Prasad V. Potluri Siddhartha Institute of Technology, Kanuru, Vijayawada. 1/4 B.Tech. SECOND SEMESTER

ENGINEERING CHEMISTRY

(Common to EEE,MECH,ECM)

Lecture: 4 periods/week **Credits: 4**

Internal assessment: 30 marks

Tutorial: 1 period /week

Semester end examination: 70 marks

Objectives:

1. To understand the treatment of municipal water.
2. Differences between semiconductors and superconductors.
3. Applications of liquid crystals.
4. Knowledge of prevention of corrosion.
5. The properties of nano materials and their engineering applications.
6. Significance of green chemistry.

Course Outcomes:

1. Develop innovative methods to produce soft water for industrial use and potable water at cheaper cost.
2. Gain the knowledge different types of semiconductors, superconductors and liquid crystals, their preparations, properties and engineering application.
3. Apply solar energy as a renewable source and its conversion into electrical energy.
4. Predict the impacts of corrosion and different methods of protection against corrosion.
5. Develop zeigler-natta catalysis in the synthesis of various polymers and also know the significance of bio-degradable polymers.
6. Design various techniques of molding of plastics , Fibre reinforced plastic and their engineering applications.
7. Synthesis nano materials and apply them in fields of engineering and medicine.
8. Reduce the environmental pollution by making use of knowledge of green chemistry.

UNIT - I

WATER TECHNOLOGY:

Introduction, Hardness of water, types of hardness, Degree of hardness, Determination. Softening methods, Treatment of Brackish and saline water by electro dialysis and reverse osmosis, Municipal water treatment.

UNIT - II

1. SUPERCONDUCTIVTY– Definition-Preparation –Properties –Engineering Applications

2. SEMICONDUCTORS-Definition –Types of semiconductors (Stiochiometric,Non stichometric ,Organic, Controlled Valency Semiconductors, Doping)-applications

3. LIQUID CRYSTALS-Definition –Types - applications in LCD and Engineering Applications.

UNIT - III SOLAR ENERGY:

Introduction – harnessing solar energy – solar heaters – photo voltaic cells – solar reflection – green house concepts.

UNIT - IV

CORROSION – Mechanism- Factors influence the rate of corrosion - Types of Corrosion - Protection methods (Anodic & Cathodic protection), - Metallic Coatings - Paints, Varnishes, Enamels , Special paints.

UNIT - V

POLYMERS:

Introduction - Types of polymers – Classification - Methods of polymerisation – Stereo specific polymers - Ziegler Natta catalysis - Properties of polymers –Conducting Polymers- Engineering applications – Biodegradable polymers - Individual polymers(Preparation,

Properties, Uses of Poly Styrene, PVC, PTFE, Bakelite's, Cellulose derivatives, Poly Carbonates)

UNIT – VI

PLASTICS – Types –Compounding of plastics- Moulding(Four types)- Fiber reinforced , Glass fibre reinforced plastics –Bullet Proof Plastics– Properties of plastics – Engineering applications.

UNIT - VII

NANO MATERIALS:

Introduction to Nanomaterials-preparation of few Nano materials(Carbon Nano Tubes, Fullerenes etc)-Properities of Nano materials- Engineering applications.

UNIT - VIII

GREEN CHEMISTRY:

Introduction – Principle of green chemistry, methods of green synthesis (aqueous phase, super critical fluid extraction method, phase transfer catalyst, micro wave induced method, ultra sound method.

Learning Resources

1. A text book of Engineering chemistry –I by N.Krishna Murthy, N.Y.S.Murthy, Dr.V.Anuradha.
2. A text book of Engineering chemistry –II by D.Srinivasulu, Srivastava, Roliverma.
3. A text book of Engineering chemistry by JAIN & JAIN.
4. A text book of Engineering chemistry by C.P.Murthy, C.V.Agarwal. Andra Naidu.
5. A text book of Engineering chemistry by S.S.DARA.
6. A text book of Engineering chemistry by Dr.C.Daniel Yesudian