

23SH1102- CHEMISTRY

(Common to EEE, ECE, CSE, IT & allied branches)

Course Category:	Basic sciences	Credits	3
Course Type:	Theory	Lecture-Tutorial-Practical:	3-0-0
Pre-requisite:	Fundamental concepts of Chemistry	Sessional Evaluation: External Exam Evaluation: Total Marks:	30 70 100

Course Objectives	To make the student learn about	
	1. To familiarize engineering chemistry and its applications	
	2. To train the students on the principles and applications of electrochemistry and polymers	
Course Outcomes	3. To introduce instrumental methods, molecular machines and switches	
	On successful completion of this course student will be able to:	
	CO1	Compare the materials of construction for battery and electrochemical sensors
	CO2	Explain the preparation, properties, and applications of thermoplastics & thermosetting, elastomers& conducting polymers.
	CO3	Explain the principles of spectrometry, slc in separation of solid and liquid mixtures
Course Outcomes	CO4	Apply the principle of Band diagrams in the application of conductors and semiconductors.
	UNIT I	
	Structure and Bonding Models: Fundamentals of Quantum mechanics, Schrodinger Wave equation, significance of Ψ and Ψ^2 , particle in one dimensional box, molecular orbital theory – bonding in homoand heteronuclear diatomic molecules – energy level diagrams of O2 andCO, etc. π molecular orbitals of butadiene and benzene, calculation of bond order	
	UNIT II	
	Modern Engineering materials: Semiconductors, band diagram in solids, Semiconductor devices (p-n junction diode as rectifier and transistors) Super conductors-Introduction basic concept, applications. Supercapacitors: Introduction, Basic Concept-Classification – Applications. Nano materials: Introduction, classification, properties and applications of Fullerenes, carbon Nano tubes and Graphines nanoparticles.	
Course content	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, conductometric titrations (acid-base titrations). Electrochemical sensors – potentiometric sensors with examples, amperometry sensors with examples. Primary cells – Zinc-air battery, Secondary cells –lithium-ion batteries- working of the batteries including cell reactions; Fuel cells, hydrogen-oxygenfuel cell– working of the cells. Polymer Electrolyte Membrane Fuel cells (PEMFC).	
	UNIT IV:	

	<p>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 – polyacetylene, polyaniline, – mechanism of conduction and applications. Bio-Degradable polymers - Poly Glycolic Acid (PGA), Polyl Lactic Acid (PLA).</p> <p style="text-align: center;">UNIT V</p> <p>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.</p>
Text Books & References	<p>TEXT BOOKS: 1.Jain and Jain, Engineering Chemistry, 16/e, DhanpatRai, 2013. 2. Peter Atkins, Julio de Paula and James Keeler, Atkins' Physical Chemistry, 10/e, Oxford University Press, 2010.:</p> <p>Reference Books: 1. Skoog and West, Principles of Instrumental Analysis, 6/e, Thomson, 2007. 2. J.M.Lehn, Supra Molecular Chemistry, VCH Publications.</p>

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