

Chemistry Programme Outcome & Course Outcome UG

Programme	Objective of Programme / Course Outcome	Employability of Programme / Course	Attainment of Programme / Course Outcome
Bachelor of Science in Chemistry (Honours)	This programme has been started to understand the chemistry/chemical process in details so that students can understand the chemical processes are in operation in industry and research laboratory or research development (R & D) works.	After completion of this course students can find employment in academia (in schools, Primary, Madhyamik and Higher secondary levels) as well as in chemical industry like: Petroleum refinery, Petrochemicals, Pharmaceuticals, Polymer and Paint Industry and many others.	This programme is a combination of Theoretical and Practical classes. The theoretical classes are held in two ways traditional class room and ICT classes. Practical classes are performed by the students in laboratory technically supported by Teachers and Laboratory attendants.
Courses	UG: Semester I		
UG/CHEM/101/C-1/T1: Organic Chemistry I	Making students familiar with: (I) Bonding and Physical Properties, (II) General Treatment of Reaction Mechanism I, (III) Stereochemistry-I.	NA	At the end of SEM-I students learn Bonding and Physical Properties, Reaction Mechanism and Stereochemistry.
UG/CHEM/101/C-1/P1: Organic Chemistry I Lab.	Making students familiar with: (I) Separation Chemistry, (II) Determination of boiling point and (III) Identification of a Pure Organic Compound.	NA	At the end of SEM-I students learn: Separation Chemistry, Determination of boiling point and Identification of a unknown Pure Organic Compound.
UG/CHEM/102/C-2: Physical Chemistry I	Students will understand the basic ideas on the vital topics of physical chemistry viz. kinetic theory & Maxwell's speed distribution, laws of thermodynamics & thermochemistry and chemical kinetics & homogeneous catalysis. The students will develop a comparative overview by performing different elementary experiments on chemical kinetics & thermochemistry in this course.	NA	A comprehensive knowledge would grow in these topics.
UG/CHEM/103/GE-1	Students will understand the Atomic Structure, Chemical Periodicity Acids and Bases, Redox Reactions. and the basic	NA	Expertise in these topics will ensure higher academic

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	ideas on the Fundamentals of Organic Chemistry and Aliphatic Hydrocarbons;, Practical of organic qualitative analysis of functional groups and basic inorganic quantitative estimation will be done.		achievements.
UG: Semester II			
UG/CHEM/ 201/C-3/T3: Inorganic Chemistry I	Extra nuclear Structure of atom: Wave mechanics: Chemical periodicity: Acid-Base reactions: Redox Reactions and precipitation reactions:	NA	At the end of SEM-II students learn Extra nuclear Structure of atom: Wave mechanics: Chemical periodicity: Acid-Base reactions: Redox Reactions and precipitation reactions
UG/CHEM/ 201/C-3/P3: Inorganic Chemistry I Lab.	Making students familiar with: Acid and Base Titrations Oxidation-Reduction Titration	NA	At the end of SEM-II students learn Acid and Base Titrations Oxidation-Reduction Titration. And students will be able to estimate strength of unknown acid and base separately and in a mixture. Also able to estimate the amount of metal ions using Oxidation-Reduction titration.
UG/CHEM/ 202/C-4/T4: Organic Chemistry II	Making students familiar with: (I) Stereochemistry-II, (II) General Treatment of Reaction Mechanism II, (III) Substitution and Elimination Reactions,	NA	At the end of SEM-II students learn: Stereochemistry-II, Advanced Reaction Mechanisms: Substitution and Elimination reactions.
UG/CHEM/ 202/C-4/P4: Organic Chemistry II Lab.	Making students familiar with: Preparations of Industrially important Organic Compounds.	NA	At the end of SEM-II students learn: Preparations of Industrially important Organic Compounds.
UG/CHEM/203/GE-2	Students will be familiar with topics viz. Bonding & Molecular Structure, Comparative Studies of p-Block Elements; States of Matter and Chemical Kinetics. Practical of qualitative inorganic analysis	NA	Acquired subjective proficiency will ensure free roaming in these subjects.

