Program outcomes, program specific outcomes and course outcomes of Chemistry Department

Subject specific outcomes	Provide a broad foundation in chemistry that stresses scientific reasoning and Analytical problem solving with a molecular perspective. Achieve the skills required to succeed in graduate school, the chemical industry and professional school. Get exposures of a breadth of experimental techniques using modern instrumentation? Understand the importance of the Periodic Table of the Elements, how it came to be, and its role in organizing chemical information. Understand the interdisciplinary nature of chemistry and to integrate knowledge of mathematics, physics and other disciplines to a wide variety of chemical problems. Learn the laboratory skills needed to design, safely and interpret chemical research. Acquire a foundation of chemistry of sufficient breadth and the depth to enable them to understand and critically interpret the primary chemical literature. Develop the ability to communicate scientific information and research results in written and oral formats. Learn professionalism, including the ability to work in teams and apply basic ethical principles
Program specific outcomes	• After completion of degree, students gained the theoretical as well as practical knowledge of handling chemicals. Also they expand the knowledge available opportunities related to chemistry in the government services through public service commission particularly in the field of food safety, health inspector, pharmacist etc**.** Afford a broad foundation in chemistry that stresses scientific reasoning and analytical problem solving with a molecular perspective. Achieve the skills required to succeed in graduate school, professional school and the chemical industry like cement industries, agro product, Paint industries, Rubber industries, Petrochemical industries, Food processing industries, Fertilizer industries etc. Got exposures of a breadth of experimental techniques using modern instrumentation. Understand the importance of the elements in the periodic table including their physical and chemical nature and role in the daily life. Understand the concept of chemistry to inter relate and interact to the other subject like mathematics, physics, biological science etc. Learn the laboratory skills and safely to transfer and interpret knowledge entirely in the working environment.

GONDWANA UNIVERSITY, GADCHIROLI
CBCS COURSES IN B. SC. CHEMISTRY

SEMESTER - I

PAPER CODE	CORE PAPER	TITLE OF THE PAPER	CREDIT
USCCHT01	I	INORGANIC CHEMISTRY	02
USCCHT02	II	ORGANIC CHEMISTRY	02
USCCHP01	PRACTICAL	CORE COURSE I & II	02

SEMESTER - II

PAPER CODE	CORE PAPER	TITLE OF THE PAPER	CREDIT
USCCHT03	III	ORGANIC CHEMISTRY	02
USCCHT04	IV	PHYSICAL CHEMISTRY	02
USCCHP02	PRACTICAL	CORE COURSE III & IV	02

SEMESTER- III

PAPER CODE	CORE PAPER	TITLE OF THE PAPER	CREDIT	SEC
USCCHT05	V	INORGANIC CHEMISTRY	02	ENVIRONMENTAL STUDIES
USCCHT06	VI	PHYSICAL CHEMISTRY	02	
USCCHP03	PRACTICAL	CORE COURSE V & VI	02	

SEMESTER- IV

PAPER CODE	CORE PAPER	TITLE OF THE PAPER	CREDIT	SEC
USCCHT07	VII	INORGANIC CHEMISTRY	02	ENVIRONMENTAL STUDIES
USCCHT08	VIII	ORGANIC CHEMISTRY	02	
USCCHP04	PRACTICAL	CORE COURSE VII & VIII	02	

SEMESTER -V

PAPER CODE	CORE PAPER	TITLE OF THE PAPER	CREDIT
USCDSECHT09	IX	ORGANIC CHEMISTRY	02
USCDSECHT010	X	PHYSICAL CHEMISTRY	02
USCDSECHP05/06	PRACTICAL	DSE COURSE 05/06	02
SEC	SEC II	CHEMISTRY OF COSMETICS & PERFUMES	01

SEMESTER -VI

PAPER CODE	CORE PAPER	TITLE OF THE PAPER	CREDIT
USCDSECHT013	XI	INORGANIC CHEMISTRY	02
USCDSECHT014	XII	PHYSICAL CHEMISTRY	02
USCDSECHP09/10	PRACTICAL	DSE COURSE 09/10	02
SEC	SEC III	PESTICIDE CHEMISTRY	01

Scheme of Marks of Theory and Practical

Semester	Paper	Title	Marks		Total
			Theory	Internal Assessment	
I	I	INORGANIC CHEMISTRY	50	10	150
	II	ORGANIC CHEMISTRY	50	10	
	Practical	Core course I and II practical based on paper I and paper II	30	-	
II	I	ORGANIC CHEMISTRY	50	10	150
	II	PHYSICAL CHEMISTRY	50	10	
	Practical	Core course iii & iv Practicals based on paper III and paper IV	30	-	
III	I	INORGANIC CHEMISTRY	50	10	150
		PHYSICAL CHEMISTRY			
		INORGANIC CHEMISTRY			
	II	PHYSICAL CHEMISTRY	50	10	
	Practical	CORE COURSE V & VI	30	-	
IV	I	INORGANIC CHEMISTRY	50	10	150
	II	ORGANIC CHEMISTRY	50	10	
	Practical	CORE COURSE VII & VIII	30	-	
V	I	INORGANIC CHEMISTRY	50	10	150
	II	ORGANIC CHEMISTRY	50	10	

