

COURSE OUTCOME FOR B.Sc.-I Semester (Chemistry)

Name of the Course (Paper)-FUNDAMENTAL CHEMISTRY -01

Course (Paper) Code- CHSC-01

<u>S.N.</u>	<u>Details of CO</u>
<u>CO-1</u>	<u>To know the contributions of ancient indian scientists, study atomic structure and periodic properties.</u>
<u>CO-2</u>	<u>To explore the concept of chemical bonding including ionic and covalent bonding, hybridization, molecular orbital theory and intermolecular interactions.</u>
<u>CO-3</u>	<u>To learn about reaction and mechanism of inorganic reactions and their stoicheochemistry.</u>
<u>CO-4</u>	<u>To understand basic principle of organic chemistry</u>

COURSE OUTCOME FOR B.Sc.-I Semester (Chemistry)

Name of the Course (Paper):-

Course (Paper) Code- CHVAC-01

<u>S.N.</u>	<u>Details of CO</u>
<u>CO-1</u>	<u>To introduce the student about dairy products, beverages, food additives, artificial sweetners, flavor, food moordants, paint pigments, dyes etc</u>
<u>CO-2</u>	<u>To make aware the students about air pollutin, hydrological cycle, composition of soil, fertilizers etc</u>
<u>CO-3</u>	<u>To introduce the students about carbohydrate, vitamins drugs.</u>
<u>CO-4</u>	<u>To introduce students about concept of thermodynamics used in day to day life.</u>

COURSE OUTCOME FOR B.Sc.-II Semester (Chemistry)

Name of the Course (Paper)-Fundamental Chemistry 02

Course (Paper) Code- CHSC-02

<u>S.N.</u>	<u>Details of CO</u>
<u>CO-1</u>	<u>To understand different acid base theories and solvent system</u>
<u>CO-2</u>	<u>To learn the preparation bonding and reactions of c-c sigma and pi bonded compounds</u>
<u>CO-3</u>	<u>To understand the concept and chemistry of aromatic compounds and their reactions</u>
<u>CO-4</u>	<u>To learn the basic concepts of various states of matter and understand the basic concepts of surface chemistry and chemical kinetics</u>

COURSE OUTCOME FOR B.Sc.-II/IV/VI Semester (Chemistry)

Name of the Course (Paper)-SEC

Course (Paper) Code- CHSEC-01

<u>S.N.</u>	<u>Details of CO</u>
<u>CO-1</u>	Understand needs, goals and obstacles in green chemistry
<u>CO-2</u>	Understand the application of twelve principles of chemistry
<u>CO-3</u>	Design green solvents and green reactions
<u>CO-4</u>	To interpret and execute case study, survey and projects on green chemistry

COURSE OUTCOME FOR B.Sc.-III Semester (Chemistry)

Name of the Course (Paper)-Inorganic and Physical Chemistry -I

Course (Paper) Code- CHSC-03

<u>S.N.</u>	<u>Details of CO</u>
<u>CO-1</u>	Understand fundamental chemical concepts of transition elements and their application.
<u>CO-2</u>	Master the principles of coordination Chemistry
<u>CO-3</u>	Grasp the core principles of thermodynamics and apply them to various phenomena
<u>CO-4</u>	Explore the world of electrochemistry and its applications.

COURSE OUTCOME FOR B.Sc.-IV Semester (Chemistry)

Name of the Course (Paper)-Organic and Physical Chemistry -I

Course (Paper) Code- CHSC-04

<u>S.N.</u>	<u>Details of CO</u>
<u>CO-1</u>	Master the synthesis, Properties and reactivity of various functional groups and apply this knowledge to understand their significance in organic chemistry.
<u>CO-2</u>	Employ the principles of Chemical and ionic equilibria, their influence factors and applications
<u>CO-3</u>	Interpret Phase diagrams for one and two components systems, determine degrees of freedom and identify the triple point.
<u>CO-4</u>	Master the principles and application of liquid liquid mixtures, Raoult's Law, Henry's law, and Nernst distribution law.

