

S. R. FATEPURIA COLLEGE

Beldanga, Murshidabad, W. B.

(NAAC Accredited)



PROGRAM & COURSE OUTCOMES OF CHEMISTRY HONOURS (B.SC.) UNDER CBCS

Program outcomes

At the completion of B. Sc. in Chemistry the students will be able to achieve the following:

1. Theoretical as well as practical knowledge of handling chemicals. Gain the laboratory skills and safely to transfer and interpret knowledge entirely in the working environment.
2. Achieve a B.Sc. honours/program certificate and be eligible for admission to M.Sc. courses.
3. Also, they expand the knowledge available opportunities related to chemistry in the government services through public service commission's particularly in the field of food safety, health inspector, pharmacist etc.
4. 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.
5. The ultimate goal of the programme is to equip learners with the necessary skills and competencies to progress in their academic career as well as it will help them to secure a job.

Course outcomes

The CBCS Course curriculum of the discipline of Chemistry was designed by the University of Kalyani, Nadia, W.B. and the curriculum is well-designed and very promising. The entire curriculum covers all branches of chemistry such as Organic, Inorganic, Physical, Analytical & Industrial chemistry. There are 14 Core courses (CC) and 4 Generic electives (GE) courses distributed over six semesters of B.Sc. (Honours) with Chemistry. Each Core course (CC) consists of theory and practical components. The core course would help to enrich the subject knowledge of the students and increase their confidence level in the field of both academia and industry. Generic electives (GE) make integration among various interdisciplinary courses to fulfill the vision and mission of designing the course. The introduction of 4 Skill Enhancement Courses (SEC) would help to gain more powerful knowledge not only in their core Chemistry subject but also in interrelated multidisciplinary subjects both theoretically and practically. The inclusion of 4 Discipline Specific Courses (DSE) has brought an opportunity in front of students to gain knowledge on various naturally and industrially important useful materials and also helps them to familiar and experts in handling different chemistry-based software after proper training. In brief, the student who graduated with this type of curriculum would be able to disseminate subject knowledge along with the necessary skills to suffice their capabilities for academia, entrepreneurship, and industry.

After careful analysis of the course, the department of Chemistry has pointed out the following outcomes of the course, and after completion of the course, the students will be able to learn the following facts.

Course Outcomes

Semester	Course code	Course Outcomes
SEM-I	CC-1	<ol style="list-style-type: none"> To gain a brief idea about the extranuclear structure of the atom To understand the basic concept of the kinetic theory of gases and know how to To learn experimentally about the estimation methods of anions present together in a mixture by acid-base titration. To learn experimentally about the determination of pH, heat of neutralization, and heat of solute.
	CC-2	<ol style="list-style-type: none"> To gain knowledge about the bonding of organic molecules and explain their physical properties on the basis of VB, and MO theory. To learn about the stereochemical projection formula and absolute configuration of organic compounds. To solve and identify the symmetry elements and point groups of organic molecules. To understand experimentally how to determine the boiling points of organic liquid compounds, separation of binary solid two organic compounds based upon solubility, by using common laboratory reagents. To identify a Pure Organic Compound experimentally by chemical test by using common laboratory reagents.
SEM-II	CC-3	<ol style="list-style-type: none"> To gain a qualitative idea of redox reactions, redox & formal potential, and precipitation reactions and their factors. To draw and construct various redox potential diagrams. To learn about different Acid-Base Concepts and Solvent systems. To gain a brief knowledge about different terms of the 2nd law of thermodynamics and be able to derive different thermodynamic relations. Learn to estimate various metal ions by redox titrimetric method.
	CC-4	<ol style="list-style-type: none"> To learn an extended part of stereochemistry about organic molecules, and reaction thermodynamics and gain details concepts of substitution and elimination reactions. To be performed different organic chemical reactions and purification of chemical products.
	CC-5	<ol style="list-style-type: none"> Learn the applications of thermodynamics, the foundation of quantum mechanics and electrical properties of molecules

