

**METHODIST COLLEGE OF ENGINEERING AND TECHNOLOGY**

**Teaching Schedule for Engineering Chemistry**

**B.E I YEAR SEM-I (2018-2019)**

**Subject Code: BS105CH**

**No. Of Classes Planned:48**

**Branch:**

No of Class	Unit I: ELECTROCHEMISTRY AND BATTERY CHEMISTRY	DATE
1,2	Introduction To Electro Chemistry – Electrolytic cell, Conductors, *(Concept of Conductance-Specific, Equivalent & Molar Conductivities)*, Cell constant.[Conductometric titrations-Strong and weak acid vs strong base]*	
3	Electrochemical (or) Galvanic cells – Daniel cell – Cell Notation – Cell Reaction .Concept of Electrode Potential and EMF – Definition of Single & Standard Electrode potential, determination of single Electrode potential. Calculation of e.m.f. of Galvanic cell – Numericals.[Electrochemical series and its applications]*	
4,5	Nernst Equation – Derivation – Its applications- electrode potential,emf of cell,PH,Keq and ΔG, Numerical Problems	
6,7	Types of Electrodes- (i) standard Hydrogen Electrode, (ii) Calomel Electrode, (iii) Quinhydrone Electrode and(iv)glass (Electrode- diagram, Description, Electrode Reaction & Potential of Electrodes)	
8	(Introduction to potentiometric titration)*, Determination of P <sup>H</sup> by using Quinhydrone electrode.	
9	Numerical problems – calculation of P <sup>H</sup> ,Emf of cell	
10	<b>Batteries</b> -Introduction- Primary and secondary battery. Primary battery: Zn – carbon battery.	
11, 12	Secondary batteries: Lead-acid battery, Li ion batteries - Charging and discharging reactions, advantages and applications.	
13	Fuel cells: concept of fuel cells and advantages. Methanol-Oxygen fuel cell – construction and applications.	
<b>Unit II: WATER CHEMISTRY AND CORROSION</b>		
1	<b>Water chemistry</b> -Introduction - Sources of Water - Hardness, Definition, Types of Hardness - Temporary & Permanent hardness. Units of hardness- ppm, mg/l, °Cl, °Fr. Calcium carbonate equivalents.	
2,3	Estimation of temporary and permanant Hardness by EDTA Method - Numerical problems on Hardness and EDTA.	
4	Alkalinity of Water – due to OH <sup>-</sup> , CO <sub>3</sub> <sup>2-</sup> & HCO <sub>3</sub> <sup>-</sup> & its determinations – Numerical problems.	
5	Water Softening Methods – Ion-Exchange Method , Reverse Osmosis - Method, Advantages.	
6	Specifications of potable water, Sterilization by Chlorination, Break point chlorination.	
1	<b>Corrosion</b> - Introduction - Definition - Causes & Effects of Corrosion - Types of Corrosion - (i) Dry / Chemical Corrosion (ii) Wet or Electrochemical corrosion.	
2	Electrochemical Corrosion, Mechanism of Electrochemical Corrosion - (i) Evolution of Hydrogen type. (ii) Absorption of Oxygen.( Ex. Rusting of Iron in Acidic, Neutral & Alkaline Medium).	
3	Types of electrochemical corrosion- Differential aeration corrosion- Waterline and Pitting corrosion.	
4	Factors influencing rate of Corrosion – (a) Nature of metal- Position of Metal In Galvanic Series, Relative areas of Anode & Cathode, Nature of surface oxide film. (b) Nature of environment-Effect of Temperature, Humidity and pH.	
5	<b>Corrosion control methods:</b> Cathodic Protection – Principle, Sacrificial Anode and Impressed Current methods..	
6	Surface coatings- Introduction to Metallic Coatings , Methods of Application: Hot-dipping- Galvanizing	
<b>Unit III : ENGINEERING MATERIALS</b>		
1	<b>POLYMERS:</b> Introduction to <b>polymers</b> , definition of the terms –monomer and its functionality , polymers and degree of polymerization , homo ,co and hetero chain polymers. Classification – natural and synthetic polymers, thermoplastics and thermosetting.	
2,3	Types of Polymerization : Addition , condensation and copolymerization. Mechanism of free radical polymerization.	
4	Thermoplastics and thermosetting Polymers .	
5	<b>Plastics:</b> Preparation, Properties & applications of PVC and Bakelite.	
6	<b>Fibers:</b> Preparation, Properties & applications of Nylon- 6,6 Kevlar . <b>Elastomers:</b> Preparation, properties and uses of Buna-S and Butyl rubber and silicone rubbers.	
7	<b>Conducting Polymers</b> - Introduction , classification Intrinsic and extrinsic conducting polymers, mechanism of conduction in polyacetylene, Applications of conducting polymers.	
8	<b>Biodegradable polymers</b> : Introduction, preparation, properties and applications of polylacticacid.	
<b>Unit IV: CHEMICAL FUELS</b>		
1	Definition of a chemical fuel, Origin of fuels, Classification– primary and secondary fuels - Solid, liquid & Gaseous fuels. Requirements of good fuel with respect to calorific value, ignition temperature, safety, control of combustion, efficiency.	
2	Combustion -calculation of air quantities by weight and volume. Numerical problems	
3,4	Calorific value-HCV, LCV. Theoretical calculation of calorific value by Dulong’s formula- Numerical problems.	
5,6	<b>Solid fuels</b> :coal and its ranking, proximate analysis of coal – moisture, volatile matter, ash. Ultimate analysis- carbon, hydrogen, nitrogen, sulphur, oxygen and Its significance.	
7	<b>Liquid fuels:</b> Source, fractional Distillation of petroleum, important fractions: composition and uses of gasoline, Diesel and kerosene.	
8,9	Knocking – Introduction, causes of knocking Fuel rating – Octane number and cetane number Cracking – Concept and significance, catalytic cracking by Moving bed method.	
10	<b>Gaseous fuels:</b> LPG, CNG composition and uses	
<b>Unit V: GREEN CHEMISTRY AND COMPOSITES</b>		
1,2	<b>Green Chemistry:</b> Concept, Principles of Green chemistry: atom economy and catalysis. Examples of Clean Technology, green solvents.	
3	<b>Biodiesel:</b> Sources, concept of Transesterification, advantages-carbon neutrality. Properties and significance.	
4,5	<b>Composites:</b> Introduction to composites, composition and characteristic properties of composites. classification of composites based on matrix, reinforcement and ply. Applications of composites.	

Total No of Classes :

Signature