



**Programme Outcomes (PO),
Programme Specific Outcomes (PSO)
and Course Outcomes (CO)**

Department of Chemistry



Govt. College Jhandutta Distt. Bilaspur (H.P.)

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Programme Outcomes (PO), Programme Specific Outcomes (PSO) and Course Outcomes (CO) for B. Sc. With Chemistry

Department of Chemistry	After successful completion of three-year degree program in Chemistry a student should be able to;
Programme Outcomes (PO) B.Sc. (Chemistry)	<p>PO-1: Demonstrate various chemical phenomenons occurring in our day to day life with logical and critical thinking.</p> <p>PO-2: Explain comprehensive knowledge and understanding of both theoretical and applied chemistry knowledge in various fields of interest like Analytical Chemistry, Physical Chemistry, Inorganic Chemistry, Organic Chemistry, Material Chemistry, etc.</p> <p>PO-3: Demonstrate Broad and balance knowledge in chemistry along with understanding of key chemical concepts, principles and theories.</p> <p>PO-4: Undertake further higher studies in chemistry and related areas or multidisciplinary areas that can be helpful for self-employment/entrepreneurship.</p>
Programme Specific Outcomes (PSO) B.Sc. (Chemistry)	<p>PSO-1: Develop skill and ability to got expertise in solving both theoretical and applied chemistry problems.</p> <p>PSO-2: To know about wide applications of chemistry in Pharma industries, research labs, chemical plants etc.</p> <p>PSO-3: Learn about basic experiments of chemistry lab like titration, analysis and other techniques like chromatography, colorimeter, pH meter etc.</p> <p>PSO-4: Gain the knowledge of various spectroscopic techniques i.e. UV-visible, FTIR, NMR (^1H and ^{13}C) and their importance in structure determination of unknown compound.</p> <p>PSO-5: Go for higher study in Chemistry through JAM (Joint admission Test for M.Sc.) through various IITs & NITs and various State/Central universities.</p>
COURSE OUTCOMES (CO): CHEMISTRY	
CLASS: B.Sc. I, II, III	
Course	Course outcomes

<p>CHEM101TH: ATOMIC STRUCTURE, BONDING, GENERAL ORGANIC CHEMISTRY & ALIPHATIC HYDROCARBONS</p>	<p>After studying the course, students will able to:</p> <ol style="list-style-type: none"> 1. To learn about atomic theory and its evolution. 2. To learn scientific theory of atoms, concept of wave function. 3. To predict the atomic structure, chemical bonding, and molecular geometry based on accepted models. 4. To learn bonding between atoms, molecules, interaction and energetics 5. Explain hybridization and shapes of atomic, molecular orbitals, bond parameters, bond-distances and energies, Differentiation between shape and geometry of molecules. 6. Explain stereochemistry of organic molecules – conformation and configuration, asymmetric molecules and nomenclature. 7. Understand concept of aromaticity, mechanism of aromatic reactions. 8. Understanding hybridization and geometry of atoms, identifying chiral centers, enantiomers and diastereomers 9. Define electrophile, nucleophiles, free radicals, electronegativity, resonance, hyperconjugation and intermediates along the reaction pathways.
<p>CHEM102TH: STATES OF MATTER, CHEMICAL KINETICS & FUNCTIONAL ORGANIC CHEMISTRY</p>	<p>After studying the course, students will familiarization with:</p> <ol style="list-style-type: none"> 1. Various states of matter and physical properties of each state of matter and laws related to describe the states. 2. Kinetic model of gas and its properties. 3. Maxwell distribution, mean-free path, kinetic energies. 4. Behavior of real gases, its deviation from ideal behavior, equation of state, isotherm, and law of corresponding states. 5. Liquid state and its physical properties related to temperature and pressure variation. 6. Familiarization about classes of organic compounds and their methods of preparation. 7. Basic uses of reaction mechanisms 8. Preparation and uses of various classes of organic compounds. 9. Organic chemistry reactions and reaction mechanisms.
<p>CHEM201TH: SOLUTIONS, PHASE EQUILIBRIUM, CONDUCTANCE, ELECTROCHEMISTRY & ORGANIC CHEMISTRY</p>	<p>After studying the course, students will familiarization with:</p> <ol style="list-style-type: none"> 1. Understanding phases, components, Gibb's phase rule and its applications. 2. Construction of phase diagram of different systems and the application of phase diagram. 3. Electrolytes and electrolytic dissociation, salt hydrolysis and acid-base equilibria 4. Ionic equilibria – electrolyte, ionization, dissociation. 5. Salt hydrolysis (acid-base hydrolysis) and its application in chemistry.

