

22CYB05 CHEMISTRY FOR AGRICULTURAL ENGINEERS (For AGRI Branch Only)							
				L	T	P	C
				3	0	0	3
PREREQUISITE : NIL							
Course Objective:		<ul style="list-style-type: none"><li>To make the students conversant with water treatment, boiler feed water techniques, nature of bonding, engineering materials and corrosive nature of metals.</li><li>To impart knowledge to the students on the basic concepts of nanochemistry and fundamentals of soil science and endow skills on weathering</li></ul>					
Course Outcomes The Student will be able to				Cognitive Level		Weightage of COs in End Semester Examination	
CO1	Identify the types of hardness in water and its removal by various water treatment techniques.			Ap		20%	
CO2	Categorize the properties of lubricants and refractories for various applications.			Ap		20%	
CO3	Explore the type of corrosion and its control measures.			An		20%	
CO4	Implement the basic concepts of soil and identify the effects of fertilizers and pesticides in modern agriculture.			Ap		20%	
CO5	Illustrate the concepts of nanoscience and its various applications.			Ap		20%	

<b>UNIT I – WATER TECHNOLOGY</b>	(9)
Hardness – types – estimation by EDTA method. Water quality parameter – BOD and COD - Domestic water treatment – disinfection methods (chlorination, ozonation and UV treatment) – Boiler troubles (scale, sludge, priming, foaming and caustic embrittlement) – Internal conditioning (carbonate, phosphate and calgon) – External conditioning – demineralization process – desalination – reverse osmosis method.	
<b>UNIT II – CHEMICAL BONDING AND ENGINEERING MATERIALS</b>	(9)
Chemical bond – Types of bonds - Covalent bond – Hydrogen fluoride, Methane (overview only) - Ionic bond – Sodium Chloride, Magnesium Oxide (overview only) - Coordinate bond – Hydrogen Peroxide, Ozone (overview only) - Hydrogen Bond – Types of hydrogen bond (overview only). Engineering Materials : Synthesis of Abrasives – Properties of Refractories – Lubricants.	
<b>UNIT III – SCIENCE OF CORRISION</b>	(9)

Corrosion – types - chemical corrosion - pilling bedworth rule - electrochemical corrosion – mechanism - galvanic corrosion - differential aeration corrosion - factors influencing corrosion - corrosion control - sacrificial anode and impressed cathodic current methods - corrosion inhibitors.	
<b>UNIT IV – BASICS OF SOIL</b>	(9)
Soil – Pedological and edaphological concepts – Earth – Interior and Exterior of earth -Composition of earth's crust – Rocks and minerals – types – Weathering of rocks and minerals – physical weathering - chemical weathering – biological weathering -- Fundamental soil forming process – Humification – Eluviation – Illuviation – Horizonation and specific soil forming process – Calcification – Decalcification – Fertilizers and pesticides – Effects of using fertilizers and pesticides in modern agriculture.	
<b>UNIT – V – NANOCHEMISTRY</b>	(9)
Introduction - Types of nanomaterials - Properties and uses of – nanoparticle - nanocluster- nanorod, nanowire and nanotube. - Synthesis of nanomaterials - sol-gel – solvothermal - laser ablation - chemical vapour deposition - electrochemical deposition and electro spinning - Applications of nanomaterials.	
<b>TOTAL (L:45) : 45 PERIODS</b>	

<b>TEXT BOOKS:</b>
<ol style="list-style-type: none"> <li>1. Ravikrishnan, A., “Engineering Chemistry I &amp; Engineering Chemistry II , Sri Krishna Hitech Publishing chem., Co. Pvt. Ltd., 13th ed., Chennai , 2020.</li> <li>2. Dilip kumar Das, “Introductory soil science”, Kalyani publishers, 2018.</li> </ol>
<b>REFERENCES:</b>
<ol style="list-style-type: none"> <li>1. Jain, P.C. and Monica Jain, “Engineering Chemistry”, Vol I &amp;II, Dhanpat Rai Pub, Co., New Delhi 15th ed., 2018.</li> <li>2. “Fundamentals of Soil Science”, ISSS Publication, New Delhi, 2019.</li> </ol>
<b>WEB LINK:</b>
<ol style="list-style-type: none"> <li>1. <a href="https://www.sciencedirect.com/book/9781856177054/water-technology">https://www.sciencedirect.com/book/9781856177054/water-technology</a></li> <li>2. <a href="https://chem.libretexts.org/Bookshelves/Inorganic_Chemistry/Supplemental_Modules_and_Websites_(Inorganic_Chemistry)/Chemical_Compounds/Introduction_to_Chemical_Bonding">https://chem.libretexts.org/Bookshelves/Inorganic_Chemistry/Supplemental_Modules_and_Websites_(Inorganic_Chemistry)/Chemical_Compounds/Introduction_to_Chemical_Bonding</a></li> <li>3. <a href="https://www.sciencedirect.com/topics/materials-science/corrosion">https://www.sciencedirect.com/topics/materials-science/corrosion</a></li> <li>4. <a href="https://www.soils.org/about-soils/basics/">https://www.soils.org/about-soils/basics/</a></li> <li>5. <a href="https://www.sciencedirect.com/topics/chemistry/nanotechnology">https://www.sciencedirect.com/topics/chemistry/nanotechnology</a></li> </ol>

Mapping of COs with POs / PSOs														
COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	3	2												
2		2					2							
3		2					2		2					
4			2				2							
5						2						2		
CO (W.A)	3	2	2			2	2		2			2		

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