

## 1/4 B.Tech - FIRST SEMESTER

**ENGINEERING CHEMISTRY**

(Common to CSE, IT, CE, ECE during I B.Tech, I Semester)

(Common to EEE, AE, ME during I B.Tech, II Semester)

Course Code(s): CE1T3, CS1T3, IT1T3, EC1T4, AE2T3, EE2T3, ME2T3

**Credits: 3****Lecture: 3 Periods/week****Internal assessment: 30 marks****Practice/Interaction: 1 Period /week****Semester end examination: 70 marks****Objectives:**

- To acquire knowledge about desalination of brackish water and treatment of municipal water.
- To gain the knowledge of conducting polymers, bio-degradable polymers and fiber reinforced plastics.
- To learn significance of green chemistry and green synthesis and the synthesis of nano materials.
- To understand mechanism of corrosion and preventive methods.
- To understand concept of semi conductivity, superconductivity and liquid crystal and solar energy.

**Outcomes:**

Students will be able to

- Develop innovative methods to produce soft water for industrial use and potable water at cheaper cost.
- Replace metals with conducting polymers and also produce cheaper biodegradable polymers to reduce environmental pollution.
- Produce economical green synthesis and new methods of synthesis of nano materials.
- Find appropriate metals or combination of metals and develop economical methods for minimizing corrosion.
- Bring the new ideas in converting solar energy into most needy electrical energy efficiently and economically to reduce the environmental pollution.

**Syllabus:****UNIT - I**

A)WATER TECHNOLOGY:- Introduction, Hardness of water, types of hardness(permanent and temporary)- Degree of hardness-Numericals-determination of hardness by EDTA Method-softening methods (lime-soda, ion exchange and zeolite process)

B)WATER TREATMENT:- Desalination-reverse osmosis-electrodialysis. Municipal water treatment-removal of micro organisms- by irradiation of UV radiation- bleaching powder process-chlorination-break point of chlorination-By using chloramine-By using ozone.

**UNIT-II**

A)POLYMERS:-Introduction - Types of polymers (addition and condensation)- mechanism of addition polymerization (free radical, ionic) – Classification - Methods of polymerisation – Stereospecific 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, PolyCarbonates).

B)PLASTICS :Types –Compounding of plastics- Moulding (Injection, compression, blow film extrusion and extrusion moulding)- Fiber reinforced plastics (Glass and carbon) – Bullet Proof Plastics– Properties of plastics – Engineering applications.

**UNIT - III**

A) 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).

B) NANO MATERIALS: -Introduction to Nanomaterials -preparation of few Nano materials (Carbon Nano Tubes, Fullerenes etc)-Properties of Nano materials- Engineering applications.

**UNIT - IV**

A) CORROSION :-Definition, causes and consequences of corrosion-mechanism of dry and wet corrosion-galvanic series, Factors influencing rate of corrosion passivity of metal, types of corrosion (galvanic, differential Aeration, pitting, crevice and stress corrosion).

B) CORROSION CONTROL: - Cathodic protection (sacrificial anodic protection and Impressed current cathodic protection) and Application of protective coating-metallic coatings (galvanization and tinning) organic coatings (paints (mechanism not required), varnishes, lacquers and enamels).

**UNIT - V**

A) SEMICONDUCTORS & SUPERCONDUCTIVITY SEMICONDUCTORS-Definition –Types of semiconductors (Stoichiometric, Non Stoichiometric, Organic, Controlled Valency Semiconductors, Doping)-applications SUPERCONDUCTIVITY– Definition-Preparation – Properties –Engineering Applications.

B) LIQUID CRYSTALS & SOLAR ENERGY: - LIQUID CRYSTALS-Definition –Types - applications in LCD and Engineering Applications.

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

**Text Books:**

1. A text book of Engineering chemistry, N.KrishnaMurthy N.Y.S.Murthy Dr.V.Anuradha.
2. A text book of Engineering chemistry II, D.Srinivasulu, Srivastava, Roliverma.
3. A text book of Engineering chemistry, JAIN & JAIN.
4. A text book of Engineering chemistry, C.P.Murthy, C.V.Agarwal. Andra Naidu.

**Reference Books:**

1. A text book of Engineering chemistry, S.S.DARA.
2. A text book of Engineering chemistry, Dr.C.Daniel Yesudian

**e-Learning Resources:**

1. <http://nptel.ac.in/courses.php>
2. <http://jntuk-coeerd.in/>