A.T.V.V. Mandal's

B. D. Kale Mahavidyalaya, Ghodegaon

DEPARTMENT OF CHEMISTRY

Course Outcomes

S.Y.B.Sc. (Chemistry)

Sr.No.	Class	Course	Course Outcome
	S. Y. Semester III	CHE-201-T MJ : Physical Chemistry-I	CO1: Remember definitions, laws, and formulas related to reaction kinetics, thermodynamics, electrolytic conductance, and phase equilibrium. CO2: Understand the rate laws of third-order reactions, thermodynamic concepts like entropy and free energy, ionic conductance, and phase diagrams. CO3: Solve numerical problems using the Arrhenius equation, entropy changes, conductance laws, phase rule etc . CO4: Compare methods for determining reaction order, thermodynamic processes, and conductance and phase systems. CO5: Assess reaction mechanisms, thermodynamic feasibility, and conductance behavior of electrolytes. CO6: Summarize the effect of temperature on reaction rate, phase stability, or ion mobility in solution.
		CHE-202-T MJ : Inorganic Chemistry-I	CO1: Learn key terms and concepts such as types of ligands, isomerism, hybridization, d-orbital shapes, and theories like VBT and CFT. CO2: Explain the principles of coordination bonding, types of isomerism, and the structural implications of VBT and CFT in coordination compounds CO3: Apply VBT and CFT to predict geometry, magnetic properties, and hybridization of coordination complexes CO4: Compare types of isomerism and interpret orbital splitting patterns in octahedral, tetrahedral, and square planar complexes. CO5: Determine the magnetic moment, ligand field strength and geometry of complexes.

			CO6: Summarize the coordination compounds according to their geometry, spin state, and ligand environment using CFT and VBT concepts.
		CHE-203-P MJP : Chemistry Practical- III	CO1: Know the experimental procedures, formulas, and theoretical principles related to kinetics, thermodynamics, conductance, and coordination chemistry. CO2: Understand the principles behind rate laws, enthalpy changes, conductometric titrations, colorimetry, and coordination complex formation. CO3: Perform laboratory experiments to determine reaction order, heat changes, cell constants, and synthesize coordination compounds. CO4: Analyze the reaction rates, calculate thermodynamic parameters, determine ligand ratios, and analyze chromatographic separations. CO5: Evaluate the accuracy of results by comparing with theoretical values, validate Beer's Law, and evaluate coordination complex properties like color and magnetism. CO6: Design experiments for synthesis, analysis, and characterization of coordination compounds.
		CHE-221-T VSC: Industrial Chemistry-I	CO1: Remember the definitions, industrial processes, pollution norms, raw materials, and key chemical manufacturing techniques used in large- and small-scale industries. CO2: Understand the principles behind unit operations, pollution control technologies, green chemistry approaches, and the roles of industrial and plant chemists. CO3:Apply knowledge of industrial processes like distillation, crystallization, and polymerization to real-world chemical production systems CO4: Compare unit operations and unit processes, renewable vs. non-renewable resources, and heavy vs. fine chemical manufacturing. CO5: Assess the environmental impact of industrial processes by interpreting pollution control standards (CPCB, EPA) and recommending improvements through green chemistry. CO6: Design sustainable chemical production workflows that incorporate energy-efficient unit

			operations and eco-friendly purification methods for fine chemicals.
		CHE-201-T IKS: Ancient Indian Chemistry	CO1: Know the Indian Knowledge System and its significance in the protection of traditional knowledge. CO2: Understand the need of the Indian Knowledge System (IKS) and significance of the ancient Indian Chemistry. CO3: Relate the various concepts of ancient chemistry with the concepts of modern Chemistry. CO4: Organize the contributions made by the ancient Indians in the field of Science and related concepts. CO5: Evaluate the contribution of Indians in the development of chemistry. CO6: Outline the chemistry heritage of ancient India.
		CHE-231 FP : Field Project	CO1: Learn the fundamental chemistry concepts to real-world environmental and community CO2: Understand the appropriate methodologies for collecting chemical and environmental data through fieldwork. CO3: Apply the chemistry concepts to real life problems or environments CO4: Analyse the experimental or observational data to derive meaningful conclusions about local chemical or environmental conditions. CO5: Evaluate local problems through a scientific lens and suggest chemistry-based solutions or awareness strategies. CO6: Prepare a scientific report and presentations based on their findings.
	S. Y. Semester IV	CHE-251-T MJ : Organic Chemistry-I	CO1: Recall basic concepts of acidity, basicity, reaction mechanisms, oxidation, reduction, and stereochemistry. CO2: Explain the mechanisms of organic reactions involving halides, oxidizing and reducing agents,