	Practical	CORE COURSE	30	-	
	SEC	CHEMISTRY OF COSMETICS & PERFUMES	30		
VI	I	INORGANIC CHEMISTRY	50	10	150
	II	ORGANIC CHEMISTRY	50	10	
	Practical	CORE COURSE	30	-	
	SEC	PESTICIDE CHEMISTRY	30		

COURSE SPECIFIC OUT COMES

B.SC. I SEMESTER – I

PAPER CODE	CORE PAPER	TITLE OF THE PAPER	COURSE SPECIFIC OUTCOMES
USCCHT 01	I	INORGANIC CHEMISTRY	• Know the discovery of electron, proton and neutron and their characteristics. • To understand the nature electromagnetic radiation and quantum theory. • To understand the periodic law and significance of atomic no and electronic configuration as the basic for periodic classification. • To classify elements into a s,p,d and f blocks and learn their main characteristics. • To understand the concept of organic reactions mechanism. • To recognize the type of organic reactions • To describe the term – paramagnetic, diamagnetic and ferromagnetic
USCCHT02	II	ORGANIC CHEMISTRY	• Discuss electrophilic and nucleophilic in aromatic compounds. • Difference between activating and deactivating groups. • Correlate the preparation of types of phenol. • Explain the mechanism of phenol. • Study about the chemistry of Aromatic aldehyde, aromatic ketones and acids. • Study about the chemistry of aromatic sulphonic acid and Nitro compounds. • Calculate the saponification, Iodine and acid value for acids and fats.
USCCHP01	PRACTICAL	CORE COURSE I & II	• Practical on identification of functional groups

B.SC. I SEMESTER –II

PAPER CODE	CORE PAPER	TITLE OF THE PAPER	COURSE SPECIFIC OUTCOMES AT THE END OF COURSE STUDENTS WILL ABLE TO UNDERSTAND
USCCHT03	III	ORGANIC CHEMISTRY	• Discuss electrophilic and nucleophilic in aromatic compounds. • Difference between activating and deactivating groups. • Correlate the preparation of types of CARBOHYDRATE • Study about the chemistry of Aromatic aldehyde, aromatic ketones and acids. • Study about the chemistry of aromatic sulphonic acid and Nitro compounds. • Calculate the saponification, Iodine and acid value for acids and fats.
USCCHT04	IV	PHYSICAL CHEMISTRY	• To apply gas laws in various real life situations. • To explain the behavior of real and ideal gas. • To differentiate between gaseous state and vapour. • To explain the kinetic theory of gases. • Explain the properties of liquids. • To describe condition required for liquefaction of gases. • To write the expressions for equilibrium constants. • To study the laws of equilibrium. • To understand various types of colloids and its applications
USCCHP02	PRACTICAL	CORE COURSE III & IV	• Purification of an impure organic compound by crystallization • Synthesis, Recrystallisation and determination of melting point

			and calculation of quantitative yields of organic compounds. • Physical chemistry experiments based on Thermochemistry, Equilibria and Liquid state.

B. Sc. II Semester III

PAPER CODE	CORE PAPER	TITLE OF THE PAPER	COURSE SPECIFIC OUTCOMES AT THE END OF COURSE STUDENTS WILL ABLE TO UNDERSTAND
USCCHT 05	V	INORGANIC CHEMISTRY	• To explain the formation of different types of bonding. • To explain the concepts of geometry of simple molecules. • To identify mode of occurrence and describe isotopes of hydrogen. • To understand the preparation and uses of ozone and hydrogen peroxide. • To explain the term mineral ore concentration, roasting etc., • To explain why specific reducing agents are used for the reduction purposes. • To apply the thermodynamic concepts like heat energy and entropy to the principles of extraction of Arsenic, Antimony and Bismuth. • To understand the principles of oxidation and reduction as applied to the extraction procedure. • To know the types of nuclear reactions and its applications
USCCHT 06	VI	PHYSICAL CHEMISTRY	• To differentiate between gaseous state and vapour. • To explain the kinetic theory of gases. • Explain the properties of liquids. • To describe condition required for liquefaction of gases. • To write the expressions for equilibrium constants. • To study the laws of equilibrium. • To understand various types of colloids and its applications

USCCHP 03	PRAC TICAL	CORE COURSE V & VI	• Semi micro qualitative analysis of inorganic salt mixture containing two acidic radicals of different group and two basic radicals of same or different groups • Physical chemistry experiments based on Nernst distribution, Phase equilibria, Chemical kinetics and Collegative properties.

