



# ***SEVA BHARATI MAHAVIDYALAYA***

***KAPGARI, JHARGRAM***

***DEPARTMENT OF CHEMISTRY***

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## **Program Outcomes, Program Specific Outcomes and Course Outcomes**

# Department of Chemistry

## Programme Outcomes: B. Sc. Chemistry (Hons.)

<b>Department of Chemistry</b>	After successful completion of three year degree program in Chemistry a student should be able to;
<b>Programme Outcomes</b>	<p>PO-1. Demonstrate, solve and an understanding of major concepts in all disciplines of chemistry.</p> <p>PO-2. Solve the problem and also think methodically, independently and draw a logical conclusion.</p> <p>PO-3. Employ critical thinking and the scientific knowledge to design, carry out, record and analyse the results of chemical reactions.</p> <p>PO-4. Create an awareness of the impact of chemistry on the environment, society, and development outside the scientific community.</p> <p>PO-5. Find out the green route for chemical reaction for sustainable development.</p> <p>PO-6. To inculcate the scientific temperament in the students and outside the scientific community.</p> <p>PO-7. Use modern techniques, various equipments and Chemical softwares.</p>

<b>Programme Specific Outcomes</b>	PSO-1. Gain the knowledge of Chemistry through theory and practical experiments. PSO-2. To explain nomenclature, stereochemistry, structures, reactivity, and mechanism of the chemical reactions. PSO-3. Identify chemical formulae and solve numerical problems. PSO-4. To understand the basic principles of Organic, Inorganic, Physical and Analytical Chemistry and its applications through Various laboratory experiments. PSO-5. Use modern chemical tools, Models, Chem-draw, Charts and Equipments. PSO-6. Understand good laboratory practices and safety. PSO-7. Develop research oriented skills. PSO-8. Aware and handle the sophisticated instruments/equipments.
<b>Course Outcomes B. Sc Chemistry</b>  <b>Semester- I</b>	
<b>Course</b>	<b>Outcomes</b>  After completion of these courses students should be able to:
<b>BCEMCCHC-101</b>  <b>ORGANIC CHEMISTRY</b>	CO-1. Understanding the Valence Bond Theory and MO Theory. CO-2. Mechanistic approach of different organic reactions and reaction Intermediates. CO-3. Understanding of the Stereochemistry of organic molecules
<b>BCEMCCHC-102</b>  <b>PHYSICAL CHEMISTRY</b>	CO-1. Understand the basic principles of Kinetic Theory of Gases. CO-2. Understand the Macroscopic Thermodynamics at equilibrium, Zeroth Law, 1 <sup>st</sup> Law of Thermodynamics.

	<p>CO-3. Adiabatic and Isothermal processes.</p> <p>CO-4. Work Done in isothermal and adiabatic processes.</p> <p>CO-5. Specific Heat and Kirchoff's Equation.</p> <p>CO-6. Joule-Thomson's Experiment.</p> <p>CO-7. Basic Principles of Kinetics of a reaction, rate of a equation, Molecularity and order of a reaction, rate determining step.</p> <p>CO-8. Understand the second law of Thermodynamics.</p> <p>CO-9. Understanding chemical kinetics</p>
<b>SEMESTER - II</b>	
<p><b>BCEMCCHC-201</b></p> <p><b>INORGANIC CHEMISTRY</b></p>	<p>CO-1. Gather an in-depth knowledge about atomic structure.</p> <p>CO-2. Understand the periodicity of the elements.</p> <p>CO-3. Define organic acids and bases and various theories of acid bases.</p> <p>CO-4. Understand the concepts of a redox reaction.</p> <p>CO-5. Explain various phenomenon of redox reactions using Nernst Equation.</p>
<p><b>BCEMCCHC-202</b></p> <p><b>ORGANIC CHEMISTRY</b></p>	<p>CO-1. Understand the basics of Stereochemistry.</p> <p>CO-2. Basic idea reaction Thermodynamics and Kinetics.</p> <p>CO-3. Understand the reaction mechanisms like <math>S_N1</math>, <math>S_N2</math>, <math>S_N1'</math>, <math>S_N2'</math>, <math>E1</math>, <math>E2</math>, <math>E1cB</math> and <math>Ei</math>.</p>
<b>SEMESTER - III</b>	
<p><b>CEMCCHC-301</b></p> <p><b>PHYSICAL CHEMISTRY</b></p>	<p>CO-1. Understanding of the concepts of viscosity.</p> <p>CO-2. Understanding the principles of electrochemistry.</p> <p>CO-3. Understanding the requirement of 2<sup>nd</sup> Law of Thermodynamics.</p> <p>CO-4. Understanding the concepts of Free Energy (G &amp; A).</p> <p>CO-5. Spontaneity and directional sense of a process from Thermodynamic point of view.</p> <p>CO-6. Understanding the concepts of Chemical Equilibrium.</p> <p>CO-7. Preliminary idea and foundations of Quantum Mechanics.</p>
<p><b>BCEMCCHC-302</b></p> <p><b>INORGANIC CHEMISTRY</b></p>	<p>CO-1. Thorough understanding of Chemical Bonding with special Emphasis on Ionic, Covalent bonding.</p> <p>CO-2. Concepts of weak bonds like Hydrogen Bond, van der Waals bond.</p> <p>CO-3. Understanding the concepts of Molecular Orbital Theory.</p> <p>CO-4. Metallic bonding and concepts of semi-conductors.</p> <p>CO-5. Understanding of Radioactivity.</p>