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	of few radicals and Experiments surface tension, viscosity & kinetics will be performed.		
UG: Semester III			
UG/CHEM/ 301/C-5: Physical Chemistry II	In this section the students will be introduced to the ideas of transport processes of fluids & charge in liquid solutions, applications of thermodynamics and introductory quantum mechanics. Experiments of viscosity, partition coefficient and conductance would enhance their analytical skills.	NA	An ample acquaintance of knowledge in these subject will endure further understanding in higher studies.
UG/CHEM/ 302/C-6/T6: Inorganic Chemistry II	Making students familiar with: Chemical Bonding-I Chemical Bonding-II Radioactivity	NA	At the end of SEM-III students learn Chemical Bonding-I Chemical Bonding-II Radioactivity
UG/CHEM/ 302/C-6/P6: Inorganic Chemistry II Lab.	Making students familiar with: Iodo / Iodimetric Titrations Estimation of metal content in some selective samples 1. Estimation of Cu in brass. 2. Estimation of Cr and Mn in Steel. 3. Estimation of Fe in cement.	NA	At the end of SEM-III students learn Iodo / Iodimetric titrations Estimation of metal content in some selective samples 1. Estimation of Cu in brass. 2. Estimation of Cr and Mn in Steel. 3. Estimation of Fe in cement. And students will be able to estimate amount of metal and non-metal ions using Iodo / Iodimetric titrations. and estimate the metal ions in brass, steel and cement.
UG/CHEM/ 303/C-7/T7: Organic Chemistry III	Making students familiar with: (I) Chemistry of alkanes, alkenes and alkynes, (II) Aromatic Substitution, (III) Reactions of Carbonyl and Related Compounds, (IV) Organometallics, (V).	NA	At the end of SEM-III students learn: Chemistry of alkanes, alkenes and alkynes, Aromatic substitution reactions, Reactions of carbonyl and related compounds, and Organometallics,

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UG/CHEM/304/GE-3	In this section the students will be introduced to Organic Chemistry preparations & reactions of Aromatic Hydrocarbons, Organometallic Compounds, Aryl Halides, Alcohols, Phenols and Ethers & Carbonyl Compounds, Chemical Energetics, Chemical Equilibrium & Conductance. Practical of Identification of a pure organic compound and experiments of preliminary level thermochemistry & conductance will be executed.	NA	An ample acquaintance of knowledge in these subject will endure further understanding in higher studies.
UG/CHEM/305/SEC-1: Basic Analytical Chemistry	Introduction to Analytical Chemistry and its interdisciplinary nature. Concept of sampling. Importance of accuracy, precision and sources of error in analytical measurements. Presentation of experimental data and results, from the point of view of significant figures. Analysis of soil Analysis of water Analysis of food products Chromatography Ion-exchange Analysis of cosmetics Suggested Instrumental demonstrations 1. Estimation of macro nutrients: Potassium, Calcium, Magnesium in soil samples by flamephotometry. 2. Spectrophotometric determination of Iron in Vitamin / Dietary Tablets. 3. Spectrophotometric Identification and Determination of Caffeine and Benzoic Acid in Soft Drinks	NA	At the end of SEM-V students learn accuracy, precision and sources of error in analytical measurements. Presentation of experimental data and results, from the point of view of significant figures. Analysis of soil Analysis of water Analysis of food products Chromatography Ion-exchange Analysis of cosmetics. Estimation of macro nutrients: Potassium, Calcium, Magnesium in soil samples by flamephotometry. Spectrophotometric determination of Iron in Vitamin / Dietary Tablets. Spectrophotometric Identification and Determination of Caffeine and Benzoic Acid in Soft Drinks
UG: Semester IV			
UG/CHEM/401/C-8:	This portion of the course will enlighten them with more advanced level of	NA	Acquired subjective proficiency will

