CHEMISTRY

COURSE OUTCOMES

SEMESTER I

Name of the Course: Chemistry -1			
Sem-1	**Credits:4**	**Course Code: CHE 103T**	**Year/Group: BtBC,BtBC, CNDBcC HPW: 4**
Course Outcomes			
CO1	Describe the structure, bonding, and classification of compounds of p-block elements including interhalogens, oxides, and xenon compounds.		
CO2	Apply structural theory (inductive effect, resonance, hyperconjugation) to predict the reactivity and stability of organic intermediates.		
CO3	Solve numerical and theoretical problems in chemical kinetics, including first- and second-order reactions and activation energy.		
CO4	Distinguish types of isomerism, identify stereoisomers using various projection formulas, and explain surface chemistry and colloid behavior.		

Name of the Course: Lab course- I			
	Credits:	**Course Code:** CHE103P	**Year/Group: BtBC,BtBC, CNDBcC HPW: 2**
Course Outcomes			
CO1	Perform acid-base and redox titrations accurately to estimate carbonate, bicarbonate, Fe^{2+}, and Cu^{2+} in various samples.		
CO2	Estimate metal ions like Mg^{2+} and Cu^{2+} using complexometric titrations and interpret the results with standardization.		

SEMESTER II

Name of the Course: Chemistry-II			
Sem:2	**Credits:4**	**Course Code:** CHE 203T	**Year/Group: BtBC,BtBC, CNDBcC HPW: 4**
Course Outcomes			
CO1	Understand and compare the electronic configuration, oxidation states, color, and magnetic behavior of d- and f-block elements and explain their complexation and catalytic activities**.**		
CO2	Apply concepts of organic reaction mechanisms to predict the products, stereochemistry, and reactivity of halogen compounds, hydroxy and ether derivatives, and carbonyl compounds.		
CO3	Analyze electrochemical data to determine conductivity, dissociation, transport number, EMF, and pH**,** using principles of Kohlrausch's law, Nernst equation, and conductometric/potentiometric methods.		
CO4	Evaluate molecular structures using MO theory, identify types of stereoisomerism, and solve numerical problems based on colligative properties to determine molecular weights and predict solution behaviors.		

Name of the Course: Lab Course -II			
Sem:2	**Credits:2**	**Course Code:** CHE203P	**Year/Group: BtBC,BtBC, CNDBcC HPW: 2**
Course Outcomes			
CO1	Apply systematic group analysis procedures to detect and confirm the presence of common anions and cations in inorganic mixtures.		
CO2	Analyze results and interpret confirmatory tests to distinguish between simple and interfering ions with accuracy and precision.		

SEMESTER III

Name of the Course: Chemistry-III			
Sem: 3	**Credits: 4**	**Course Code:CHE 303T**	**Year/Group: BtMC,BtBC, CNDBCC H PW: 4**
Course Outcomes			
CO1	Understand the electronic configuration, properties of f block elements, theories of coordination compounds and reactions of organo metallic compounds		
CO2	Analyse the synthetic applications of carboxylic acids, nitro compounds, amino acids, cyanides, and isocyanides to design and conduct experiments		
CO3	Understand the fundamental principles of thermodynamics, including thermodynamic functions, processes, and laws		
CO4	Analyse the types of analytical data, reaction mechanisms of carbanions, and phase equilibria of one-component and two-component systems		

Name of the Course: Lab Course-III			
Sem: 3	**Credits: 1**	**Course Code:** CHE303P	**Year/Group: BtMC,BtBC, CNDBCC HPW: 3**
Course Outcomes			
CO1	Learn the skills of organic synthesis.		
CO2	Apply the techniques of Thin Layer Chromatography (TLC).		

Name of the Course: Skill Enhancement Course III (SEC-III) (2 credits) Materials and their applications			
Sem:3	**Credits: 2**	**Course Code:** SEC 2A	**Year/Group: BtMC,BtBC, CNDBCC,MGC,MZCHPW: 2**
Course Outcomes			
S4CO1	Understand the essential components of a comprehensive laboratory Safety Program		
S4CO2	Understanding laboratory safety rules and to improve the skills in the preparation of laboratory reagents.		

SEMESTER IV

Name of the Course: Chemistry -IV			
Sem: 4	**Credits: 4**	**Course Code:** CHE 403T	**Year/Group: BtMC,BtBC, CNDBCC HPW: 4**
Course Outcomes			
CO1	Acquire knowledge of crystal field theory, hard-soft acid-base concept, and transition metal complexes		
CO2	Understand the structure, properties, and classification of biomolecules, and heterocyclic compounds		
CO3	Explain the fundamental principles of chemical kinetics and laws of photochemistry.		
CO4	Interpret the role of carbanions in reaction mechanisms and to study colloids and adsorption.		

Name of the Course: Lab course -IV			
Sem: 4	**Credits: 1**	**Course Code:CHE403P**	**Year/Group: BtMC,BtBC, CNDBCC HPW: 3**
Course Outcomes			
CO1	Acquire knowledge of qualitative analysis of organic compounds		
CO2	Apply the principle of organic synthesis		

Name of the Course: Skill Enhancement Course III (SEC-III) (2 credits) Materials and their applications			
Sem:4	**Credits: 2**	**Course Code:** SEC 4A	**Year/Group: BtMC,BtBC, CNDBCC,MGC,MZC HPW: 2**
Course Outcomes			
S4CO1	Acquire knowledge of different types of materials, their properties and applications**.**		
S4CO2	Gain knowledge of types and application of polymers.		

