

GOVERNMENT COLLEGE FOR WOMEN(AUTONOMOUS), MANDYA

Department of Chemistry

Academic Year-2020-21

(Revised CBCS Scheme 2018-19 Onwards)

Criterion –II- Teaching - Learning and Evaluation

2.6 Teaching – Learning Process

2.6. Student Performance and Learning Outcomes

2.6.1 Programme outcomes, programme Specific outcomes and Course outcomes for all programs offered by the institution are stated and displayed in website of the institution (to provide web link)

**Department of Chemistry (Common for both PCM and CBZ : UG-Programme)
2018-19 onwards (CBCS-Scheme)**

Programme Outcomes (POs): Chemistry- Common for both PCM and CBZ:

The B.Sc(CBZ + PCM) programme enables students to:

1. Demonstrate an understanding of core theories and principles of chemistry in both aspects of physical, chemical and biological backgrounds.
2. Understand the interrelations between the different branches of chemistry and chemical sciences
3. Develop skills necessary to plan, design the experiments to adopt and test based on theoretical knowledge reliably.
4. Develop skills to conduct and demonstrate and verify the experiments taking respective precautionary measures.
5. Develop ability to logically analyse data and solve problems systematically and objectively.
6. Acquire ability to choice of desired subject for higher studies and to face competitive exams for social services.
7. Contribute the knowledge base of science by knowledge and its logic application to society by scientific temperament.

PROGRAMME SPECIFIC OUTCOMES (PSOs): Chemistry

The undergraduate course in chemistry would provide the opportunity to the students:

1. To enhance their knowledge by boost chemical concept, principle and theories in various branches of chemistry.
2. By acquiring consolidate chemical knowledge to conduct experiments in labs.
3. To develop the ability to apply knowledge towards current issues.

4. To enhance their academic and personal qualities and transferable skills to develop as responsible citizens.
5. To excel in the competencies and develop values required for leadership to serve a rapidly evolving global community.
6. To emphasize the various branches of chemistry for pursuing interdisciplinary and multidisciplinary areas in higher education.
7. To emphasize the importance of various branches of chemistry for sustaining the existing chemical application industries/small scale industries and establishing new ones to create job opportunities at all levels of employment.

Course outcomes (COs): Chemistry (CBCS)-2018 onwards- Common for both PCM and CBZ:

Class	semester	course	Title of the course	Course Outcomes(Cos)
I BSc	I SEM	DSC-2A (Theory)	Chemistry-1	<p>Unit-1: Inorganic chemistry</p> <ul style="list-style-type: none"> • In this unit introduce the basic concept of atomic structure, atomic spectra, electronic arrangement in their respective shell based on quantum chemistry. • Students would learn about the electronic arrangement in a atom their principle and stability of atom. • Understand the periodic arrangement on the basis of their periodic properties such as radius ionization enthalpy, Electron gain enthalpy, electronegativity. <p>Unit-2: Organic chemistry:</p> <ul style="list-style-type: none"> • Student would understand the basic concept on different types of chemical reaction from reaction intermediates and their stability • The course build the student get an idea about types of chemical reaction and preparation of basic compounds such as alkanes, alkenes, alkynes and dienes. • Develops the practical skill and acquire knowledge about to demonstrate the chemical reactions <p>Unit-3: Physical chemistry:</p> <ul style="list-style-type: none"> • Learn the concept of indicator their pH and their usages based on principle and theories.

				<ul style="list-style-type: none"> • Understands the concept of miscibility of Liquid mixture their combination, types and separation of liquid mixture. • Student gain a knowledge of distribution mixture based on Nernst distribution Law and its application <p>Unit-4: General chemistry:</p> <ul style="list-style-type: none"> • Student would learn about the contamination in the compounds and their purification process • Understand about the concept of various molecules formation with different stoichiometry. • Develops application organic chemistry in various fields in our daily life and to naming the chemical compound those were bifunctional, aliphatic and aromatic compounds
		DSC-2A (Practical)	Practical-1	<ul style="list-style-type: none"> • Students would perform basic experiments related to volumetric analysis such as acid-base, oxidation-reduction, iodometric titration and complexometric titration.
				<p>Unit-1: Inorganic Chemistry</p> <ul style="list-style-type: none"> • The course gives an idea for chemical bonding and molecular structure • They learn about different types of chemical bonding and their stability and their molecular properties • Understand the concept of molecular orbital approach,(VB and MO) <p>Unit-2: Organic Chemistry:</p> <ul style="list-style-type: none"> • Understanding the students about the stability of cycloalkanes • Students learn about aromatic compound undergone electrophilic substitution reaction and hydrogenation of aromatic compounds • Understand preparation of Biphenyls, alkenyl Benzenes and Alkyl halides .Nature of the reaction condition of Alkyl halide reaction. <p>Unit-3: Physical chemistry:</p> <ul style="list-style-type: none"> • Understand the concept of reaction mechanism concept using chemical