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<p>Physical Chemistry III</p>	<p>physical chemistry viz. applications of thermodynamics on colligative properties, homogeneous & heterogeneous phase equilibrium, electrical Properties of molecules and quantum chemistry. To substantiate their theoretical knowledge, experiments on solubility product, EMF, phase equilibrium and ionic effect on reaction rate will be done for acceptability of these theories.</p>		<p>ensure free roaming in these subjects.</p>
<p>UG/CHEM/402/C-9/T9: Inorganic Chemistry III</p>	<p>General Principles of Metallurgy Chemistry of s and p Block Elements Noble Gases Inorganic Polymers Coordination Chemistry-I</p>	<p>NA</p>	<p>At the end of SEM-IV students learn General Principles of Metallurgy Chemistry of s and p Block Elements Noble Gases Inorganic Polymers Coordination Chemistry-I</p>
<p>UG/CHEM/402/C-9/P9: Inorganic Chemistry III Lab.</p>	<p>Making students familiar with: Complexometric titration Inorganic preparations</p>	<p>NA</p>	<p>At the end of SEM-IV students learn Complexometric titration Inorganic preparations. And students will be able to estimate amount of metal ions individually and in a mixture using complexometric titrations. Also able to prepare some inorganic salts like complex, double salts.</p>
<p>UG/CHEM/403/C-10/T10: Organic Chemistry IV</p>	<p>Making students familiar with: (I) Nitrogen compounds, (II) Rearrangement reactions, (III) The Logic of Organic Synthesis, (IV) Organic molecular Spectroscopy, and Applications of IR, UV and NMR spectroscopy for identification of simple organic molecules.</p>	<p>NA</p>	<p>At the end of SEM-IV students learn: Nitrogen compounds, Rearrangement reactions, The Logic of organic synthesis, Organic molecular Spectroscopy and Applications of IR, UV and NMR spectroscopy for identification of simple organic molecules.</p>

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<p>UG/CHEM/ 403/C-10/P10: Organic Chemistry IV Lab.</p>	<p>Making students familiar with: (I) Estimation of glycine by Sørensen's formol method, 2. Estimation of glucose by titration using Fehling's solution, 3. Estimation of sucrose by titration using Fehling's solution, 4. Estimation of vitamin-C (reduced), 5. Estimation of aromatic amine (aniline) by bromination (Bromate-Bromide) method, 6. Estimation of phenol by bromination (Bromate-Bromide) method, 7. Estimation of formaldehyde (Formalin), 8. Estimation of acetic acid in commercial vinegar, 9. Estimation of urea (hypobromite method), 10. Estimation of saponification value of oil/fat/ester.</p>	<p>NA</p>	<p>At the end of SEM-IV students learn: quantitative estimation of organic compounds in solutions. These experiments are important for pathological determination of sugars in blood and urine. Estimation of phenolic and aniline impurities in water.</p>
<p>UG/CHEM./404/GE-4</p>	<p>In this section the students will be introduced to Organic Chemistry preparations & reactions of Carboxylic Acids and Their Derivatives, Amines and Diazonium Salts, Amino Acids and Carbohydrates and Coordination Chemistry and Transition Metal Chemistry, Analytical & Industrial Chemistry. Practical of simple organic and inorganic preparations and gravimetric and complexometric estimation of metals ions will be done.</p>	<p>NA</p>	<p>An ample acquaintance of knowledge in these subject will endure further understanding in higher studies.</p>
<p>UG/CHEM/ 405/SEC-2: Pharmaceutical Chemistry</p>	<p>To empower the students with sound knowledge of drug discovery, design and development; Basic Retrosynthetic approach. Synthesis of therepresentative drugs of the following classes: analgesics agents, antipyretic agents, antiinflammatory agents (Aspirin, paracetamol, Ibuprofen); antibiotics (Chloramphenicol); antibacterial and antifungal agents (Sulphonamides; Sulphanethoxazol, Sulphacetamide, Trimethoprim); antiviral agents (Acyclovir), Central Nervous System agents (Phenobarbital, Diazepam), Cardiovascular (Glyceryl trinitrate), antilprosy (Dapsone), HIV-AIDS related drugs (AZT-Zidovudine). Fermentation Aerobic and anaerobic fermentation. Production of (i) Ethyl alcohol and citric acid, (ii) Antibiotics; Penicillin, Cephalosporin, Chloromycetin and</p>	<p>NA</p>	<p>At the end of this course students will be able to prepare and characterized the drugs such as: Analgesics and antipyretic agents, anti-inflammatory agents like Aspirin, paracetamol, Ibuprofen and antibiotics Chloramphenicol. The antibacterial and antifungal agents such as: Sulphonamides; Sulpha-nethoxazol, Sulphacetamide, Trimethoprim. They acquire knowledge of antiviral agents: Acyclovir as well as Central Nervous</p>

