Course Code	Category	L	T	P	C	I.M	E.M	Exam
B20BS1103	BS	3	--	--	3	30	70	3Hrs

APPLIED CHEMISTRY

(Common to CSE,ECE &IT)

Course Objectives:

1.	To understand the physical and mechanical properties of Polymers/Plastics/elastomers helps in selecting suitable materials for different purpose.
2.	To create awareness on fuels as a source of energy for industries like thermal power stations, steel industry, fertilizer industry etc.
3.	To understand the concept of galvanic cells and corrosion with theories like electro chemical theory.
4.	To understand the importance of water.
5.	To understand about the materials which are used in major industries like steel and metallurgical manufacturing industries, construction and electrical equipment manufacturing industries.

Course Outcomes: At the end of the course students will be able to

S.no	Out Come	KL
1.	Develop polymer composites, synthetic polymers and formulation of polymers and their use in design	K3
2.	Apply the knowledge about quality of water and its treatment methods for domestic and industrial applications. Understanding the principle, mechanism of corrosion and utilization of various techniques to control.	K3
3.	Develop the knowledge of fuels and their economics, advantages and limitations. Make use of the basic concepts of semiconductors and liquid crystals for engineering applications.	K3
4.	Identify constituents of various ceramic materials, characteristics and their appropriate use in construction. Apply the knowledge of electrochemistry principles to design energy storage	K2

SYLLABUS

UNIT-I (10Hrs)	**High Polymers and Plastics; Rubbers & Elastomers** Polymerization Definition, Types of Polymerization, free radical Mechanism of addition polymerization, Plastics as engineering materials, Thermoplastics and Thermosetting plastics, Compounding of plastics, Fabrication of plastics (4 techniques); Preparation, Properties and applications of Polyethylene, PVC, Bakelite, Nylon - 6,6, Bullet Proof plastics -polycarbonate and Kelvar; Fiber reinforced plastics, conducting polymers, Biodegradable Polymers - PHBV, Nylon 2, Nylon 6. Natural rubber – Vulcanization – Compounding of Rubber; Preparation, properties and applications of Buna – S; Buna – N;
UNIT-II (10Hrs)	**Energy Sources and Applications:** **Nuclear Energy:** Nuclear fission and Nuclear fusion – Nuclear Power reactor – Applications. Thermal fuels – Introduction – Classification – Calorific value – HCV and

	LCV – Bomb calorimeter; Coal : Proximate and ultimate analysis of coal – Significance of the analysis – Manufacture of coke by Otto Hoffman's by Product Process , Refining crude oil; Knocking; Chemical structure-Knocking, Octane number of gasoline, Cetane number of diesel oil, synthetic Petrol; LPG, CNG
UNIT-III (12Hrs)	**Electrochemical cells and Corrosion** Galvanic cell, single electrode potential, Calomel electrode; Modern batteries: - Lead – Acid battery; Fuel cells- Hydrogen – Oxygen fuel cell, Lithium battery Theories of corrosion (i) dry Corrosion (ii) wet corrosion. Types of corrosion - differential aeration corrosion, pitting corrosion, galvanic corrosion, stress corrosion, Factors influencing corrosion, Protection from corrosion-material selection & design, cathodic protection, Protective coatings- metallic coatings – Galvanizing, Tinning, Electroplating; Electrrolessplating ;Paints
UNIT-IV (8Hrs)	**Water technology** Sources of water – Hardness of water – Estimation of hardness of water by EDTA method; Boiler troubles – sludge and scale formation, Boiler corrosion, caustic embrittlement, Priming and foaming; Softening of water by Lime – Soda Process, Zeolite Process, Ion – Exchange Process; Municipal water treatment; Desalination of sea water by Electrodialysis and Reverse osmosis methods.
UNIT-V (10Hrs)	**Chemistry of Engineering Materials& Advanced Engineering materials** **Cement:-** Manufacture of Portland cement, setting and hardening of cement, Deterioration of cement concrete. **Refractories:-** Definition, Characteristics, classification, Properties and failure of refactories. **Solar Energy: -** Construction and working of Photovoltaic cell, applications. **Solid State Materials:** Crystal imperfections, Semi Conductors, Classification and chemistry of semi conductors: Intrinsic semiconductors; Extrinsic semiconductors; Defect semiconductors, Compound Semiconductors and Organic Semiconductors. **Liquid Crystals: -** Definition – Classification with examples – Applications

Text Books:	
1.	Engineering Chemistry by Jain and Jain, Dhanpat Rai Publishing co.
2.	Engineering Chemistry by Willy India Pvt Ltd.
3.	Engineering Chemistry by Dr.K.Anji Reddy and Dr.M.S.R.Reddy ; Silicon Publications.
Reference Books:	
1.	Engineering Chemistry by Shikha Aharwal; Cambridge University Press, 2015 edition.
2.	A text of Engineering Chemistry by S.S.Dara; S.Chand& Co Ltd.
3.	Chemistry in Engineering and Technology by JC Kuriacose and J. Rajaram Mc. Graw Hill edition.