



MANGALORE UNIVERSITY

Department of Chemistry MSc CHEMISTRY

OCE 456: ENVIRONMENTAL, ELECTRO AND POLYMER CHEMISTRY

COURSE OUTCOME:

- It is an elective course offered to students from disciplines other than chemistry. It aims at enhancing their general understanding of chemistry.
- Few important topics such as sources and detection of air pollution, batteries as power sources, devices of solar energy conversion,
- Polymers used in day to day life and for medical and technical applications will be taught with awareness of plastic pollution and technique of plastic waste management.
- To study corrosion effects.

UNIT-I:

[12 hrs]

Environmental segments, evolution of earth's atmosphere. Air pollution : Air pollutants, prevention and control, Green house gases and acid rain. Carbon monoxide, industrial sources and transportation sources. SO_x- sources, ambient concentration, test methods, control techniques - scrubbing, limestone injection process. Ozone hole and CFC's. Photochemical smog and PAN. NO_x - Sources, ambient concentration, test methods, thermodynamics and NO_x control techniques. Particulates : Size distribution, , particulate collection - settling chambers, centrifugal separators, wet scrubbers, electrostatic precipitators & fabric filters. Catalytic converters for mobile sources. Bhopal gas tragedy.

UNIT-II

[12 hrs]

Corrosion - Introduction, consequence, types, prevention and Conventional sources of energy, limitations, Importance of storage, Battery-Electrodes, Cell, battery Brief account of primary, secondary, lithium battery and fuel cells. Semiconductor electrodes and Solar energy system. Introduction to bioelectrochemistry, electrochemical communication in biological organisms. Theory and applications of Electroplating and electroless plating. 7hrs

Reaction Kinetics-Theory and applications of different types of reactions- Oscillatory, chain reaction, branched chain reaction. Energy of activation and thermodynamic parameters, Collision theory of reaction rates, limitations and basics of transition state theory. 5 hrs.

UNIT-III

[12 hrs]

Polymers: Introduction-Basic concepts and classification of polymers, Molecular weight and its distribution, Chemistry of polymerization- Step, chain, Coordination, Copolymerization. Polymerization techniques- bulk, solution, suspension, emulsion, poly-condensation, solid and gas phase polymerization. Chemical and geometrical structure of polymer molecules, Structure property relationship- Physical, Thermal and mechanical properties 6 hrs

Synthesis, properties, structural features and applications of some important commercial polymers (PE, PP, PS, PVC, PMMA, PET, Nylon-6, Nylon-6,6) Engineering polymers (Kevlar, Nomex, ABS, PC, Teflon). Applications of polymers in separations: reverse osmosis, ultra and nano-filtration. Applications in electronics- conducting polymers and electronic

shielding, Applications of polymers in medicine. cManagement of plastics in environment - recycling, incineration and biodegradation

6hrs

References:

1. A.K. De : Environmental Chemistry, (Wiley Eastern).
2. S.K.Banerji : Environmental Chemistry, (Prentice Hall India), 1993.
3. S.D. Faust and O.M. Aly : Chemistry of Water Treatment, (Butterworths),1983.
4. Sawyer and McCarty, Chemistry for Environmental Engineering(McGraw Hill) 1978
5. I.Williams, Environmental Chemistry, John Wiley, 2001
6. S.M.Khopkar, Environmental Pollution Analysis, (Wiley Eastern).

