallization, centrifugation and other details of industrial process.
CO96	Explain the Manufacture of Industrial Heavy Chemicals.
CO97	Describe the use, Classification and applications of Synthetic Polymers.
CO98	Categorized the different term involved in nanotechnology.
CO99	Impart the role of Petroleum industry and eco-friendly fuels.
CO100	Identify the concept of Nanotechnology.