B. Sc. II Semester IV

PAPER CODE	**CORE PAPER**	**TITLE OF THE PAPER**	**COURSE SPECIFIC OUTCOMES AT THE END OF COURSE STUDENTS WILL ABLE TO UNDERSTAND**
USCCHT 07	VII	INORGANIC CHEMISTRY	• To explain the formation of different types of bonding. • To explain the concepts of geometry of simple molecules. • To identify mode of occurrence and describe isotopes of hydrogen. • To understand the preparation and uses of ozone and hydrogen peroxide. • To explain the term mineral ore concentration, roasting etc., • To explain why specific reducing agents are used for the reduction purposes. • To apply the thermodynamic concepts like heat energy and entropy to the principles of extraction of Arsenic, Antimony and Bismuth. • To understand the principles of oxidation and reduction as applied to the extraction procedure. • To know the types of nuclear reactions and its applications
USCCHT 08	VIII	ORGANIC CHEMISTRY	• To learn about various methods of preparation and applications of hydrocarbons. • To understand the mechanism of alkyl halides. • To estimate no of hydroxyl groups and alkoxy group in alcohol and ether.

			• To understand the term rectified spirit and methylated spirit. • To explain the mechanism of few selected reactions of aldehyde and ketones. • To describe the methods of preparation and reactions of acids. • To know about the concepts of stereochemistry. • To understand the difference between configuration and conformation. • To describe the structure and properties of various types of carbohydrates
USCCHP 04	PRAC TICAL	CORE COURSE VII & VIII	• Practical on Gravimetric Analysis • Identification of Organic Compounds along with Preparation of its Derivatives

B. Sc. III Semester V

PAPER CODE	**CORE PAPER**	**TITLE OF THE PAPER**	**COURSE SPECIFIC OUTCOMES AT THE END OF COURSE STUDENTS WILL ABLE TO UNDERSTAND**
USCDSECHT09	IX	ORGANIC CHEMISTRY	• To learn about various methods of preparation and applications of hydrocarbons. • To understand the mechanism of alkyl halides. • To estimate no of hydroxyl groups and alkoxy group in alcohol and ether. • To understand the term rectified spirit and methylated spirit. • To explain the mechanism of few selected reactions of aldehyde and ketones. • To describe the methods of preparation and reactions of acids. • To know about the concepts of stereochemistry. • To understand the difference between configuration and

			conformation. • To describe the structure and properties of various types of carbohydrates • To understand Concept of Green Chem. & Technology for Sustainable Development
USCDSECHT010	X	PHYSICAL CHEMISTRY	• Gives knowledge Electrochemistry & Its Applications • Introduction of Quantum Chemistry • Deep Study of Colligative Properties of Solution • Gives knowledge of Magnetic Properties of Compounds
USCDSECHP05/06	PRACTICAL	DSE COURSE 05/06	• Gives knowledge of Separation & Identification of Organic Compounds • Provides knowledge of Estimation of Glucose & Amides Along With Preparation of Aspirin & Paracetamol • Provides knowledge of Different Counductometric & Potentiometric Analysis
SEC	SEC II	CHEMISTRY OF COSMETICS & PERFUMES	• Provides knowledge of Preparation of Talcum Powder, Shampoo, Enamel, Face Cream & Nail Polish

B.Sc. III Semester VI

PAPER CODE	**CORE PAPER**	**TITLE OF THE PAPER**	**COURSE SPECIFIC OUTCOMES AT THE END OF COURSE STUDENTS WILL ABLE TO UNDERSTAND**
USCDSECHT013	XI	INORGANIC CHEMISTRY	• To understand the key features of coordination compounds, including: - the variety of structures. - oxidation numbers and electronic configurations. -

			coordination numbers. - ligands, chelates. - bonding, stability of complexes. • To be able to use Crystal Field Theory to understand the magnetic properties (and in simple terms the colour) of coordination compounds. • To be able to describe the shapes and structures of coordination complexes with coordination numbers ranging from 4 to 12. • To be able to describe the stability of metal complexes by the use of formation constants and to calculate thermodynamic parameters from them. • To be able to recognize the types of isomers in coordination compounds. • To be able to name coordination compounds and to be able to draw the structure based on its name. • To become familiar with some applications of coordination compounds. • To study about the concepts of Biochemistry and material chemistry
USCDSECHT014	XII	PHYSICAL CHEMISTRY	• To impart the students the knowledge on phase rule, its applications and alloys, their importance, composition and applications. • To demonstrate the application of spectroscopic and electrochemical methods in mechanistic studies of photochemical reactions • To make students familiar with a broad variety of photochemical systems and their applications.

			• To make students familiar with Surface Chem. & Nuclear Chemistry
USCDSECHP09/10	PRACTICAL	DSE COURSE 09/10	• The course provides wide knowledge about Instumentation in Photochemistry • Gains skill to Use of Abbes Refractometer ,Paper Chromatography • Practice of Analysis of Soil. • Understanding of Laboratory safety measures, laboratory good practices.
SEC	SEC III	PESTICIDE CHEMISTRY	• Students gain knowledge about various tools & techniques used in Pestiside Analysis and gives them insight about their uses.