			and stereochemical outcomes in cyclic systems. CO3:Apply knowledge of acidity, basicity, nucleophilic substitution, oxidation, reduction, and stereochemical principles to predict the behavior of organic compounds. CO4: Analyze reaction mechanisms, reactivity trends of halogenated hydrocarbons, and stability of substituted cyclohexane conformations. CO5: Evaluate the choice of reagents and reaction conditions for achieving specific transformations in organic synthesis. CO6: Develop synthetic strategies using organic reactions and stereochemical concepts.
		CHE-252-T MJ : Analytical Chemistry-I	CO1: Learn concepts, definitions, and reagents used in volumetric analysis, colorimetry, chromatography, and solvent extraction. CO2: Explain the principles of titrations, Beer-Lambert law, chromatographic separation, and solvent extraction mechanisms. CO3: Use standard analytical techniques to determine concentrations of substances through titration, colorimetry, chromatography, and extraction. CO4: Interpret titration curves, calibration plots, chromatograms, and extraction efficiencies to assess analytical results. CO5: Compare the accuracy, precision, and suitability of analytical techniques like redox titrations vs. complexometry or paper chromatography vs. TLC. CO6: Perform an analytical procedure of titrimetric, colorimetric, or extraction methods to determine unknown concentrations in a sample.
		CHE-253-P MJP : Chemistry Practical – IV	CO1: Remember the fundamental concepts, reagents, and functional group tests used in organic estimation, preparation, and volumetric analysis. CO2: Explain the principles behind organic reactions, separation techniques, and titration methods used in qualitative and quantitative analysis.

			CO3: Perform organic synthesis, separation of binary mixtures, and estimations using volumetric and chromatographic methods in laboratory settings. CO4: Differentiate between organic functional groups in mixtures, interpret chromatograms, and analyze titration results to identify and quantify substances. CO5: Assess the purity and identity of synthesized or separated compounds using melting point, TLC, and confirmatory tests; validate volumetric results through standardization. CO6: Execute multi-step analytical procedures combining organic preparation, separation, and titration.
		CHE-271-P VSC: Industrial Chemistry Practical-I	CO1: Learn basic concepts of industrial preparations, qualitative estimations, and pollution control techniques used in chemical laboratories and industries CO2: Explain the principles behind organic synthesis, water hardness estimation, and environmental sampling methods including their industrial significance. CO3: Demonstrate the preparation of industrially important compounds like paracetamol and dyes, and perform titrimetric analysis for water and soil quality assessment. CO4: Compare experimental results to evaluate chemical purity, water salinity, and environmental parameters using field and lab-based methods. CO5: Evaluate the efficiency of pollution indicators, safety protocols, and synthetic routes based on lab outcomes and industrial practices. CO6: Design and present a project/report synthesizing learnings from industrial visits and practical's to propose improvements in industrial or environmental chemical practices.
		SEC-201- P CHE (B) : Clinical Chemistry Practical	CO1: Recall the normal biochemical composition of urine and blood plasma, and the procedures used for their analysis. CO2: Explain the principles and significance of

			biochemical tests such as colorimetry and titrimetry used in clinical diagnosis. CO3: Perform standard biochemical tests on simulated blood and urine samples to analyze compounds such as creatinine, vitamin C, glucose, and cholesterol. CO4: Differentiate between normal and abnormal biochemical test results to identify potential physiological conditions. CO5: Assess the accuracy and reliability of biochemical test methods and their relevance in clinical diagnosis. CO6:Design a complete workflow for biochemical analysis of a clinical sample, including sample preparation, test selection, execution, and reporting.
		CHE-281 CEP: Community Engagement Project (CEP)	CO1: Identify the chemical aspects of local community issues such as water quality, waste management, or household chemical safety. CO2: Understand the societal issues and can provide a scientific solution CO3: Apply chemistry knowledge to promote awareness about safe chemical practices, sustainability, and green alternatives in daily life. CO4: Analyse the effectiveness of community engagement activities based on feedback and participation data. CO5: Assess the societal issues through the group-based outreach and community interactions. CO6: Plan chemistry-related awareness activities such as demonstrations, campaigns, or surveys in schools or local communities.

Principal
B.D.Kale Mahavidyalaya
Ghodegaon,Dist.Pune