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	Streptomycin, (iii) Lysine, Glutamic acid, Vitamin-B2, Vitamin-B12 and Vitamin C.		System agents : Phenobarbital, Diazepam. Similarly, they have basic idea of Cardiovascular (Glyceryl trinitrate), antilaprosy (Dapsone), HIV-AIDS related drugs (AZT-Zidovudine). Thus, students will be fit for the employment in the pharmaceutical industry or in R & D as chemists.
UG: Semester V			
UG/CHEM/501/C-11/T11: Inorganic Chemistry IV	Coordination Chemistry-II Chemistry of d- and f- block elements Transition Elements Lanthanoids and Actinoids	NA	At the end of SEM-V students learn Coordination Chemistry-II Chemistry of d- and f-block elements Transition Elements Lanthanoids and Actinoids
UG/CHEM/501/C-11/P11: Inorganic Chemistry IV Lab.	Making students familiar with: Chromatography of metal ions Gravimetry Spectrophotometry	NA	At the end of SEM-V students learn Chromatography of metal ions Gravimetry Spectrophotometry And students will be able to separate metal ions by Paper chromatography. Able to estimate metal and non-metak ions by gravimetric and sepectrophotomeric method.
UG/CHEM/502/C-12/T12: Organic Chemistry V	Making students familiar with: (I) Carbocycles: Polynuclear hydrocarbons and their derivatives: synthetic methods and chemical properties and (II) Heterocycles: Heterocyclic compounds: 5- and 6-membered rings with one heteroatom; reactivity, orientation and important reactions (with mechanism) of furan, pyrrole, thiophene and pyridine, (III) Cyclic Stereochemistry	NA	At the end of SEM-V students learn: Polynuclear hydrocarbons and their derivatives: synthetic methods and chemical properties, chemistry of hetero-cyclic compounds: 5- and 6-

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	<p>including substitution elimination and rearrangement reactions, (IV) Pericyclic reactions (with reaction mechanism and stereochemistry).</p> <p>(V) Carbohydrates: Monosaccharides: Aldoses up to 6 carbons; structure of D-glucose & D-fructose (configuration & conformation); ring structure of mono-saccharides (furanose and pyranose forms), (VI) Chemistry of Disaccharides and Polysaccharides,</p> <p>(VII) Biomolecules: Amino acids: synthesis and properties with mechanistic details.</p>		<p>membered rings with one hetero-atom; reactivity, orientation and important reactions (with mechanism) of furan, pyrrole, thiophene and Pyridine, and Cyclic stereochemistry including substitution elimination and rearrangement reactions. Pericyclic reactions (with reaction mechanism and stereochemistry).</p> <p>Not only the above but also students will learn the chemistry of natural products like: mono-, di-, polysaccharides, and bio-molecules aminoacids.</p>
<p style="text-align: center;">UG/CHEM/ 502/C-12/P12: Organic Chemistry V Lab.</p>	<p>Making students familiar with: Methods of Chromatographic Separations Like:</p> <ol style="list-style-type: none"> 1. TLC separation of a mixture containing 2/3 amino acids, 2. TLC separation of a mixture of dyes (fluorescein and methylene blue), 3. Column chromatographic separation of leaf pigments from spinach leaves, 4. Column chromatographic separation of mixture of dyes, 5. Paper chromatographic separation of a mixture containing 2/3 amino acids, 6. Paper chromatographic separation of a mixture containing 2/3 sugars. <p>Spectroscopic Analysis of Organic Compounds:</p> <p>Analysis IR and ¹H-NMR of 30 industrially important organic compounds.</p>	NA	<p>At the end of SEM-V students learn: Methods of separation of a mixture of two organic compounds by Column, Thin Layer Chromatography (TLC) and Paper Chromatography (PC).</p> <p>Not only that students will be able to analyse the unknown organic compounds using non-destructive tests of organic of compounds like IR, ¹H-NMR spectroscopy, which is important for industrial and quality controlled purpose in pharmaceutical industry.</p> <p>The methods are also very much applicable for new product developments in R & D.</p>
<p style="text-align: center;">UG/CHEM/ 503/DSE-1: Advanced Physical Chemistry</p>	<p>In this module number of essential topic of physical chemistry viz. crystal structure, statistical thermodynamics, specific heat of solids, physical chemistry of polymers etc. will be discussed to ease their accessibility. Practicals of computer</p>	NA	<p>Expertise in these topics will ensure higher academic achievements.</p>