<b>BCEMCCHC-303</b>  <b>ORGANIC CHEMISTRY</b>	CO-1. Understanding of the chemistry of unsaturated compounds. CO-2. Aromatic substitution reaction mechanisms. CO-3. Understanding of various reactions of the Carbonyl Group. CO-4. Understanding of Organometallic chemistry.
<b>BCEMSEHC-304 (SEC-1)</b>  <b>PHARMACEUTICAL CHEMISTRY</b>	CO-1. Understanding of the concepts of Drugs and Pharmaceuticals. CO-2. Understanding of the concepts of Fermentation.
<b>GE-3-305</b>	CO-1. Understand the concept chemical energetics. CO-2. Elementary idea of chemical equilibrium. CO-3. Understanding of the idea of ionic equilibrium.
<b>SEMESTER - IV</b>	
<b>CEMCCHC-401</b>  <b>PHYSICAL CHEMISTRY</b>	CO-1. Understanding of applications of the Laws of Thermodynamics. CO-2. Concepts of Phase Rule. CO-3. Understanding of EMF and Electrochemical Cell. CO-4. Understanding of ionic equilibrium. CO-5. Basic principles of Quantum Chemistry.
<b>BCEMCCHC-402</b>  <b>INORGANIC CHEMISTRY</b>	CO-1. Understanding of the basic principles of Metallurgy. CO-2. Detailed knowledge of s and p-block elements. CO-3. Detailed study of the Noble gases. CO-4. Elementary idea of Inorganic polymers. CO-5. Thorough understanding of Co-ordination Chemistry. CO-6. Isomerism of Inorganic Compounds. CO-7. IUPAC nomenclature of Inorganic compounds.
<b>BCEMCCHC-403</b>  <b>ORGANIC CHEMISTRY</b>	CO-1. Detailed study of organic nitrogenous compounds. CO-2. Rearrangement reactions and their mechanism. CO-3. Development of Logic of Organic Synthesis. CO-4. Understanding of asymmetric synthesis. CO-5. Understanding of Organic spectroscopy with special emphasis to UV-Vis, IR, NMR spectroscopy and their applications.

<b>BCEMSEHC-404 (SEC-2)</b>  <b>PESTICIDE CHEMISTRY</b>	CO-1. Understanding of the concepts of Pesticides. CO-2. Understanding the concept of benefits and adverse effects of pesticides. CO-3. Basic principle of the synthesis of DDT, Malathion, Carbaryl etc.
<b>GE-4-405</b>	CO-1. Understand the concept of solutions. CO-2. Understand the concept of Phase Equilibrium. CO-3. Understand the concept of Conductance. CO-4. Understand the concept of EMF. CO-5. Understand the concept of Chemical Analysis. CO-6. Understand the concept of Environmental Chemistry.
<b>SEMESTER - V</b>	
<b>BCEMCCHC-501</b>  <b>INORGANIC CHEMISTRY</b>	CO-1. Thorough understanding of Co-ordination chemistry in the light Of VBT, CFT, LFT. CO-2. Understanding of the colour and spectra of co-ordination Compounds and their magnetic properties. CO-3. Detailed study of d- and f- transition elements. CO-4. Detailed study of Lanthanides and Actinides.
<b>BCEMCCHC-502</b>  <b>ORGANIC CHEMISTRY</b>	CO-1. Detailed study of Carbocycles and Heterocycles. CO-2. Understanding of the stereochemistry of cyclic compounds. CO-3. Understanding of Pericyclic reactions. CO-4. Thorough study of Carbohydrates. CO-5. Study of amino acids, peptides and nucleic acids.
<b>BCEMDSHC-503 (DSE-1)</b>  <b>ADVANCED PHYSICAL CHEMISTRY</b>	CO-1. Detailed study of crystal structure. CO-2. Understanding the concepts of Statistical Thermodynamics. CO-3. Understanding of the 3 <sup>rd</sup> Law of Thermodynamics
<b>BCEMDSHC-504 (DSE-2)</b>  <b>ANALYTICAL METHODS IN CHAMISTRY</b>	CO-1. Understanding of qualitative and quantitative aspects of analysis. CO-2. Understanding of Optical methods of analysis. CO-3. Understanding of Thermal methods of analysis. CO-4. Understanding of Separation techniques.

**SEMESTER - VI**

<b>BCEMCCHC-601</b> <b>INORGANIC</b> <b>CHEMISTRY</b>	CO-1. Developing the idea and concepts of Bio-inorganic chemistry. CO-2. Understanding of Organometallic chemistry from Inorganic Point of view. CO-3. Study of catalysis by organometallic compounds. CO-4. Understanding inorganic reaction mechanism and kinetics.
<b>BCEMCCHC-602</b> <b>PHYSICAL</b> <b>CHEMISTRY</b>	CO-1. Understanding of molecular spectroscopy using Born-Oppenheimer approximation. CO-2. Developing the concepts of Photochemistry. CO-3. Developing the concepts of Surface Phenomenon.
<b>BCEMDSHC-603</b> <b>(DSE-3)</b> <b>GREEN</b> <b>CHEMISTRY</b>	CO-1. Understanding of the concepts of Green Chemistry. CO-2. Understanding the basic principles of Green Synthesis. CO-3. Requirements of Green Chemistry. CO-4. Understanding the Future Trends of Green Chemistry.
<b>BCEMDSHC-604</b> <b>(DSE-4)</b> <b>POLYMER</b> <b>CHEMISTRY</b>	CO-1. Elementary idea of introduction and history of Polymeric materials. CO-2. Understanding the concept of functionality and its importance. CO-3. Understanding of the concept of Polymerization. CO-4. Understanding of the determination of Molecular Weight of polymers. CO-5. Understanding of the polymer solution.