	II SEM	DSC-2B (Theory)	Chemistry-II	<p>kinetic and their stoichiometric studies.</p> <ul style="list-style-type: none"> • Learn about kinetics theories and application of reaction at lower concentration explaining some reactions. • Reactivity in dilute concentrations supported by theories such as Debye-Huckel , Onsager and Debye-Huckel Limiting equations for activity coefficients <p>Unit-4: General chemistry:</p> <ul style="list-style-type: none"> • Student understand the concept of catalyst activity • Understand the concept of polymers and their preparation and their molecular determination • Learn the concept usage of organic reagents in inorganic analysis and preparation, application of soaps, detergents and waxes.
		DSC-2B (practical)	Practical-II	<ul style="list-style-type: none"> • Student would perform systematic analysis of organic compounds and organic preparation and their purification.
	III Sem	DSC-2C	Chemistry-III	<p>Unit-1: Inorganic chemistry:</p> <ul style="list-style-type: none"> • This course introduce the concept of transition elements reaction and their spectral and chemical properties • Understand difference between transition and inner transition elements and their physical and chemical properties • Learn about organometallic compounds and their structural difference and applications <p>Unit-II: Organic chemistry:</p> <ul style="list-style-type: none"> • In this unit student would understand concept of different types of alcohols and their reaction rates and aromatic alcohols like phenols involved in chemical reaction. • Student would learn about synthesis of ethers and examples of crown ether and their application • Epoxides synthesis and preparation chemical compounds using carbonyl compounds

II B.Sc.				<p>Unit-III : physical chemistry:</p> <ul style="list-style-type: none"> • Student understand the application laws of thermodynamics and concept of entropy. • Apply the free energy relationship physical changes in the matter and calculation of free energies. • In this unit students learn about the solids and their crystalline structures and calculation of bond distances using X-ray studies. And application of liquid crystals. <p>Unit-IV: General chemistry</p> <ul style="list-style-type: none"> • Student learn about the separation technique and develop practical skills by different types of chromatographic techniques(CC,GC,HPLC) • Application of Energy sources like dry cell and lead storage battery, conventional method of energy storage such as solar cell and fuel cell. • Student would understand world of nanotechnology and their synthesis and application of carbon nanotubes and nanowires. • Students enhance the knowledge about the reaction of amino acids and proteins on biological applications
		DSC-2C (Practical)	Practical -III	<ul style="list-style-type: none"> • Student would analyse the elements of anions and cation present in the inorganic compounds, through performing the experiment.
	IV Sem	DSC-2D	Chemistry-IV	<p>Unit-1: Inorganic chemistry:</p> <ul style="list-style-type: none"> • In this unit student learn coordination compounds and stability factors and application in cancer therapy. • Isomerism in coordination complexes and formation of these compounds on the basis of valence bond theory. • Student would understands the limitation and further implications of theories such as crystal field and ligand field theory. <p>Unit-2: Organic chemistry:</p> <ul style="list-style-type: none"> • Student would understand the concept of molecular formula and structural formula by stereochemistry and geometrical

				<p>isomerisation.</p> <ul style="list-style-type: none"> • Learn about carbohydrate their classification and reactions and their ring size • Understand the concept of structural elucidation of Disaccharide and polysaccharides and formula. <p>Unit-3: physical chemistry:</p> <ul style="list-style-type: none"> • Elementary concept of quantum mechanics on radiations and significance of operators and values and functions • Student understand about the activity of ions and conversion chemical energy to electrical energy or work. • Develop the application of conductance measurements using conductometers and their principles <p>Unit-4: General chemistry:</p> <ul style="list-style-type: none"> • Knowledge about the stability of inorganic compounds based on HSAB concept. • Purification of element form which converted in to easily dissociated compound in lab condition by different types of gravimetical analysis. • Chemical composition of dyes and their structural elucidation. , understand the concept behind the physical properties and chemical constitution of compounds.
		DSC-2D-Practical	Practical-IV	<ul style="list-style-type: none"> • Students would conduct the experiments based of physical properties of density, viscosity and surface tension measurements. Study the reaction of kinetics by application of theoretical logics. Estimated the organic compound in the given substances.
				<p>Unit-1: Inorganic chemistry:</p> <ul style="list-style-type: none"> • Student would understand manufacturing about the daily usage raw materials such as glass, ceramic and cement. • They learn about fertilizers to vital our soil by knowing fertilizers composition and its manufacturing. • They gain the knowledge about protective reagents paints and its treatment on the surfaces and different composition and