SEM-III		2. Learn about practical knowledge to determine physical properties of compounds such as viscosity and saponification value using conductometric titration etc.
	CC-6	1. To gain deeper knowledge about chemical bonding such as VB, MOT, able to construct B-H cycle, the structure of ionic solids, etc. 2. To learn about Metal extraction and purification methods. 3. To gain practical knowledge to determine the metal ion from mixture using redox titration.
	CC-7	1. Learn about the Chemistry of alkenes and alkynes, Aromatic Substitution reaction, the chemistry of Carbonyl and Related Compounds, Organometallics, and Elementary ideas of Green Chemistry. 2. To gain practical about Qualitative Analysis of Single Solid Organic Compounds.
	SEC-1B	1. To learn about basic analytical chemistry such as soil analysis, cosmetics, analytical methods of food products, chromatographic technique etc.
SEM-IV	CC-8	1. Learn the applications of thermodynamics, the foundation of quantum mechanics, and electrical properties of molecules 2. To gain practical knowledge about potentiometric, pH metric titration, solubility product determination etc.
	CC-9	1. Learn about the Chemistry of s and p-block elements, Coordination Chemistry 2. Learn Complexometric titration and inorganic preparation.
	CC-10	1. To gain deep theoretical knowledge about Nitrogen compounds, Rearrangements, The Logic of Organic Synthesis, and Organic Spectroscopy. 2. To gain practical knowledge about the estimation of glycine, glucose, sucrose, Vit-C etc.
	SEC-II	1. To learn about pharmaceutical chemistry. 2. To learn experimentally how to prepare aspirin in the laboratory and how to analyze it.
SEM-V	CC-11	1. To gain deep theoretical knowledge about Coordination Chemistry, Magnetochemistry, Chemistry of d- and f-block elements, Reaction Kinetics and Mechanism. 2. To gain practical knowledge about the estimation of available oxygen in pyrolusite, Cu in brass, paper chromatographic separation technique etc.
	CC-12	1. To achieve a deeper theoretical knowledge of Molecular Spectroscopy, Photochemistry, Surface phenomenon, etc. 2. To learn practical knowledge about the determination of surface tension, CMC, Lambert-Beers law verification etc.
	DSC-1B	1. Helps to understand how to prepare different substances in Silicate Industries, Fertilizers, Surface Coatings, Batteries, Alloys, Catalysis, and explosives. 2. To learn how to analyze the composition of different fertilizers, cement, composition of percentage of metals in alloy, electroless metallic coatings on ceramic and plastic.

	DSE-2A	<ol style="list-style-type: none"> 1. To learn in detail about the Qualitative and quantitative aspects of analysis, Optical methods of analysis. Thermal and Electroanalytical methods of analysis. Separation techniques 2. To learn experimentally how to separate a mixture of ions by solvent extraction technique; determination of pH of soil and estimation of Ca, Mg and phosphate ion in soil, COD, BOD in a water sample.
	DES-2C	<ol style="list-style-type: none"> 1. To learn about green chemistry and its necessity, Principles of Green Chemistry and Designing a Chemical synthesis, Examples, and Future Trends of green chemistry. 2. To learn how to perform green synthesis of a number of organic compounds in the laboratory.
SEM-VI	CC-13	<ol style="list-style-type: none"> 1. To gain deep knowledge about Molecular Symmetry and the Point group of inorganic molecules. 2. To know about Bio-inorganic Chemistry and Organometallic Chemistry includes a catalytic role in different organometallic compounds. 3. To study experimentally the qualitative detection of known and unknown radicals and insoluble materials in a mixture.
	CC-14	<ol style="list-style-type: none"> 1. To learn in detail about the synthesis, properties, chemical reactions, and reaction mechanisms of polynuclear hydrocarbons and their derivatives, and the synthesis of heterocyclic compounds. 2. Helps to understand the classification, structure, properties, reactions, and use of carbohydrate molecules. 3. Deals with the synthesis, structure, properties, chemical and biological reactions of amino acids, peptides, and nucleic acids. 4. To learn experimentally how to separate molecules by chromatographic methods and how to analyze Organic compounds by spectroscopic techniques.
	DSE-3	<ol style="list-style-type: none"> 1. To gain deep theoretical knowledge about Crystal Structure, Statistical Thermodynamics, Special selected topics on physical chemistry. 2. Helps to understand the basics of computer programming (FORTRAN), creating and application of spreadsheet software (MS Excel), and statistical data analysis. how to prepare graphs by using spreadsheets. 3. To study the Acid-Base Titration Curve, Plotting of the First and Second derivative Curve for pH metric and Potentiometric titrations, Calculation and Plotting of a Precipitation Titration Curve with MS Excel, Michaelis-Menten Kinetics for Enzyme Catalysis using Linear and Non - Linear Regression.
	DSE-4	<ol style="list-style-type: none"> 1. To know how to do research work and write a review article on a particular field/topic as assigned by the teacher. 2. To know how to handle the technical devices for presenting research works.