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	Programming based on some numerical methods (e.g. roots of equations, numerical differentiation, numerical integrations etc.) using computers will develop their interactive skills with computers.		
UG/CHEM/ 504/DSE-2: Green Chemistry	Making students familiar with: (I) Introduction to Green Chemistry (II) Principles of Green Chemistry and Designing a Chemical synthesis, (III) Examples of Green Synthesis/ Reactions and some real world cases, (IV) Future Trends in Green Chemistry	NA	At the end of SEM-V students learn: The twelve Principles of Green Chemistry, Applications of Chemistry in designing a chemical synthesis, Some examples of green synthesis/ Reactions and some real world cases, and future trends in green chemistry.
UG/CHEM/ 504/DSE-2: Green Chemistry Lab.	Making students familiar with: Safer starting materials: 1. Preparation and characterization of nanoparticles of gold using tea leaves. Using renewable resources: 2. Preparation of biodiesel from vegetable/waste cooking oil. Avoiding waste: Principle of atom economy. 3. Preparation of propene by two methods can be studied 4. Triethylamine ion + OH ⁻ → propene + trimethyl propene + water. 5. Other types of reactions: like addition, elimination, substitution and rearrangement should also be studied for the calculation of atom economy. 6. Use of enzymes as catalysts: Benzoin condensation using Thiamine Hydrochloride as a catalyst instead of cyanide. 7. Mechano-chemical solvent free synthesis of azomethines 8. Alternative sources of energy: a) Solvent free, microwave assisted one pot synthesis of phthalocyanine complex of copper (II). b) Photoreduction of benzophenone to benzopinacol in the presence of sunlight.	NA	At the end of SEM-V students will be able to prepare and characterized the nano-particles. They can prepare and characterized the biodiesel. They will be able to use of biocatalysts in different area of chemical synthesis. Finally, they will be able to carry out microwave and photo induced chemical reactions.
UG: Semester VI			
UG/CHEM/ 601/C-13/T13: Inorganic Chemistry V	Bioinorganic Chemistry Organometallic Chemistry Catalysis by Organometallic Compounds Reaction Kinetics and Mechanism	NA	
UG/CHEM/ 601/C-13/P13:	Making students familiar with: Qualitative semimicro analysis	NA	

