

## CHEMISTRY

<b>Course Code</b>	23BS1102	<b>Year</b>	I	<b>Semester</b>	I
<b>Course Category</b>	Basic Sciences	<b>Branch</b>	CSE	<b>Course Type</b>	Theory
<b>Credits</b>	3	<b>L-T-P</b>	3-0-0	<b>Prerequisites</b>	Nil
<b>Continuous Internal Evaluation:</b>	30	<b>Semester End Evaluation:</b>	70	<b>Total Marks:</b>	100

## Course Outcomes

Upon successful completion of the course, the student will be able to

<b>CO1</b>	Interpret fundamental concepts of chemistry. L2
<b>CO 2</b>	Apply knowledge of quantum mechanics, materials and energy sources to describe and solve problems. L3
<b>CO3</b>	Utilize knowledge of conducting polymers and instrumentation to design and develop new materials.L3
<b>CO4</b>	Analyze bonding models, Modern engineering materials, and electrochemical processes to make informed decisions L4
<b>CO5</b>	Assume the concept of polymers and instrumentation methods and their respective applications to design and develop new products. L4
<b>CO6</b>	Communicate concepts and technologies related to chemistry effectively in written reports.

## Contribution of Course Outcomes towards achievement of Program Outcomes &amp; Strength of correlations (3: High, 2: Medium, 1: Low)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
<b>CO1</b>	2													
<b>CO2</b>	3													
<b>CO3</b>	3													
<b>CO4</b>		3												
<b>CO5</b>		3												
<b>CO6</b>									3	3		3		

## SYLLABUS

Unit No.	Contents	Mapped CO
I	<b>UNIT I Structure and Bonding Models:</b> Fundamentals of Quantum mechanics, Schrodinger Wave equation, significance of $\Psi$ and $\Psi^2$ , particle in one dimensional box, molecular orbital theory – bonding in homo-and hetero nuclear diatomic molecules – energy level diagrams of O <sub>2</sub> and CO etc. $\pi$ -molecular orbitals of butadiene and benzene-calculation of bond order.	<b>CO1,</b> <b>CO2</b> <b>CO4</b> <b>CO6</b>
II	<b>UNIT II Modern Engineering materials Semiconductors-</b> Introduction, basic concept, applications. Super conductors-Introduction ,basic concept, applications. <b>Super capacitors-</b> Introduction, Basic Concept, Classification and Applications. <b>Nano materials-</b> Introduction, classification, properties and applications of Fullerenes, carbon Nano tubes , Graphines and nanoparticles.	<b>CO1,</b> <b>CO2</b> <b>CO4,</b> <b>CO6</b>

III	<p><b>UNIT III Electrochemistry and Applications</b></p> <p>Electrochemical cell, Nernst equation, cell potential calculations and numerical problems. potentiometry- potentiometric titrations (redox titrations), concept of conductivity, conductivity cell, conduct metric titrations (acid-base titrations). Electrochemical sensors – potentiometric sensors with examples, amperometric sensors with examples. Primary cells – Zinc-air battery, Secondary cells – lithium- ion batteries- working of the batteries including cell reactions. Fuel cells- hydrogen-oxygen fuel cell– working of the cells. Polymer Electrolyte Membrane Fuel cells (PEMFC).</p>	<p><b>CO1,</b> <b>CO2</b> <b>CO4,</b> <b>CO6</b></p>
IV	<p><b>UNIT IV Polymer Chemistry</b></p> <p>Introduction to polymers, functionality of monomers, chain growth and step growth polymerization, coordination polymerization with specific examples and mechanisms of polymer formation</p> <p>Plastics –Thermo and Thermosetting plastics, Preparation, properties and applications of – PVC, Teflon, Bakelite, Nylon-6,6, carbon fibres.</p> <p>Elastomers–Buna-S, Buna-N–preparation, properties and applications. Conducting polymers – poly acetylene, poly aniline, – mechanism of conduction and applications. Bio-Degradable polymers - Poly Glycolic Acid (PGA), Polyl Lactic Acid (PLA).</p>	<p><b>CO1,</b> <b>CO3</b> <b>CO5,</b> <b>CO6</b></p>
V	<p><b>UNIT V Instrumental Methods and Applications</b></p> <p>Electromagnetic spectrum- Absorption of radiation- Beer-Lambert’s law. UV-Visible Spectroscopy, electronic transition, Instrumentation, IR spectroscopies, fundamental modes and selection rules, Instrumentation. Chromatography-Basic Principle, Classification. HPLC : Principle, Instrumentation and Applications.</p>	<p><b>CO1,</b> <b>CO3,</b> <b>CO5,</b> <b>CO6</b></p>

### Learning Resources

**Text Books:**

1. Jain and Jain, Engineering Chemistry, 16/e, Dhanpat Rai, 2013.
2. Peter Atkins, Julio de Paula and James Keeler, Atkins’ Physical Chemistry, 10/e, Oxford University Press, 2010.

**Reference Books:**

1. Skoog and West, Principles of Instrumental Analysis, 6/e, Thomson, 2007.
2. J.D. Lee, Concise Inorganic Chemistry, 5th Edition, Wiley Publications, Feb.2008
3. Textbook of Polymer Science, Fred W. Billmayer Jr, 3rd Edition

**E-Resources:**

<https://nptel.ac.in/courses/103108100>  
[https://onlinecourses.nptel.ac.in/noc23\\_cy19/previe](https://onlinecourses.nptel.ac.in/noc23_cy19/previe)  
w <https://nptel.ac.in/courses/118104008>