Name of the Course: Skill Enhancement Course- IV (SEC- IV) Chemistry of Cosmetics and Food Processing			
Sem: 4	**Credits: 2**	**Course Code:** SEC 4B	**Year/Group: BtMC,BtBC, CNDBCC HPW: 2**
Course Outcomes			
S4-CO1	To Understand the preparation of Cosmetics and Perfumes and the essential oils used in the process		
S4-CO2	To have a basic idea of Food processing and Food Adulterants		

SEMESTER V

Name of the Course: Chemistry - Semester V Generic Elective (GE) Course (For B.Sc , non Chemistry/B.A/B.Com Students			
Sem: 5	**Credits: 4**	**Course Code:CHE GE** S5	**Year/Group: BtMC,BtBC, CNDBCC,MGC,MZC HPW: 4**
Course Outcomes			
CO1	Analyze and evaluate the chemical composition, preparation methods, applications, benefits, and potential risks of various cosmetic products, including hair care, skin care,and oral care items, as well as essential oils, deodorants, and antiperspirants.		
CO2	Analyze the principles and methods of food processing, adulteration, packaging, and labelling, and evaluate their impact on nutrition and food quality.		
CO3	Explain the pharmacological principles, classification, formulation, and characteristics ofvarious drugs and pharmaceuticals, and identify their applications, advantages, and disadvantages		
CO4	Explain the classification, mechanisms of action, and therapeutic applications of various pharmacological agents, including chemotherapeutic agents, pharmacodynamic agents, and drugs acting on metabolic processes.		

Name of the Course: Chemistry -V Semester-V, Paper-V Discipline Specific Elective- A Spectroscopy and Chromatography			
Sem: 5	**Credits: 4**	**Course Code:** CHE 503T	**Year/Group: BtMC,BtBC, CNDBCC, MGC,MZC HPW: 4**
Course Outcomes			
CO1	Explain the principles and applications of, rotational spectroscopy, and infrared spectroscopy in determining molecular structure, bond length, and force constant.		
CO2	Analyze and interpret the principles and applications of Proton Magnetic Resonance (PMR) Spectroscopy and Mass Spectrometry		
CO3	Understand the principles, methods, and applications of solvent extraction, thin layer chromatography (TLC), and paper chromatography		

Name of the Course: Chemistry -V Semester-V, Paper- V Discipline Specific Elective-B Metallurgy, Dyes and Catalysis			
Sem: 5	**Credits: 4**	**Course Code:** CHE 503T	**Year/Group: BtMC,BtBC, CNDBCC,MGC,MZC** **HPW: 4**
Course Outcomes			
CO1	Understand hydrometallurgy, electrometallurgy, refining, and non-ferrous metal production.		
CO2	Understand the definition, classification, structures, synthesis, and applications of natural and synthetic dyes.		
CO3	Understand catalysis principles and mechanisms		
CO4	Understand catalysis principles and mechanisms		

Name of the Course: Chemistry -V Paper V Experiments in Physical Chemistry-I			
Sem: 4	**Credits: 1**	**Course Code: CHE 503P**	**Year/Group: BtMC,BtBC, CNDBCC,MGC,MZC** **HPW: 3**
Course Outcomes			
CO1	Analyze and interpret experimental data.		
CO2	Apply theoretical concepts to design and conduct experiments		

SEMESTER VI

Name of the Course: Chemistry -VISemester-VI, Paper- VI Discipline Specific Elective-A Medicinal Chemistry			
Sem:6	**Credits:4**	**Course Code:** CHE 603T	**Year/Group: BtMC,BtBC, CNDBCC,MGC,MZC** **HPW: 4**
Course Outcomes			
CO1	Define and classify key terms and concepts in medicinal chemistry, including diseases,drugs, and pharmacological principles Explain the principles of ADME		
CO2	Analyze the mechanisms of enzyme action and receptor interactions, and evaluate theimportance of enzyme inhibitors and structure-activity relationships in drug design.		
CO3	Synthesize knowledge of the synthesis, therapeutic activity, and mechanisms of action of vagarious, including chemotherapeutics, metabolic disorder treatments, and nervous system agents.		
CO4	Explain the role and regulation of molecular messengers, including hormones and neurotransmitters, and identify the sources, deficiency disorders, and remedies of essentialvitamins and micronutrients.		

Name of the Course: Chemistry –VI Semester-VI, Paper- VI Discipline Specific Elective-B Agricultural and Fuel Chemistry			
Sem: 6	**Credits: 4**	**Course Code:** CHE 603T	**Year/Group: BtMC,BtBC, CNDBCC,MGC,MZC** **HPW: 4**
Course Outcomes			
CO1	Classify and explain the properties, synthesis, and uses of various types of pesticides, includingtheir toxicity, environmental impact, and potential alternatives		
CO2	Explain the classification, composition, and uses of various types of fertilizers, including nitrogenous, phosphate, potassium, complex, and biofertilizers, and evaluate their impact on plantgrowth and soil health		
CO3	Compare and contrast different energy sources, including renewable and non-renewable fuels, and explain the properties, uses, and conversion processes of coal		
CO4	Classify and explain the properties, applications, and uses of various petroleum products, petrochemicals, lubricants, and non-petroleum fuels.		

Name of the Course: Chemistry -VI Paper VI Experiments in Physical Chemistry-II			
Sem: 4	**Credits: 1**	**Course Code: CHE 603P**	**Year/Group: BtMC,BtBC, CNDBCC,MGC,MZCHPW: 2**
Course Outcomes			
CO1	Design and conduct experiments to determine the specific reaction rates of catalyzed reactions, including hydrolysis and decomposition reactions		
CO2	Apply potentiometric and pH metric techniques to determine various electrochemical properties, including redox potentials, concentrations, and acid dissociation constants.		