**Teaching Schedule for Engineering Chemistry**

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

**Subject Code: BS104CH No. Of Classes Planned:48 Branch:**

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| **No of Class** | **Unit I: ELECTOCHEMISTRY AND BATTERY CHEMISTRY** | | **DATE** |
| **1,2** | Introduction To Electro Chemistry – Electrolytic cell, Conductors, \*(Concept of Conductance-Specific, Equivalent & Molar Conductivities)\*, Cell constant.. | |  |
| **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 | |  |
| **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 Electrodes, (ii) Calomel Electrode, (iii) Quinhydrone Electrode and(iv)glass (Electrode- diagram, Description, Electrode Reaction & Potential of Electrodes) | |  |
| **8** | Principle, method and application of \*( Potentiometric titration)\*. | |  |
| **9** | Determination of PH by using Quinhydrone electrode, numerical problems. | |  |
| **10** | **Batteries**-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. | |  |
| **Unit II: WATER CHEMISTRY AND CORROSION** | | | |
| **1** | | **Water chemistry**-Introduction - Sources of Water - Hardness, Definition, Types of Hardness - Temporary & Permanent. Units of hardness- ppm, mg/l, °Cl, °Fr. |  |
| **2,3** | | Determination of Hardness by EDTA Method - Numerical problems on Hardness and EDTA. |  |
| **4** | | Alkalinity of Water – due to OH-, CO32- & HCO3- & its determinations – Numerical problems. |  |
| **5** | | Water Softening Methods – Ion-Exchange Method , Reverse Osmosis - Method, Advantages. |  |
| **6** | | Specifications of potable water, Sterilization by a) Chlorination, Break point chlorination. |  |
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| **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- 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** | | **Corrosion control methods**: Cathodic Protection – Principle, Sacrificial Anode and Impressed Current methods.. |  |
| **6** | | surface coatings- Introduction to Metallic Coatings , Methods of Application: Hot-dipping- Galvanizing |  |
| **Unit III : ENGINEERING MATERIALS** | | | |
| **1** | | **POLYMERS:** Introduction to **polymers,** definition of the terms –monomer and its functionality , polymers and degree of polymerization , homo ,co and hetero chain 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** | | **Plastics**: Preparation, Properties & applications of PVC and Bakelite. |  |
| **6** | | **Fibers**: Preparation, Properties & applications of Nylon- 6,6 Kevlar .  **Elastomers**:Preparation, properties and uses of Buna-S and Butyl rubber and silicone rubbers. |  |
| **7** | | **Conducting Polymers -**  Introduction , classification Intrinsic and extrinsic conducting polymers, mechanism of conduction in polyacetylene, Applications of conducting polymers. |  |
| **8** | | **Biodegradable polymers** : introduction, preparation, properties and applications of polylaticacid. |  |
| **Unit IV: CHEMICAL FUELS** | | | |
| **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** | | **Solid fuels** : Ranking of coal - proximate analysis of coal – moisture, volatile matter, ash. Ultimate analysis- carbon, hydrogen, nitrogen, sulphur, oxygen and Its significance. |  |
| **7** | | **Liquid fuels**: Source, fractional Distillation of petroleum, important fractions: composition and their uses-gasoline, Diesel and kerosene. |  |
| **8** | | Cracking – Concept and significance, catalytic cracking by Moving bed method.. |  |
| **9** | | Knocking – Introduction, causes of knocking. Fuel rating – Octane number and cetane number. |  |
| **10** | | **Gaseous fuels**: LPG, CNG composition and uses |  |
| **Unit V: GREEN CHEMISTRY AND COMPOSITES** | | | |
| **1,2** | | **Green Chemistry**: Concept and Principles of Green chemistry: atom economy and catalysis. Examples of Clean Technology. |  |
| **3** | | **Biodiesel**: Sources, concept of Transesterification, advantages-carbon neutrality. Properties and significance |  |
| **4,5** | | **Composites**: 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**

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| 5 | **Corrosion control methods**: Cathodic Protection – Principle, Sacrificial Anode and Impressed Current methods.. | | | |
| 6 | surface coatings- Introduction to Metallic Coatings - Anodic Coating, Cathodic Coatings. Methods of Application: Hot-dipping- Galvanising | | | |
| **Unit III : ENGINEERING MATERIALS** | | | | |
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| 7 | **Liquid fuels**: Source, fractional Distillation of petroleum, important fractions: composition and their uses-gasoline,Diesel and kerosene. | | | |
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