

**GOVT. GEN. DEGREE COLLEGE, CHAPRA**  
**UNDER GRADUATE DEPARTMENT OF CHEMISTRY**  
**Three years B.Sc. Chemistry (General) CBCS Syllabus**  
[Programme Specific Outcomes \(P.O\)](#)

<u><a href="#">Programme Outcome</a></u>	
<b>PO-I</b>	The present CBCS curriculum the students will not only able to learn the fundamental learning of the subject and advance their knowledge, but will also increase the ability of critical thinking, development of scientific attitude, handling of different instruments, improve practical skills, enhance communication skill, social interaction, recognize the ethical value system and increase awareness in environment related issues. This will definitely help the students in their profession in the future.
<b>PO-II</b>	To provide skills and knowledge to the students that will enable them to undertake further studies in chemistry on related areas or multi-disciplinary areas that can be helpful for self-employment.
<b>PO-III</b>	To provide knowledge and skills to the students in rural area that will enable them to undertake further studies in chemistry on related areas or multi-disciplinary areas that can be helpful for self-employment and entrepreneurship.
<b>PO-IV</b>	Achieve the skills required to succeed for doing jobs in Govt. and private sectors of academia and industry.
<b>PO-V</b>	Learn, identify and solve complex scientific problems, sample analysis in scientific ways at all levels.
<b>PO-VI</b>	The course fulfils to produce competent chemists who can think and work independently in chemical laboratories or can fit themselves in chemical industries.
<b>PO-VII</b>	Investigate chemical problems using scientific tools for investigation and interpretation of figures.
<b>PO-VIII</b>	Select, design and apply appropriate experimental techniques along with IT tools to solve chemical problems.
<b>PO-IX</b>	Communicate effectively through scientific report writing, documentation and effective presentations.

Course Outcome or Learning Outcome (C.O)

Generic Elective -1 Course Code:	GE-Sem-I (Theory) [CHEM-G-CC-T-01]	Atomic Structure, Chemical Periodicity, Acids and Bases, Redox Reactions, Fundamentals of Organic Chemistry, Stereochemistry & Aliphatic Hydrocarbons	<ol style="list-style-type: none"> <li>1. Basic knowledge of atomic models</li> <li>2. Ideas about various periodic properties such as electronegativity; electron affinity; ionization energy etc.</li> <li>3. Implementation of acid-base balance and pH concepts</li> <li>4. Create concepts to balance a chemical equation using oxidation-reduction and ion-electron methods</li> <li>5. Understand intermolecular transformations and symmetry elements and describe stereochemical properties of organic molecules and reactions.</li> <li>6. Investigate the mechanisms of electrophilic addition reactions, elimination reactions and determination of reaction mechanisms using several different methods</li> </ol>
	GE-Sem-I (Prac) [CHEM-G-CC-P-01]	Redox Titration  Determination of functional groups	<ol style="list-style-type: none"> <li>1. Estimation of oxalic acid, Mohr salt or Fe (II) by both permanganometry and dichromatometry</li> <li>2. To determine the nature of the functional groups, present in an Organic molecule.</li> </ol>
Generic Elective -2 Course Code:	GE-Sem-II (Theo) [CHEM-G-CC-T-02]	States of Matter & Chemical Kinetics, Chemical Bonding & Molecular Structure, P- Block Elements	1. Understand the general properties of main group elements, with special attention to the synthesis and properties of main group compounds such as diborane; borazine; borazole; phosphonitrile compounds; silicates; silicone etc.
	GE-Sem-II (Pract) [CHEM-G-CC-P-02]	Inorganic Chemistry Qualitative semi-micro analysis of mixtures containing three radicals	1. Understand the various chemical reactions involved in the recognition of cationic and anionic radicals. Like a tire test; warming effect of salts; flame test; test of boraxes etc.
Generic Elective -3 Course Code:	GE-Sem-III (Theory) [CHEM-G-CC-T-03]	Chemical Energetics, Equilibria, Organic Chemistry-II	<ol style="list-style-type: none"> <li>1. To understand the various laws of thermodynamics</li> <li>2. Applications of thermodynamics</li> <li>3. To learn about ionic equilibrium</li> <li>4. Mechanisms of aromatic substitution reactions.</li> <li>5. Understand the carbonyl group and various reactions.</li> <li>6. Knowledge of organometallic chemistry.</li> <li>7. knowledge of unsaturated molecules and chemistry.</li> </ol>
	GE-Sem-III (Practical) [CHEM-G-CC-P-03]	Expts based of thermodynamics, Identification of Organic compounds	<ol style="list-style-type: none"> <li>1. Measurement of pH</li> <li>2. Preparation of various buffer solutions</li> <li>3. Solubility of sparingly soluble salt Detection of pure organic compounds oxalic acid, succinic acid, resorcinol, urea, glucose, benzoic acid and salicylic acid, acetone, aniline and nitrobenzene</li> </ol>

