**MUFFAKHAM JAH COLLEGE OF ENGINEERING AND TECHNOLOGY**

**Teaching Schedule for Chemistry**

 **B.E I-SEM (2024-2025)**

 **Subject Code: BS204CH No. Of Classes Planned:48 Branch:**

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| **No of Class** | **Unit I: ELECTROCHEMISTRY AND BATTERY CHEMISTRY** | **DATE** |
| **1,2** | Introduction To Electro Chemistry – Electrolytic conductance, Specific and equivalent conductance, factors effecting conductance.  |  |
| **2** | Types of cells -Electrolytic and Galvanic cells. Galvanic cells -Cell notation, cell reaction and cell potentials |  |
| **3** | 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 (Ecathode –Eanode) |  |
| **4,5** | Nernst Equation for cell emf and electrode potential– Derivation – Its applications- Calculation of electrode potential, emf of cell ,PH ,Keq , Numerical Problems |  |
| **6,7** | Types of Electrodes- (i) standard Hydrogen Electrode, (ii) Calomel Electrode, (iii) Quinhydrone Electrode and (iv)glass Electrode- (diagram, Description, Electrode Reactions & Potential of Electrodes) |  |
| **8** | **Batteries**-Introduction- Primary and secondary battery. Primary battery: Zn – carbon battery – construction and applications |  |
| **9,10** | Secondary batteries: Lead-acid storage battery, Li ion batteries – Construction ,Charging and discharging reactions, advantages and applications.  |  |
| **10** | Fuel cells: concept of fuel cells and advantages. Methanol-Oxygen fuel cell – construction and applications. |  |
| **Unit II: WATER CHEMISTRY AND CORROSION** |
| **1** | **Corrosion** - 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-galvanic and Differential aeration corrosion- Waterline |  |
| **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** | **Corrosion control methods**: Cathodic Protection – Principle, Sacrificial Anode and Impressed Current cathodic protection methods. |  |
| **6** | Surface coatings- Hot-dipping- Galvanizing |  |
| **1** |  **Water chemistry**-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 permanent Hardness by EDTA Method - Numerical problems on Hardness by EDTA (based on concentration of EDTA –Normality or Molarity). |  |
| **4** | Water Softening Methods – Ion-Exchange Method , Advantages. |  |
| **5** |  Reverse Osmosis - Method, Advantages. Alkalanity in water and its sources. |  |
| **6,7** | Specifications of potable water, Sterilization of water by Chlorination, Break point chlorination. |  |
| **Unit III : ENGINEERING MATERIALS** |
| **1,2** |  **POLYMERS:** Introduction to **polymers,** definition of the terms –monomer, functionality , polymers and degree of polymerization. Classification – natural and synthetic polymers, thermoplastics and thermosetting (differences with one example each) |  |
| **3** |  Types of Polymerization: Addition , condensation and copolymerization. With one example each  |  |
| **4** | **Applications of Plastics, Fibres and elastomers- -examples- Plastics**: PVC and Bakelite.**Fibers**: Nylon- 6,6 .**Elastomers**: Buna-S and Buna- N |  |
| **5** | **Conducting Polymers -**  Introduction , classification- Intrinsic and extrinsic conducting polymers,Properties, Applications of conducting polymers |  |
| **6 , 7** | **BioMaterials** : Introduction .definition of biomaterials , Preparation, properties and applications of Polylactic acid(PLA) |  |
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| **Unit IV: CHEMICAL FUELS** |
| **1,2** | **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** | Calorific value-HCV, LCV. Theoretical calculation of calorific value by Dulong’s formula- Numerical problems. |  |
| **3,4** |  **Solid fuels** :coal and its ranking, proximate analysis of coal – moisture, volatile matter, ash. Ultimate analysis- carbon, hydrogen, nitrogen, sulphur, oxygen and its significance. |  |
| **5** | **Liquid fuels**: Source, important fractions: composition and uses of gasoline, Diesel and kerosene. |  |
| **6** | Knocking – Introduction, Fuel rating – Octane number and cetane number-concept and significance. . |  |
| **7** |  **Gaseous fuels**: LPG, CNG composition and uses  |  |
| **8,9** | **Biodiesel**: Sources, Transesterification reaction. Advantages and properties of Biodiesel. Carbon Neutrality-concept and significance. Ethanol-biodiesel, sourses and uses. |  |
| **Unit V: SPECTROSCOPY and GREEN CHEMISTRY** |
| **1,2** | **Spectroscopy**- Description of Electromagnetic spectrum.Principles of UV-Visible Spectroscopy: Statement of Beer-Lambert Law. Absorption and intensity shifts: Bathochromic, Hypsochromic, Hyperchromic and Hypochromic shifts with one example each.  |  |
| **3** | Principle and applications of UV - visible spectroscopy |  |
| **4,5** | **IR Spectroscopy**: Principle of IR Spectroscopy. Principle and applications of IR . |  |
| **6,7** | **NMR Spectroscopy**: Principle of H 1 -NMR Spectroscopy. Multiplicity, Chemical Shift.  |  |
| **8** | Principle and Applications of MRI  |  |
| **9,10** | **Green Chemistry**: Concept, Mention- Principles of Green chemistry. Diels Alder reaction. |  |

 Total No of Classes :

**Signature**