Office of the Principal
GOVERNMET COLLEGE – GURUR
(Formerly Known as Government Naveen College Gurur)
DISTRICT – BALOD (C.G.), INDIA
Ph No : 07749 – 265461 Email : gururgovernmentcollege@gmail.com Website : gcgurur.org.in

Department of Chemistry

Chemistry Course Learning Outcomes in B.Sc. (PCM) & B.Sc. (CBZ)

Title of the Paper	Inorganic Chemistry – I
Course Code/ Paper code	
Credits	02
Total Hours	36

Course learning outcome:

After going through the course, the student should be able to

- Atomic theory and its evolution.
- Learning scientific theory of atoms, concept of wave function.
- Elements in periodic table; physical and chemical characteristics, periodicity.
- To predict the atomic structure, chemical bonding, and molecular geometry based on accepted models.
- To understand atomic theory of matter, composition of atom.
- Identity of given element, relative size, charges of proton, neutron and electrons, and their assembly to form different atoms.
- Defining isotopes, isobar and isotone.
- Physical and chemical characteristics of elements in various groups and periods according to ionic size, charge, etc. and position in periodic table.
- Characterize bonding between atoms, molecules, interaction and energetics (ii) hybridization and shapes of atomic, molecular orbitals, bond parameters, bond- distances and energies.
- Valence bond theory incorporating concepts of hybridization predicting geometry of molecules.
- Importance of hydrogen bonding, metallic bonding.

Title of the Paper	Organic Chemistry – I
Course Code/ Paper code	
Credits	02
Total Hours	36

Course learning outcome:

After going through the course, the student should be able to

- Basic of organic molecules, structure, bonding, reactivity and reaction mechanisms.
- Stereochemistry of organic molecules – conformation and configuration, asymmetric molecules and nomenclature.
- Aromatic compounds and aromaticity, mechanism of aromatic reactions.
- Understanding hybridization and geometry of atoms, 3-D structure of organic molecules, identifying chiral centers.
- Reactivity, stability of organic molecules, structure, stereochemistry.
- Electrophile, nucleophiles, free radicals, electronegativity, resonance, and intermediates along the reaction pathways.
- Mechanism of organic reactions (effect of nucleophile/leaving group, solvent), substitution *vs.* elimination.

Title of the Paper	Physical Chemistry – I
Course Code/ Paper code	
Credits	02
Total Hours	36

Course learning outcome:

After going through the course, the student should be able to

- Familiarization with various states of matter.
- Physical properties of each state of matter and laws related to describe the states.
- Calculation of lattice parameters.
- Electrolytes and electrolytic dissociation, salt hydrolysis and acid-base equilibria.
- Understanding Kinetic model of gas and its properties.

- Maxwell distribution, mean-free path, kinetic energies.
- Behavior of real gases, its deviation from ideal behavior, equation of state, isotherm, and law of corresponding states.
- Liquid state and its physical properties related to temperature and pressure variation.
- Properties of liquid as solvent for various household and commercial uses.
- Solids, lattice parameters – its calculation, application of symmetry, solid characteristics of simple salts.
- Ionic equilibria – electrolyte, ionization, dissociation.
- Salt hydrolysis (acid-base hydrolysis) and its application in chemistry.

Title of the Paper	Inorganic Chemistry – II
Course Code/ Paper code	
Credits	02
Total Hours	36

Course learning outcome:

After going through the course, the student should be able to

- Oxidation-Reductions and their use in metallurgy.
- Chemistry of s and p-block elements.
- Chemistry of noble gases.
- Inorganic polymers and their use.
- Understanding redox reactions in hydrometallurgy processes.
- Structure, bonding of s and p block materials and their oxides/compounds.
- Understanding chemistry of boron compounds and their structures.
- Chemistry of noble gases and their compounds; application of VSEPR theory in explaining structure and bonding.
- Understanding chemistry of inorganic polymers, their structures and uses.