Generic Elective -4 Course Code:	GE-Sem-IV(Theo) [CHEM-G-CC-T-04]	Solutions, Phase Equilibria, Conductance, Electrochemistry & Analytical and Environmental Chemistry	Understanding 1. Ideal & non-ideal solutions 2. Phase equilibria 3. Conductance of ionic solutions 4. Electromotive force 5. Chemical analysis based on volumetric, gravimetric, chromatographic methods 4. BOD, TDS, COD, DO, hardness
	GE-Sem-IV(Prac) [CHEM-G-CC-T-04]	Solutions, Phase Equilibria, Conductance, Electrochemistry & Analytical and Environmental Chemistry	Carry out experiments for 1. Conductometric determination of the dissociation constant of a weak acid 2. Potentiometric titration 3. Total hardness of water
Generic Elective -5 Course Code:	GE-Sem-V(Theo) [CHEM-G-DSE-T-01]	Analytical, Environmental and Industrial Chemistry	Understanding 1. Chemical Analysis 2. Environmental Chemistry 3. Error Analysis and Computer Applications 4. Industrial Chemistry
	GE-Sem-V(Prac) [CHEM-G-DSC-P-01]	Analytical and Environmental Chemistry, Analytical and Industrial Chemistry	Carry out experiments for 1. Total hardness of water by EDTA titration 2. To determine the rate constant for the acid catalyzed hydrolysis of an ester. 3. Determination of the strength of the H <sub>2</sub> O <sub>2</sub> sample. 4. Titration of Na <sub>2</sub> CO <sub>3</sub> and NaHCO <sub>3</sub> mixture vs HCl using phenolphthalein and methyl orange indicators. 5. Titration of HCl and CH <sub>3</sub> COOH mixture vs NaOH using two different indicators to find the concentration. Estimation of available oxygen in pyrolusite
Generic Elective -6 Course Code:	GE-Sem-VI(Theo) [CHEM-G-DSE-T-02]	Advanced Organic Chemistry and Industrial Chemistry	Understanding 1. Carboxylic Acids and Their Derivatives 2. Amines and Diazonium Salts 3. Amino Acids and Carbohydrates 4. Polymers 5. Paints 6. Fermentation chemicals Food additives etc.
	GE-Sem-VI(Prac) [CHEM-G-DSE-P-02]	Advanced Organic Chemistry and Industrial Chemistry	1. Considering the yield of the crude product, the following reactions are to be performed: i. Nitration of aromatic compounds ii. Condensation reactions iii. Hydrolysis of amides/imides iv. Acetylation of aromatic amines v. Benzoylation of aromatic amines 2. Purification of the crude product is to be made by crystallisation from water/alcohol.  Carry out experiments for 1. Estimation of saponification value of oil / ester / fat. 2. Estimation of available chlorine in bleaching powder. 3. Estimation of acetic acid in commercial vinegar.

