

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

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

DEPARTMENT OF CHEMISTRY

SYLLABUS FOR THE SEMESTER-II

APPLIED CHEMISTRY

(For ECE, CSE & IT branches)

Instruction : 2+1hours per week	Semester End Exam Marks : 50	Subject Reference Code : BS
Credits : 2	Sessional Marks : 25	Duration of semester End Exam : 3 Hours

OBJECTIVES	OUTCOMES
The course will enable the students to:	At the end of the course students should be able to:
<ol style="list-style-type: none"> 1. To study types of conductance, variation of electrode potential and EMF. And to acquaint with applications of Galvanic Cell. 2. To classify and compare various types of batteries. 3. To appraise advanced engineering materials. 4. Get acquainted with engineering materials like liquid crystals, membranes and nano materials. 5. Expose to different high energy materials. 	<ol style="list-style-type: none"> 1. Construct the galvanic cell and to evaluate the effect of change in concentration on EMF and pH. 2. Select the battery for particular purpose based on chemical nature. 3. Suggest the suitable engineering materials for diversified applications. 4. Apply the knowledge of liquid crystals, membranes and nano materials in engineering applications. 5. Appreciate the applications & usage of high energy materials.

UNIT-I: Electro Chemistry

Types of conductors, description of conductivity cell-cell constant, 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. Principle and applications of potentiometric titrations.

UNIT-II: Chemistry of Batteries

Definition, Types of batteries

Primary batteries Zn-Carbon battery and Zn-alkaline battery

Secondary batteries: Lead-acid battery, Ni-Cd battery- construction, charging & discharging reactions and their applications.

Modern Batteries: Li - ion batteries- construction, advantages and their applications.

Fuel cells: Concept of fuel cells and merits.

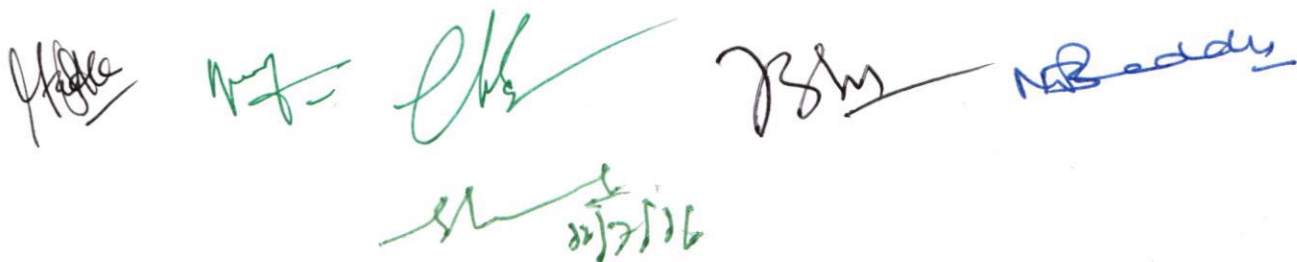
Construction and working of Molten carbonate fuel cell, phosphoric acid fuel cell , reactions and applications.

UNIT-III: Chemistry of Advanced Engineering Materials-I**a) Conducting polymers**

Definition, Classification into extrinsic and intrinsic polymers. Mechanism of conduction in doped and undoped Polyacetylene & Polyaniline - Applications.

b) Composite materials

Introduction, advantages, constituents of composites. Types of composites-fiber reinforced composites(Glass, Carbon & Aramid). Layered composites- Applications.



UNIT-IV: Chemistry of Advanced Engineering Materials -II

a) Liquid Crystals

Introduction, classification of liquid crystals-Thermotropic and Lyotropic - Chemical constitution & liquid crystalline behavior. Molecular ordering in liquid crystals- Nematic, Smectic and Cholestric - Applications.

b) Membrane technology:

Introduction, Definition, classification, working principle of membrane, casting methods-phase inversion, solvent evaporation method.

Synthesis of poly phenylene oxide, poly ether sulphone and their casting.

Applications of membranes.

c) Nano Materials

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

Production of Carbon Nano tubes by Arc - Discharge method and their applications.

UNIT-V: Rocket Propellants & Explosives

a) **Rocket Propellants**- Principle of rocket propulsion, classification, characteristics of good propellants.

b) **Explosives/ High energy materials**- Introduction, classification, precautions during storage, preparation of lead azide, TNT, Nitro glycerine and RDX

Learning resources:

1. PC Jain, M Jain *Engineering Chemistry*, Dhanapathi Rai &sons (16th edition), New Delhi.
2. Sashi Chawla, Text book of *Engineering Chemistry*, Dhanapathi Rai &sons, New Delhi.
3. O.G. PALANNA, *Engineering Chemistry*, TMH Edition.
4. JC Kuriacose and J Rajaram, *Chemistry in Engineering and Technology* TMH, New Delhi.
5. SS Dara, S Chand &sons, *Engineering Chemistry*, New Delhi.
6. Puri, Sharma and Pathania *Principles of physical chemistry*, Vishal Publishing Co.
7. PL Soni and op Dharmarha, S Chand &sons, *Text book of Physical Chemistry*, New Delhi.
8. S. Glasstone and D Lewis, *Elements of Physical Chemistry*.
9. Fred W. Billmeyer Jr., *Textbook of Polymer Science*.
10. Shikha Agarwal, *Engineering Chemistry*, Cambridge University Press, 2015.
11. Wikipedia.


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