COURSE OUTCOME FOR B.Sc.-V Semester (Chemistry)

Name of the Course (Paper)-Organic and Inorganic Chemistry -I

Course (Paper) Code- CHSC-05

<u>S.N.</u>	<u>Details of CO</u>
<u>CO-1</u>	Explore role of nitrogen in organic chemistry by studying N containing compounds and heterocycles.
<u>CO-2</u>	Unravel Molecular structures using techniques like rotational vibrational and raman spectroscopy
<u>CO-3</u>	Demystify bonding in transition metal complexed, including stability lability and magnetic properties.
<u>CO-4</u>	Understand the importance of organometallic and inorganic compounds in biological systems.

COURSE OUTCOME FOR B.Sc.-VI Semester (Chemistry)

Name of the Course (Paper)-Organic and Physical Chemistry -II

Course (Paper) Code- CHSC-06

<u>S.N.</u>	<u>Details of CO</u>
<u>CO-1</u>	To understand role of Quantum mechanics in chemistry
<u>CO-2</u>	To know the organic compound in biological system
<u>CO-3</u>	To know the polymer in chemistry their preparation and application of polymer
<u>CO-4</u>	To learn the techniques for studying the structure of chemical molecule.

COURSE OUTCOME FOR B.Sc.-VII Semester (Chemistry)

Name of the Course (Paper)- INORGANIC AND PHYSICAL CHEMISTRY-II

Course (Paper) Code- CHSC-07

<u>S.N.</u>	<u>Details of CO</u>
<u>CO-1</u>	Study the formation, stability and electronic spectra of complexes
<u>CO-2</u>	Analyze the chemistry of metal carbonyls and metal nitrosyls
<u>CO-3</u>	Solve the Schrodinger equation for the hydrogen atom and utilize Huckel theory for conjugated Systems
<u>CO-4</u>	Analyze collision theory and transition state theory to understand chemical reactions.

COURSE OUTCOME FOR B.Sc.-VIII Semester (Chemistry)

Name of the Course (Paper)-ORGANIC AND INORGANIC CHEMISTRY II

Course (Paper) Code- CHSC-08

<u>S.N.</u>	<u>Details of CO</u>
<u>CO-1</u>	Master mechanisms, kinetics, mechanism and reactivity factors in organic Chemistry
<u>CO-2</u>	Understand and predict regioselectivity in aromatic electrophilic substitution reactions
<u>CO-3</u>	Utilize symmetry and group theory to analyze molecules and predict spectroscopic features.
<u>CO-4</u>	Understand and classify supramolecular Chemistry

COURSE OUTCOME FOR B.Sc.-III Semester (Chemistry)

Name of the Course (Paper)- Basic Analytical Chemistry

Course (Paper) Code- CHSE-01T

<u>S.N.</u>	<u>Details of CO</u>
<u>CO-1</u>	To understand the sampling, Procedure and treatment of sample
<u>CO-2</u>	To understand the analytical techniques for analysis in different types of chemical reaction
<u>CO-3</u>	To understand the Volumetric analysis Technique
<u>CO-4</u>	To understand the gravimetric analysis technique

COURSE OUTCOME FOR B.Sc.-III Semester (Chemistry)

Name of the Course (Paper) - Basic Analytical Chemistry

Course (Paper) Code - CHSE-01

<u>S.N.</u>	<u>Details of CO</u>
<u>CO-1</u>	To understand the sampling, procedure and treatment of sampal.
<u>CO-2</u>	To understand the analytical techniques for analysis in different types of chemical reactions
<u>CO-3</u>	To understand the volumetric analysis technique
<u>CO-4</u>	To understand the gravimetric analysis technique

COURSE OUTCOME FOR B.Sc.-IV Semester (Chemistry)

Name of the Course (Paper) - Environmental Chemistry

Course (Paper) Code - CHSE-02

<u>S.N.</u>	<u>Details of CO</u>
<u>CO-1</u>	To explore the environment through the lens of chemistry, examining interactions between the biosphere, lithosphere and atmosphere
<u>CO-2</u>	To delve into ecological principles, biogeochemical cycles and the challenges of the thermal and noise pollution
<u>CO-3</u>	To develop concept of water quality, water management and the multifaceted issue of water pollution take center stage.
<u>CO-4</u>	To investigate air pollution, soil composition, radiation chemistry and potential solutions for environmental challenges.