Title of the Paper	Organic Chemistry – II
Course Code/ Paper code	
Credits	02
Total Hours	36

Course learning outcome:

After going through the course, the student should be able to

- Familiarization about classes of organic compounds and their methods of preparation.
- Basic uses of reaction mechanisms.
- Name reactions, uses of various reagents and the mechanism of their action.
- Preparation and uses of various classes of organic compounds.
- Organometallic compounds and their uses.
- Organic chemistry reactions and reaction mechanisms.
- Use of reagents in various organic transformation reactions.

Title of the Paper	Physical Chemistry – II
Course Code/ Paper code	
Credits	02
Total Hours	36

Course learning outcome:

After going through the course, the student should be able to

- Laws of thermodynamics and concepts.
- Partial molar quantities and its attributes.
- Dilute solution and its properties.
- Understanding the concept of system, variables, heat, work, and laws of thermodynamics.
- Understanding the concept of heat of reactions and use of equations in calculations of bond energy, enthalpy, etc.
- Understanding the concept of entropy; reversible, irreversible processes. Calculation of entropy using 3nd law of thermodynamics.
- Understanding the application of thermodynamics: Joule Thompson effects, partial molar quantities.
- Understanding theories/thermodynamics of dilute solutions.

Title of the Paper	Inorganic Chemistry – III
Course Code/ Paper code	
Credits	02
Total Hours	36

Course learning outcome:

After going through the course, the student should be able to

- Coordination compounds – its nomenclature, theories, d-orbital splitting in complexes, chelate.
- Transition metals, its stability, color, oxidation states and complexes.
- Lanthanides, Actinides – separation, color, spectra and magnetic behavior
- Bioinorganic chemistry – metal ions in biological system, its toxicity; hemoglobin.
- Understanding the nomenclature of coordination compounds/complexes, Molecular orbital theory, d-orbital splitting in tetrahedral, octahedral, square planar complexes, chelate effects.
- Understanding the transition metals stability in reactions, origin of colour and magnetic properties.
- Understanding the separation of Lanthanoids and Actinoids, its color, spectra and magnetic behavior.
- Understanding the bioinorganic chemistry of metals in biological systems.
- Hemoglobin and its importance in biological systems.

Title of the Paper	Organic Chemistry – III
Course Code/ Paper code	
Credits	02
Total Hours	36

Course learning outcome:

After going through the course, the student should be able to

- Nitrogen containing functional groups and their reactions.
- Familiarization with polynuclear hydrocarbons and their reactions.
- Heterocyclic compounds and their reactions.
- Alkaloids and Terpenes.
- Understanding reactions and reaction mechanism of nitrogen containing functional groups.
- Understanding the reactions and mechanisms of diazonium compounds.
- Understanding the structure and their mechanism of reactions of selected polynuclear hydrocarbons.
- Understanding the structure, mechanism of reactions of selected heterocyclic compounds.

- Classification, structure, mechanism of reactions of few selected alkaloids and terpenes.

Title of the Paper	Physical Chemistry – III
Course Code/ Paper code	
Credits	02
Total Hours	36

Course learning outcome:

After going through the course, the student should be able to

- Phases, components, Gibbs phase rule, Phase diagrams and applications.
- Chemical kinetics: type of reactions, determination of rate, theories of reaction rate, steady state approximation.
- Catalyst – mechanism, acid base catalysis, enzyme catalysis.
- Adsorption isotherms.
- Understanding phases, components, Gibb's phase rule and its applications, construction of phase diagram of different systems, the application of phase diagram.
- Understanding the basics of chemical kinetics: determination of order, molecularity, and understanding theories of reaction rates, determination of rate of opposing/parallel/chain reactions with suitable examples, application of steady state kinetics, Steady-state approximation.
- Catalyst – mechanism of catalytic action, enzyme catalysis.
- Langmuir, Freundlich – adsorption isotherms, significance, multilayer adsorption – theory and significance.

========

H. O. D.
Department of Chemistry
Government College Gurur
Dist. Balod (C.G.)

Co-ordinator
IQAC
Government College Gurur
Dist. Balod (C.G.)

Principal
Govt. College, Gurur
Dist. - Balod (C.G.)