

ENGINEERING CHEMISTRY

II Semester								
Course Code:	Category	Hours / Week			Credits	Maximum Marks		
A5BS13	BSC	L	T	P	C	CIA	SEE	Total
		4	0	0	4	30	70	100
COURSE OBJECTIVES								
<p>The course should enable the students to:</p> <ol style="list-style-type: none"> 1. Impart knowledge on soft and hard water types and softening methods. 2. Introduce the basic concepts to develop electrochemical cells. 3. enhance knowledge on corrosion and its significance 4. Analyze the types of fuel based on calorific value for selected applications. 5. Interpret the properties and applications of lubricants 								
UNIT-I	WATER AND ITS TREATMENT							
Introduction - Hardness of water- Causes and effects of hardness - Expression and Units of Hardness - Determination of hardness by complexometric method- Numerical problems – Treatment of water by Ion exchange process - Potable water and its specifications – steps involved in treatment of potable water: screening, aeration, sedimentation, coagulation, filtration and sterilisation of water by Chlorination. Desalination of water by Reverse Osmosis.								
UNIT-II	ELECTROCHEMISTRY AND ITS APPLICATIONS							
Electro chemical cells – electrode potential - standard electrode potential - Nernst Equation -Types of electrodes - SHE, Calomel, Quinhydrone and Glass electrode -Electrochemical series, and its application- Numerical Problems. Potentiometric: acid- base and redox titration.								
UNIT-III	CORROSION AND ITS CONTROL							
Introduction-causes and effects-Chemical and Electrochemical corrosion – Mechanism of electrochemical corrosion- factors affecting rate of corrosion- corrosion control methods - cathodic protection and Protective coatings – Metallic coatings- Methods of metallic coatings – Hot dipping methods: Galvanizing, Tinning, cementation (Sherardizing) - electroplating (Copper), electroless plating (nickel). Organic coating - Paints (constituents and functions).								
UNIT-IV	FUELS AND COMBUSTION							
Fuels- Characteristics of good fuels - Classification of fuels with examples – Composition, Characteristics and uses of gasoline, diesel, kerosene oils - Knocking- octane and cetane rating – Aviation fuel: Composition and Characteristics- LPG and CNG: Composition, Characteristics and Uses. Combustion - Calorific value – Gross Calorific Value and Net Calorific Value. Calculation of air quantities required for combustion of a fuel – Numerical problems.								
UNIT-V	LUBRICANTS							
Lubricant: Definition – Classification with examples: Solid, gas and semisolid lubricants – Mechanism of Lubrication – Characteristics of good lubricant – Important properties of lubricant: viscosity, pour point, flash Point, demulsibility, volatility - Lubricant Additives – Advantages - Grading of lubricants								
TEXT BOOKS:								
1. A Text Book of Engineering Chemistry by C.Parameswara Murthy, C.V.Agarwal, B.S Publications								

2. A Text book of Engineering Chemistry by Dr. Bharathi Kumari, Dr. Jyothsna, V.G.S Book links

REFERENCE BOOKS:

1. Sashichawla, A Textbook of Engineering Chemistry, Dhanapath Rai and sons, 2003.
2. P.C. Jain and M. Jain, Engineering Chemistry, 15/e, Dhanapat Rai & Sons, Delhi, 2014.

COURSE OUTCOMES

At the end of the course, student will be able to:

1. **Illustrate** the types of hard and soft water, treatment of drinking and industrial water.
2. **Demonstrate** the basic principles of Electrochemistry in electrochemical cells.
3. **Apply** the methods of metal finishing in solving corrosion related problems.
4. **Explain** the chemistry of various fuels and their combustion.
5. **Identify** the properties, application of lubricants and mechanism of lubrication.