COURSE OUTCOME FOR B.Sc.-V Semester (Chemistry)

Name of the Course (Paper) - Dyes & Polymer Chemistry

Course (Paper) Code - CHSE-03

<u>S.N.</u>	<u>Details of CO</u>
<u>CO-1</u>	To know about various synthetic dyes and their structures.
<u>CO-2</u>	To understand classification, colour and chemical constitution of dye
<u>CO-3</u>	To know about various types of polymeric materials

<u>CO-4</u>	To understand preparation, structure, properties and application of polymers.
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COURSE OUTCOME FOR B.Sc.-VI Semester (Chemistry)

Name of the Course (Paper)-Heterocyclic Chemistry

Course (Paper) Code- CHSE-04

<u>S.N.</u>	<u>Details of CO</u>
<u>CO-1</u>	To apply Hantzsch Widman and IUPAC nomenclature for Heterocyclic Compounds
<u>CO-2</u>	To understand the concept of tautomerism in aromatic heterocycles to analyze the influence of strain on small ring heterocycles.
<u>CO-3</u>	To learn the synthesis and reactions of 3, 4,5 and 6 membered heterocycles with one heteroatom
<u>CO-4</u>	To learn the synthesis of important bicyclic heterocycles(indole, quinoline and isoquinoline) and learn the mechanism of reaction.

COURSE OUTCOME FOR B.Sc.-VII Semester (Chemistry)

Name of the Course (Paper)- Photochemistry and pericyclic Reaction

Course (Paper) Code- CHSE-05

<u>S.N.</u>	<u>Details of CO</u>
<u>CO-1</u>	To study the photochemical reaction and pericyclic reaction
<u>CO-2</u>	To gain knowledge about mechanism of thermal reaction
<u>CO-3</u>	To learn the mechanism of light induced reaction
<u>CO-4</u>	To understand the difference between light and thermal reaction.

COURSE OUTCOME FOR B.Sc.-VII Semester (Chemistry)

Name of the Course (Paper)- Spectroscopy I

Course (Paper) Code- CHSE-06

<u>S.N.</u>	<u>Details of CO</u>
<u>CO-1</u>	To equip students with advanced spectroscopic techniques for in depth molecular analysis
<u>CO-2</u>	To enable classification, isotope effect analysis and vibrational energy calculations of techniques like microwave and infrared spectroscopy
<u>CO-3</u>	To provide detailed information on structure, environment and electronic configuration on advanced methods like NMR, NQR and PES.
<u>CO-4</u>	To allow students to probe Chemical and surface properties of materials using photoacoustic spectroscopy.

COURSE OUTCOME FOR B.Sc.-VII Semester (Chemistry)

Name of the Course (Paper)-Chemical Kinetics and Nuclear Chemistry

Course (Paper) Code- CHSE-07

<u>S.N.</u>	<u>Details of CO</u>
<u>CO-1</u>	To understand types/kinetics of composite reactions and elucidate mechanism and derive rate laws, calculate various activation parameters and predict feasibility of reaction of its basis.
<u>CO-2</u>	To explain the concept of acidity functions and illustrate the various rate correlations, isotopic effect and solvent effect.
<u>CO-3</u>	To discuss various aspects of nuclear models, nuclear reactions and nuclear reactors.
<u>CO-4</u>	To understand the principles of radioactivity, its measurements, counters, apply in determining reaction mechanism, structures, physiochemical properties and in chemical analysis