CHEM202TH: CHEMISTRY OF MAIN GROUP ELEMENTS, CHEMICAL ENERGETICS AND EQUILIBRIA	<p>The student will be able to understand and apply:</p> <ol style="list-style-type: none"> 1. Chemistry of s and p-block elements & their properties 2. Chemistry of noble gases & their properties 3. Inorganic polymers and their uses. 4. Understanding redox reactions in hydrometallurgy processes. 5. Structure, bonding of s and p block materials and their oxides/compounds. 6. Understanding chemistry of boron compounds and their structures. 7. Chemistry of noble gases and their compounds; application of VSEPR theory in explaining structure and bonding.
CHEM203TH: BASIC ANALYTICAL CHEMISTRY	<p>After studying this skill enhancement course, student will be able to:</p> <ol style="list-style-type: none"> 1. Understand the basics of analytical chemistry 2. Undertake Soil analysis, water analysis and various aspects food analysis 3. Undertake analysis using chromatographic techniques 4. Undertake the analysis of cosmetics like deodorants and antiperspirant, talcum powder etc
CHEM204TH: FUEL CHEMISTRY & CHEMISTRY OF COSMETICS & PERFUMES	<p>After studying the course, students will familiarization with:</p> <ol style="list-style-type: none"> 1. Energy sources (renewable and non-renewable) 2. Coal in various industries, composition and processing 3. Petroleum and Petrochemical Industry 4. Classification of lubricants, lubricating oils, Properties of lubricants 5. preparation and uses of the following: Hair dye, hair spray, shampoo, suntan lotions etc. 6. Essential oils and their importance in cosmetic industries
CHEM301TH: POLYNUCLEAR HYDROCARBONS, DYES, HETEROCYCLIC COMPOUNDS AND SPECTROSCOPY	<p>After studying the course, students will familiarization with:</p> <ol style="list-style-type: none"> 1. Polynuclear hydrocarbons, aromatic character and their reactions. 2. Heterocyclic compounds and their reactions. 3. Understanding the structure and their mechanism of reactions of selected polynuclear hydrocarbons. 4. Understanding the structure, mechanism of reactions of selected heterocyclic compounds 5. To study UV, IR and NMR spectroscopy. 6. Identify structure of compound by spectroscopic methods
CHEM304TH: CHEMISTRY OF TRANSITION AND INNER TRANSITION ELEMENTS, COORDINATION CHEMISTRY, ORGANOMETALLICS, ACIDS & BASES	<p>The students will be able to understand the:</p> <ol style="list-style-type: none"> 1. Coordination compounds: nomenclature, theories, d-orbital splitting in complexes, Jahn Teller distortion, chelation and stability of chelate complexes. 2. Transition metals, its stability, colour, oxidation states and stability of Transition metal complexes. 3. Lanthanides and Actinides: separation, colour, spectra and magnetic behavior, lanthanide and actinide contraction 4. Understanding the nomenclature of coordination compounds/complexes, Molecular orbital theory, d-orbital splitting in tetrahedral, octahedral, square planar complexes, chelate effects. 5. Understanding the transition metals stability in reactions, origin of colour and magnetic properties. 6. Know the shapes of d-orbital and degeneracy of d-orbital

<p>CHEM307TH: CHEMICAL TECHNOLOGY & SOCIETY AND BUSINESS SKILLS FOR CHEMISTRY</p>	<p>On completion of this course, the students will be able to:</p> <ol style="list-style-type: none"> 1. Various processes and instruments used in chemical technology such as distillation, solvent extraction, extruders, pumps, mills, emulgators. 2. Scaling up operations in chemical industry. 3. Introduction to clean technology. 4. Exploration of societal and technological issues from a chemical perspective 5. Key business concepts: Business plans, market need 6. Current challenges and opportunities for the chemistry-using industries 7. Concept of intellectual property rights and patents.
<p>CHEM308TH: PESTICIDE CHEMISTRY & PHARMACEUTICAL CHEMISTRY</p>	<p>The students will have the knowledge of:</p> <ol style="list-style-type: none"> 1. Various pesticides, insecticides, fungicides and herbicides. 2. Synthesis of DDT, Malathion, Parathion, Carbofuran. 3. Uses of Drugs & Pharmaceuticals Drug discovery 4. Synthesis of the drugs like analgesics agents, antipyretic agents, anti-inflammatory agents. 5. Production of Ethyl alcohol and citric acid, Penicillin, Cephalosporin, Chloromycetin and Streptomycin, Lysine, Glutamic acid, Vitamin B2, Vitamin B12 and Vitamin C.