

Course Number and Name							
BCH101 - ENGINEERING CHEMISTRY I							
Credits and Contact Hours							
3 & 45							
Course Coordinator's Name							
MS.Madhubala							
Text Books and References							
<p>TEXT BOOKS:</p> <ol style="list-style-type: none"> 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). <p>REFERENCES :</p> <ol style="list-style-type: none"> 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). 3. http://ocw.mit.edu/courses/find-by-topic 4. http://nptel.ac.in/course.php?disciplineId=122 5. https://en.wikipedia.org/wiki/Electrochemistry 							
Course Description							
To impart a sound knowledge on the principles of chemistry involving the different application oriented topics required for all engineering branches.							
<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="width:50%;">Prerequisites</th> <th style="width:50%;">Co-requisites</th> </tr> </thead> <tbody> <tr> <td>+ 2 Level Chemistry</td> <td>Nil</td> </tr> <tr> <td colspan="2" style="text-align:center;">required, elective, or selected elective (as per Table 5-1)</td> </tr> </tbody> </table>		Prerequisites	Co-requisites	+ 2 Level Chemistry	Nil	required, elective, or selected elective (as per Table 5-1)	
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+ 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 indus purposes.						
CO2	To impart knowledge on the essential aspects of Principles of polymer chemistry 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 application 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 en 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 ELECTRO CHEMISTRY 9

Introduction CELLS: types of 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) Conduct metric 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 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