CHEMISTRY

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

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

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3: High,2: Medium, 1: Low)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2													
CO2	3													
CO3	3													
CO4		3												
CO5		3												
CO6									3	3		3		

SYLLABUS		
Unit No.	Contents	Mapped CO
I	**UNIT I Structure and Bonding Models:** Fundamentals of Quantum mechanics, Schrodinger Wave equation, significance of Ψ and Ψ2, particle in one dimensional box, molecular orbital theory – bonding in homo-and hetero nuclear diatomic molecules – energy level diagrams of O2 and CO etc. π-molecular orbitals of butadiene and benzene-calculation of bond order.	CO1,CO2 CO4. CO6
II	**UNIT II Modern Engineering materials** **Semiconductors**- Introduction, basic concept, applications.	CO1,CO2 CO4,CO6

	Super conductors-Introduction ,basic concept, applications. **Super capacitors-** Introduction, Basic Concept, Classification and Applications. **Nano materials**-Introduction, classification, properties and applications of Fullerenes, carbon Nano tubes , Graphines and nanoparticles.	
III	**UNIT III Electrochemistry and Applications** 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).	**CO1,CO2 CO4,CO6**
IV	**UNIT IV Polymer Chemistry** Introduction to polymers, functionality of monomers, chain growth and step growth polymerization, coordination polymerization with specific examples and mechanisms of polymer formation Plastics –Thermo and Thermosetting plastics, Preparation, properties and applications of – PVC, Teflon, Bakelite, Nylon-6,6, carbon fibres. 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).	**CO1,CO3 CO5,CO6**
V	**UNIT V Instrumental Methods and Applications** 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.	**CO1,CO3, CO5,CO6**

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 w https://nptel.ac.in/courses/118104008