COURSE OUTCOME FOR B.Sc.-VII Semester (Chemistry)

Name of the Course (Paper)-

Course (Paper) Code- CHSE-08

<u>S.N.</u>	<u>Details of CO</u>
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<u>CO-1</u>	Understand electrochemistry fundamentals, explain laws and industrial applications
<u>CO-2</u>	To explain and derive equations related to the theory of strong electrolytes Debye Huckel Laws and its extensions, Structure and models and thermodynamics of electrified interfaces, polarography and its application.
<u>CO-3</u>	To describe and interpret various absorption isotherms and its application, concept and various aspects of micelles.
<u>CO-4</u>	To understand the fundamentals, types and applications of surfactants and micelles.

COURSE OUTCOME FOR B.Sc.-VII Semester (Chemistry)

Name of the Course (Paper):-

Course (Paper) Code- CHSE-09

<u>S.N.</u>	<u>Details of CO</u>
<u>CO-1</u>	To interpret the vibrational spectra of molecules to identify functional group and understand their bonding modes.
<u>CO-2</u>	To gain proficiency in analyzing NMR and ESR spectra to determine the structure and electronic environment of atoms within a molecule
<u>CO-3</u>	To equip students with the ability to utilize Mossbauer spectroscopy for the characterization of iron containing materials, analyzing their oxidative state and local environment.
<u>CO-4</u>	To develop the skills to interpret mass spectra, including fragmentation patterns, to determine the molecular weight and structure of unknown compound.

COURSE OUTCOME FOR B.Sc.-VII Semester (Chemistry)

Name of the Course (Paper):-

Course (Paper) Code- CHSE-10

<u>S.N.</u>	<u>Details of CO</u>
<u>CO-1</u>	Understand the origin and nature of defects and crystals, electrically conducting solids and superconductors.
<u>CO-2</u>	Apply the concepts of band theory to explain the behavior of conductors.
<u>CO-3</u>	To compare bulk and nanomaterials, explain the role of size, shape and properties and uses of nanomaterials, describe various methods for synthesis

	of nanoparticles
CO-4	To describe the instrumentation / principles of various characterization techniques like EDAX, FTIR, SEM, TEM etc and its application.

COURSE OUTCOME FOR B.Sc.-VII Semester (Chemistry)

Name of the Course (Paper)-Natural Products and medicinal Chemistry

Course (Paper) Code- CHSE-11

<u>S.N.</u>	<u>Details of CO</u>
<u>CO-1</u>	To study the occurrence, types, structure and analysis methods of terpene and alkaloids and their biosynthesis
<u>CO-2</u>	To grasp key concepts of medicinal chemistry and drug terminology and learn importance of drug structure of activity
<u>CO-3</u>	To explore specific drug classes and study the medicinal value of natural products

COURSE OUTCOME FOR B.Sc.-VII Semester (Chemistry)

Name of the Course (Paper)- Instrumental methods of Analysis

Course (Paper) Code- CHSE-12

<u>S.N.</u>	<u>Details of CO</u>
<u>CO-1</u>	Understand the importance of sampling and sample treatment
<u>CO-2</u>	Select appropriate sampling technique based on sample and target analyte
<u>CO-3</u>	Explain Principle and instrumentation involved in AAS
<u>CO-4</u>	Deduce the necessity to remove interferences in AAS and methods involved

COURSE OUTCOME FOR B.Sc.-Semester (Chemistry)

Name of the Course (Paper)- Chemistry Lab Course 01

Course (Paper) Code- CHSC -01/P

<u>S.N.</u>	<u>Details of CO</u>
<u>CO-1</u>	Analyse mixture of cations and anions using H ₂ S or other methods.
<u>CO-2</u>	Perform titrimetric analysis
<u>CO-3</u>	Estimate the concentration of acetic acid in vinegar / alkali contents in anta

	acids and free alkalis in soap and detergents.
CO-4	Utilize complexometric titrations for calcium water hardness. Fe 2+/Fe3+ and Cu2+