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Inorganic Chemistry V Lab.			
UG/CHEM/ 602/C-14: Physical Chemistry IV	In this unit the students will be introduced to the physical concepts of molecular spectroscopy such as rotational spectroscopy, vibrational spectroscopy, Raman spectroscopy, NMR spectroscopy & ESR spectroscopy, fundamental level of photochemistry and surface phenomenon e.g. surface tension, adsorption & properties of colloids. To compare their theoretical learning few experiments on surface phenomenon & spectrophotometry will be executed.	NA	Aptitude in these frontier topics would be advantageous in the field of research.
UG/CHEM/ 603/DSE-3: Analytical Methods in Chemistry	Qualitative and quantitative aspects of analysis Optical methods of analysis Thermal methods of analysis Electroanalytical methods Separation techniques	Students will be eligible for Employment in academia and industry	At the end of SEM-V students learn Qualitative and quantitative aspects of analysis Optical methods of analysis Thermal methods of analysis Electroanalytical methods Separation techniques
UG/CHEM/ 603/DSE-3: Analytical Methods in Chemistry Lab.	Making students familiar with Separation Techniques – Chromatography Solvent Extractions 2. Analysis of soil: 3. Ion exchange: Determination of exchange capacity of cation exchange resins and anion exchange resins. Spectrophotometry	Students will be eligible for Employment in academia and industry	At the end of SEM-V students learn Separation Techniques – Chromatography Solvent Extractions 2. Analysis of soil: 3. Ion exchange: Determination of exchange capacity of cation exchange resins and anion exchange resins. Spectrophotometry And students will be able to separate metal ions by Paper chromatography, TLC and by solvent extraction. Able to estimate substances by spectrophotometric method.
UG/CHEM/	Making students familiar with:	Students will be	

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<p>604/DSE-4: Polymer Chemistry</p>	<p>(I) Introduction and history of polymeric materials; (II) Functionality and its importance; (III) Kinetics of Polymerization; (IV) Crystallization and crystallinity; (V) Nature and structure of polymers; (VI) Determination of molecular weight of polymers; (VII) Glass transition temperature (T_g) and determination of T_g; (VIII) Polymer Solution (VIII) Properties of Polymer;</p>	<p>eligible for Employment in academia and industry</p>	
<p>UG/CHEM/ 604/DSE-4: Polymer Chemistry Lab.</p>	<p>For making students familiar with handle of polymers: Polymer Synthesis: 1. Free radical solution polymerization of styrene (St) / Methyl Methacrylate (MMA) / Methyl Acrylate (MA) / Acrylic acid (AA). 2. Purification of monomer, 3. Polymerization using benzoyl peroxide (BPO) / 2,2'-azo-bis-isobutyronitrile (AIBN), 4. Preparation of nylon 66/6 5. Interfacial polymerization: preparation of polyester from isophthaloyl chloride (IPC) and phenolphthalein. 6. Redox polymerization of acrylamide 7. Precipitation polymerization of acrylonitrile 8. Preparation of urea-formaldehyde resin 9. Preparations of novalac resin/ resold resin. 10. Microscale Emulsion Polymerization of Poly(methylacrylate). Polymer characterization: 1. Determination of molecular weight by viscometry: a. Polyacrylamide-aq.NaNO₂solution b. (Poly vinyl propylidene (PVP) in water 2. Determination of the viscosity-average molecular weight of poly(vinyl alcohol) (PVOH) and the fraction of "head-to-head" monomer linkages in the polymer. 3. Determination of molecular weight by end group analysis: Polyethylene glycol (PEG) (OH group). 4. Testing of mechanical properties of polymers. 5. Determination of hydroxyl number of a polymer using colorimetric method. Polymer analysis: Estimation of the amount of HCHO in the given solution by sodium sulphite method: 2. Instrumental Techniques 3. IR studies of polymers 4. DSC analysis of polymers.</p>	<p>Students will be eligible for Employment in academic world and industries.</p>	<p>At the end of SEM-VI, students will be able to handle polymers in industry, like Rubber industry/Tyre industry, Footwear industry, Paint industry, etc.</p> <p>Thus, at the end of the learning of organic chemistry course, B. Sc. (Honours) students will be fit for the work in academic world as well as in various chemical industries as chemists and analysts as mentioned earlier.</p>

