

# VASAVI COLLEGE OF ENGINEERING

(AUTONOMOUS)

9-5-81, Ibrahimbagh, Hyderabad, Telangana -500031

## DEPARTMENT OF CHEMISTRY ENGINEERING CHEMISTRY-II

SYLLABUS FOR THE SEMESTER-II  
(For ECE, CSE & IT branches)

Instruction : 3 periods per week	Semester End Exam Marks : 70	Subject Reference Code : CH1230
Credits : 3	Sessional Marks : 30	Duration of semester End Exam : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
<b>The course will enable the students to:</b>	<b>At the end of the course students should be able to:</b>
<ol style="list-style-type: none"> <li>To study variation of electrode potential and EMF with variation of concentration, Temperature and to acquaint with applications of Galvanic Cell.</li> <li>To classify and compare various types of batteries.</li> <li>To apply concepts of electrochemical principles in corrosion and its control.</li> <li>The behavior of composition of heterogeneous equilibria.</li> <li>To appraise few engineering materials.</li> </ol>	<ol style="list-style-type: none"> <li>Construct the galvanic cell and to evaluate the effect of change in concentration on EMF and pH</li> <li>Select the battery for particular purpose based on chemical nature.</li> <li>Realise the gravity and type of corrosion suggest suitable control method</li> <li>Apply the principle of phase rule to heterogeneous equilibria.</li> <li>Get expose to basic concepts of engineering materials such as Lubricants, Liquid crystals, Nano materials and Refractories</li> </ol>

### UNIT-I: Electro Chemistry (09)

Types of conductors, Types of Conductance (Specific conductance, Equivalent conductance & Molar conductance) and their relationship. Electrolytic and Galvanic cells. Electrode potential, IUPAC convention of Cell notation, Cell reaction, EMF, Electro chemical series – applications, Nernst equation, Numericals. Reversible & Irreversible cells. Types of electrodes, Calomel Electrode (CE), Quinhydrone and Glass Electrode (GE). Determination of  $P^H$  using Quinhydrone and Glass Electrodes.

### UNIT-II: Battery Technology (8)

Definition, Types, Primary cell- Zn-C cell and Zn-alkaline cell

Secondary cells: -Ni-Cd battery, Lead-acid battery, Li - ion battery- charging & discharging reactions - applications. Fuel cells: phosphoric acid fuel cell - applications.

### UNIT-III: Corrosion & Its Control (8)

Concept, Gravity of corrosion-Types of corrosion (Dry & Wet), Mechanism of wet corrosion. Formation of anodic and cathodic areas-Differential aeration corrosion. and Galvanic corrosion- Factors influencing corrosion, Galvanic series.

**Nature of metal:** Relative areas of anode & cathode, Nature of corrosion product, Relative position of metal in galvanic series.

**Nature of environment:** Temperature,  $P^H$ , Humidity.

**Corrosion control methods:** Cathodic protection, Sacrificial Anodic Protection (SAP), Impressed Current Cathodic Protection (ICCP)- principle of electro plating & electro less plating and their differences (no plating process), Paint-its constituents and their Applications.

### UNIT-IV: Phase rule (8)

Terms, Statement of phase rule, one component system-water system- Condensed phase rule, two component system-Lead- Silver (Pb-Ag) system, Pattinson's process, Copper -Nickel (Cu-Ni) system, Safety fuses and solders.

[Signatures and dates: 3.12.14, 3/12/15]

## UNIT-V: Chemistry of Engineering Materials (9)

### a) Liquid Crystals (6)

Introduction, Classification of liquid crystals-Thermotropic and Lyotropic - Chemical constitution & liquid crystalline behavior. Molecular ordering in liquid crystals- Nematic, Smetic and Cholostric - Applications.

### b) Nano Materials

Introduction, preparation methods-(Vapor deposition & Sol-gel) - Applications.

### c) Membrane technology:

Introduction, Synthesis of two membranes. Applications.

### Learning resources:

1. Elements of Physical Chemistry by S. Glasstone and D Lewis
2. Principles of physical chemistry by Puri, Sharma and Pathania.
3. Text book of physical chemistry by PLSONI and op Dharmarha, s Chand &sons, new Deihi.
4. Engineering chemistry by PC Jain, M Jain Dhanpat Rai &sons (15<sup>th</sup> edition), New Delhi
5. Engineering chemistry by Sashi Chawla, Dhanpat Rai &sons, New Delhi.
6. Engineering chemistry by O.G. PALANNA, tmh, and Newdelhi
7. Chemistry in engineering and technology by JC Kuriacose and J Rajaram TMH, and New Delhi
8. Engineering chemistry by SS Dara, S Chand &sons, New Delhi.
9. Wikipedia



R. P. Reddy  
3.12.14