COURSE OUTCOME FOR B.Sc.-Semester (Chemistry)

Name of the Course (Paper)- CHEMISTRY Lab course II

Course (Paper) Code- CHSC -02/P

<u>S.N.</u>	<u>Details of CO</u>
<u>CO-1</u>	Demonstrating and using common glassware for accurate measurements
<u>CO-2</u>	Studying the functional group analysis organic compound
<u>CO-3</u>	Determining melting point to assess compound purity and employing distillation and sublimation techniques to establish boiling points
<u>CO-4</u>	Equipping with essential skills in measuring liquid surface tension and solution viscosity

COURSE OUTCOME FOR B.Sc.-Semester (Chemistry)

Name of the Course (Paper)- Chemistry Lab Course III

Course (Paper) Code- CHSC -03/P

<u>S.N.</u>	<u>Details of CO</u>
<u>CO-1</u>	Understand the principle of determining transition temperature of hydrated or other allotropic salts
<u>CO-2</u>	Employ the principle of determination of solubility of a given salt at different temperature
<u>CO-3</u>	Apply Born Haber cycle to determine enthalpy and lattice energy
<u>CO-4</u>	Determine strength of an acid, ionization constant of weak acid and solubility product by conductometric titration

COURSE OUTCOME FOR B.Sc.-Semester (Chemistry)

Name of the Course (Paper)- Chemistry Lab Course IV

Course (Paper) Code- CHSC -04/P

<u>S.N.</u>	<u>Details of CO</u>
<u>CO-1</u>	Understands the fundamental of organic compounds analysis including preparation of sodium extract and detection of elements
<u>CO-2</u>	Identify functional group and prepare derivatives
<u>CO-3</u>	Determine the PH of various samples like water/acid/base/soil
<u>CO-4</u>	Apply the concepts of phase equilibria to determine critical solution

COURSE OUTCOME FOR B.Sc.-Semester (Chemistry)

Name of the Course (Paper)- Chemistry Lab Course V

Course (Paper) Code- CHSC -05/P

<u>S.N.</u>	<u>Details of CO</u>
<u>CO-1</u>	To apply the knowledge of qualitative and quantitative estimations in real sample analysis
<u>CO-2</u>	To get hands on practice and develop skill for synthesis of various inorganic compounds
<u>CO-3</u>	To learn the concept of gravimetric estimation

COURSE OUTCOME FOR B.Sc.-Semester (Chemistry)

Name of the Course (Paper)- Chemistry Lab Course VI

Course (Paper) Code- CHSC -06/P

<u>S.N.</u>	<u>Details of CO</u>
<u>CO-1</u>	To understand the basic principles involved in separation and identification of organic compound
<u>CO-2</u>	To apply the knowledge of qualitative and quantitative estimation in real water analysis
<u>CO-3</u>	To learn the synthesis of organic compounds

COURSE OUTCOME FOR B.Sc.-Semester (Chemistry)

Name of the Course (Paper)- Chemistry Lab Course VII

Course (Paper) Code- CHSC -01/P

<u>S.N.</u>	<u>Details of CO</u>
<u>CO-1</u>	Master separating and estimating acidic and basic radicals in inorganic mixtures
<u>CO-2</u>	Apply qualitative and quantitative analysis skills to real samples.
<u>CO-3</u>	Gain hands on experience synthesizing inorganic compounds and identify them using spectral analysis

COURSE OUTCOME FOR B.Sc.-Semester (Chemistry)

Name of the Course (Paper)- Chemistry Lab Course VIII

Course (Paper) Code- CHSC -08/P

<u>S.N.</u>	<u>Details of CO</u>
<u>CO-1</u>	Master mechanisms kinetics, mechanism and reactivity factors in organic chemistry
<u>CO-2</u>	Understand and predict regioselectivity in aromatic electrophilic substitutions
<u>CO-3</u>	Understand and classify supramolecular chemistry