Course Outcomes of Chemistry for B.Sc. students
(Programm & GE)

Semester	Course code	Course Outcomes
SEM-I	CHEMGT-1	<ol style="list-style-type: none"> 1. To learn the details about the Atomic Structure, Chemical Periodicity, Acids and Bases, Redox Reactions, and General Organic Chemistry & Aliphatic Hydrocarbons. 2. To study the estimation of ions or salts by acid-base titration method and oxidation-reduction titration method and how to detect an organic sample by qualitative analysis.
SEM-II	CHEMGT-2	<ol style="list-style-type: none"> 1. To know in detail about the Kinetic Theory of Gases; Liquids and Chemical Kinetics, Chemical Bonding & Molecular Structure, and comparative study of P-Block. 2. To determine the viscosity of an unknown liquid (glycerol, sugar) with respect to water surface tension of a liquid using Stalagmometer and the solubility of sparingly soluble salt in water 3. To study experimentally the qualitative detection of known and unknown radicals and insoluble materials in a mixture.
SEM-III	CHEMGT-3	<ol style="list-style-type: none"> 1. To learn the Chemical Energetics, chemical & Ionic equilibria, 2. To understand the synthesis, properties, chemical reactions, and mechanisms of Aromatic Hydrocarbons, Organometallic Compounds, and Aryl Halides. 3. To learn experimentally the qualitative analysis of single known and unknown solid organic compounds and also the identification of pure solid and liquid organic compounds. 4. To gain practical knowledge related to thermochemistry.
	CHEMHS-1B	To understand the basic concept of analytical chemistry. To learn how to analyze soil, water, food products and cosmetics and chromatographic technique for sample analysis.
SEM-IV	CHEMGT-4	<ol style="list-style-type: none"> 1. To gain deep theoretical knowledge of the following topics: Solutions, Phase Equilibria, Conductance, Electrochemistry, Transition Metal & Coordination Chemistry 2. To learn how to determine the hardness of water by complexometric titration and preparation of a few inorganic compounds.
	CHEMHS-2A	<ol style="list-style-type: none"> 1. Helps to understand about the drug discovery, design and development of representative drugs of the following classes: Antipyretic, Analgesics, Anti-inflammatory, Antibacterial, Antifungal, Antiviral, Antibiotics, Anti-leprosy, Central Nervous System agents, HIV-AIDS related drugs 2. To know about aerobic and anaerobic fermentation, the importance of Vitamins and Amino acids, synthesis of

		<p>Penicillin, Cephalosporin, Chloromycetin, Streptomycin and their role as an antibiotic.</p> <p>3. To learn experimentally how to prepare aspirin in the laboratory and how to analyze it.</p>
SEM-V	CHEMGTDSE-1	<p>1. To understand the various methods of chemical analysis, Analytical Industrial Chemistry and environmental chemistry.</p> <p>2. To gain practical knowledge of how to determine solubility of sparingly soluble salts, complexometric titration using EDTA and estimation of available oxygen in pyrolusite.</p>
	CHEMHS-2B	<p>1. Helps to understand about the preparation, structures, reactions and biological importance of carbohydrates, proteins, enzymes, lipids, and lipoproteins.</p> <p>2. To know the biochemistry of different diseases through a diagnostic approach by blood and urine analysis. How to perform the qualitative estimation of carbohydrate, proteins and lipids.</p> <p>3. To study the quantitative estimation of carbohydrate, cholesterol, nucleic acids, determination of the iodine number of oil and saponification number of oil.</p>
SEM-VI	CHEMGTDSE-2	<p>1. To know about Functional group approach preparations & reactions for the following reactions (carboxylic acid, amine, carbohydrates, etc.)</p> <p>2. To achieve the basic concept of polymers, paints, varnishes, dyes, fats, oils, etc.</p> <p>3. To perform various organic synthetic reactions procedure and purification methods.</p>
	CHEMHS-1A	<p>1. Helps to understand about the basics of computer programming (FORTRAN), creating and application of spreadsheet software (MS Excel)</p> <p>2. Helps to know about statistical data analysis.</p>