

Course Number and Name													
BCH101 - Engineering Chemistry I													
Credits and Contact Hours													
3 & 45													
Course Coordinator's Name													
Dr.Rajenderan													
Text Books and References													
Text Books:													
1. P.C.Jain and Monica Jain, "Engineering Chemistry" Dhanpat Rai Pub, Co., New Delhi(2002).													
2. S.S. Dara "A text book of engineering chemistry" S.Chand & Co.Ltd., New Delhi(2006).													
3. P. J. Lucia, M. Subhashini, "Engineering Chemistry, Volume 1", Crystal Publications, Chennai, (2007).													
References:													
1. B.K.Sharma "Engineering chemistry" Krishna Prakasan Media (P) Ltd., Meerut(2001).													
2. B. Sivasankar "Engineering Chemistry" Tata McGraw-Hill Pub.Co.Ltd, New Delhi(2008)													
Course Description													
To impart a sound knowledge on the principles of chemistry involving the different application oriented topics required for all engineering branches.													
Prerequisites							Co-requisites						
+2 level Chemistry							Nil						
required, elective, or selected elective (as per Table 5-1)													
Required													
Course Outcomes (COs)													
CO1: Understand the principles of water characterization and treatment for portable and industrial purposes.													
CO2:To impart knowledge on the essential aspects of Principles of polymer chemistry and engineering applications of polymers.													
CO3:Having a sound knowledge in the Field of the Conventional and non-Conventional energy													
CO4:To impart knowledge on the essential aspects of electrochemical cells, EMF and applications of EMF measurements.													
CO5: To make the students understand the Principles of corrosion and corrosion control.													
CO6:To impart knowledge about the Conventional and non-conventional energy sources and energy storage devices.													
Student Outcomes (SOs) from Criterion 3 covered by this Course													
COs/SOs	a	b	c	d	e	f	g	h	i	j	k	l	
CO1	H						H						
CO2		L	H		M								
CO3		M		H									
CO4	H		M	L			H						
CO5		L	L										
CO6	H						H						

List of Topics Covered

UNIT I WATER TECHNOLOGY

9

Introduction-Characteristics : Hardness of water – types - temporary and permanent hardness - estimation by EDTA method Alkalinity – types of alkalinity - Phenolphthalein and Methyl orange alkalinity - determination – Domestic water treatment – disinfection methods (Chlorination, ozonation , UV treatment) Boiler feed water – requirements – disadvantages of using hard water in boilers Internal conditioning (Calgon Conditioning method) – External conditioning – Demineralization process – Desalination and Reverse osmosis.

UNIT II POLYMERS

9

Introduction-Polymers- definition – polymerization – degree of polymerization - types of polymerization – Addition polymerization and Condensation polymerization – Mechanism of Polymerization - free radical polymerization mechanism only, Plastics: Classification – thermoplastics and thermosetting plastics – difference between thermoplastics and thermosetting plastics - preparation, properties and uses of PVC, Teflon, nylon-6,6, PET, Rubber :Types – drawbacks of natural rubber -vulcanization of rubber - properties and uses of vulcanized rubber Synthetic rubbers – butyl rubber and SBR

UNIT III ELECTROCHEMISTRY

9

Introduction CELLS : Types of Cells : Electrochemical cells , Electrolytic cells – Reversible and Irreversible cells EMF – measurement of EMF – Single electrode potential – Nernst equation Reference electrodes : Standard Hydrogen electrode -Calomel electrode Ion selective electrode : Glass electrode and measurement of pH using Glass electrode electrochemical series – significance Titrations: Potentiometer titrations (redox - Fe^{2+} vs dichromate titrations) conductometric titrations (acid-base – HCl vs, NaOH titrations)

UNIT IV CORROSION AND CORROSION CONTROL

9

Introduction: Chemical corrosion Definition - Chemical Corrosion - Electrochemical corrosion – different types – galvanic corrosion –differential aeration corrosion – mechanism of Chemical and Electrochemical corrosion factors influencing corrosion Corrosion control – sacrificial anode and impressed cathodic current methods – Protective Coatings: Paints – constituents of the paint and their functions Metallic coatings – electroplating of Gold and electroless plating of Nickel.

UNIT V NON-CONVENTIONAL ENERGY SOURCES AND STORAGE DEVICES

9

Introduction : Nuclear fission and nuclear fusion reactions – differences between nuclear fission and nuclear fusion reactions – nuclear chain Reactions – nuclear energy critical mass - super critical mass - sub - critical mass Light water nuclear reactor for power generation (block diagram only) – breeder reactor Solar energy conversion – solar cells – wind energy Fuel cells – hydrogen – oxygen fuel cell Batteries :Primary and secondary Batteries – differences between Primary and secondary Batteries Secondary batteries: Lead–acid storage battery –working – uses Nickel–cadmium battery - working –uses Solid – state battery : Lithium battery.