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Courses	UG: Semester I		
UGP/CHEM/101/C-1A	Students will understand the basic ideas on the Fundamentals of Organic Chemistry and Aliphatic Hydrocarbons; Atomic Structure, Chemical Periodicity, Acids and Bases, Redox Reactions. Practical of organic qualitative analysis of functional groups and basic inorganic quantitative estimation will be done.	NA	Expertise in these topics will ensure higher academic achievements.
UG: Semester II			
UGP/CHEM/201/C-1B	Students will be familiar with topics viz. Bonding & Molecular Structure, Comparative Studies of p-Block Elements; States of Matter and Chemical Kinetics. Practical of qualitative inorganic analysis of few radicals and Experiments surface tension, viscosity & kinetics will be performed.	NA	Acquired subjective proficiency will ensure free roaming in these subjects.
UG: Semester III			
UGP/CHEM/301/C-1C	In this section the students will be introduced to Organic Chemistry preparations & reactions of Aromatic Hydrocarbons, Organometallic Compounds, Aryl Halides, Alcohols, Phenols and Ethers & Carbonyl	NA	An ample acquaintance of knowledge in these subject will endure further understanding in higher studies.

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	Compounds, Chemical Energetics, Chemical Equilibrium & Conductance. Practical of Identification of a pure organic compound and experiments of preliminary level thermochemistry & conductance will be executed.		
UGP/S.C/304/ SEC-1: Basic Analytical Chemistry	Students will comprehend the basic ideas on the concepts of Basic Analytical Chemistry and Analysis of soil, Analysis of water, Analysis of food products, Chromatography (paper, TLC, ion exchange), Analysis of cosmetics.	NA	Aptitude in these topics would be advantageous in the field of research.
UG: Semester IV			
UGP/CHEM./401/C-1D	In this section the students will be introduced to Organic Chemistry preparations & reactions of Carboxylic Acids and Their Derivatives, Amines and Diazonium Salts, Amino Acids and Carbohydrates and Coordination Chemistry and Transition Metal Chemistry, Analytical & Industrial Chemistry. Practical of simple organic and inorganic preparations and gravimetric and complexometric estimation of metals ions will be done.	NA	An ample acquaintance of knowledge in these subject will endure further understanding in higher studies.
UGP/S.C./404/ SEC-2: Pharmaceutical Chemistry	Students will be familiar with the synthesis of drugs & pharmaceuticals of the following classes viz. analgesics agents, antipyretic agents, anti-inflammatory agents, antibiotics, antibacterial, antifungal agents, antiviral agents, Cardiovascular, antilaprosy, HIV-AIDS related drugs and Aerobic and anaerobic fermentation of organic compounds.	NA	A comprehensive knowledge would grow in these topics.
UG: Semester V			
UGP/CHEM./501/DSE-1A: Green Chemistry	Students will grasp the basic ideas on Principles of Green Chemistry & its chemical synthesis and Future Trends in Green Chemistry. Experiments of green chemistry synthesis will ne performed.	NA	Acquired subjective proficiency will ensure free roaming in these subjects.

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UGP/S.C./504/SEC-3: IT Skill for Chemists	In this section the students will be introduced to the mathematics behind physical chemistry viz. functions, Statistical treatment of data, Numerical methods of finding roots, numerical differentiation, Numerical integration etc. and basic Computer fundamentals & BASIC computer programming.	NA	Expertise in these topics will ensure higher academic achievements.
UG: Semester VI			
UGP/CHEM./601/DSE-1B: Polymer Chemistry	In this section students would be familiarized with the chemical & physical properties of polymers and Brief introduction to preparation, structure, properties and application of the few of them. Practical of few polymer synthesis, characterization & analysis will be done.	NA	Aptitude in these frontier topics would be advantageous in the field of research.
UGP/S.C./ 604/SEC-4: Analytical Clinical Biochemistry	In this course students will be enlightened with the clinical biochemical approach towards important bio-entities like carbohydrates, proteins, enzymes, lipids, DNA & RNA and diagnosis of disease by blood/urine analysis.	NA	A comprehensive knowledge would grow in these topics.