III B.Sc	V Sem	DSE-2A	Chemistry-5	<p>usages.</p> <p>Unit-2:Organic chemistry:</p> <ul style="list-style-type: none"> • Know about terpenes and their isolation and structural elucidation of citral. • Introductory of Heterocyclic compounds their synthesis and chemical reactions. Alkaloids Physiological importance. • Understand about the vital our body with vitamins and Hormones production, their structure and their importance. To overcome infected diseases they would gain knowledge of drugs. <p>Unit-3: Physical chemistry:</p> <ul style="list-style-type: none"> • Student would learn and adopt Spectrophotometric techniques to get amount of dissolved elements present in the sample easily recognisable. Laws of photochemistry and its applications .and difference between photo physical and photochemical process. • Knew about radiation sources and calculation of dose radiation emission from the element and also knowledge about application of radioactive element. • Detection of chemical compound using spectroscopic techniques and its applications of IR and Raman spectra
		DSE-2A Practical	Practical-V	<ul style="list-style-type: none"> • Students would perform the gravimetric extraction of elements and ore analysis by theoretical logics.
		SEC-1.1	Basic analytical chemistry	<ul style="list-style-type: none"> • This course enhance the application of analytical technique towards the determination of elements and purification of sample • Knowledge about minimization error • They learn about the knowledge of detection of contamination in our environmental resources from scientific temperament. • They conduct the separation techniques based on application of theoretical knowledge.

		SEC 1.2	Fuel chemistry	<ul style="list-style-type: none"> • This course enhances knowledge about energy resources and their types • Energy resources chemical combination and refining of energy sources to get high calorific value • Student would learn about the petroleum consumption and petrochemical industries works and grievances. • They would understand the usage of lubricants and applications in our daily life.
VI Sem		DSE-2B	Chemistry-VI	<p>Unit-1: Inorganic chemistry:</p> <ul style="list-style-type: none"> • This unit given knowledge about Different types of metallurgical process • They understand some refractory material manufacturing using powder metallurgical process. • Alloy manufacturing and their uses • They learn about importance of elements present in the tracer composition and their physiological and biological importance. <p>Unit-2: Organic chemistry:</p> <ul style="list-style-type: none"> • This unit deals with polymers' choice, types and structure, and advantages of polymer support reagents. Understands the phase transfer catalysis. • They learn about the eco-friendly preparation of chemical compounds in single step and multistep in Microwave assisted and Sonochemistry based reactions. • Student understand the difference between synthetic and natural colour pigments and synthesis of Hydroxy acids, nucleic acids and their structure and importance of biological system Identification of organic compound by spectroscopic technique such as UV,IR and NMR <p>Unit-3: Physical chemistry:</p> <ul style="list-style-type: none"> • Electrochemistry deals with the Conversion of chemical energy into electrical energy or work which will be based on theories and their principles. They learn about calculating energy discharge from a cell by knowing some experimental knowledge.

				<ul style="list-style-type: none"> • They learn about phase rule and reduced phase rule knowing some examples of a two-component system. • Students would learn about the Adsorption of gases on solids and applications. They acquire knowledge about the current kinetics of fast reactions and their principle and procedure to study the kinetics
		DSE-2B Practical	Practical-VI	<ul style="list-style-type: none"> • The Student would conduct the experiment based on physical chemistry experiments such as conductometric, titrimetric, colorimetric potentiometric experiments and separation technique.
		SEC-2.1	Sugar Technology	<p>This course enhances knowledge of local crop production and grievance of the industrial technologies</p> <ul style="list-style-type: none"> • Student learn about extraction and purification of sugars from sugarcane and local productivity in Mandya district. • They understand the composition of cane and juice and technology on different clarification of modern techniques •
		SEC-2.2	Food Chemistry	<p>This course enhances the knowledge of the vital role of food in our body and health</p> <ul style="list-style-type: none"> • Student learn about proper balance diet in daily food take • They understand the knowledge of the vital role of lipids, proteins, carbohydrates and vitamins and their physical and biological importance in daily life. • Student learn about food preservation by using chemical and physical methods