

II SEMESTER

HARD CORE COURSES

ESH463 ENVIRONMENTAL CHEMISTRY

52 hrs.

Course Outcomes:

CO1 Understand the fundamentals of environmental chemistry with reference to atmospheric and water chemistry.

CO2 Understand the principles and basics of chemical reactions related to the environment.

CO3 Describe chemical composition of air and classification of elements.

CO4 Discuss on air pollutants and their reactions in the atmosphere.

CO5 Describe the chemical properties of water.

CO6 Develop skills on chemical property of environment.

UNIT I (13 hours)

Fundamentals of Environmental Chemistry: Stoichiometry, Gibbs' energy, chemical potential, chemical equilibria, acid-base reactions, solubility product, solubility of gases in water, the carbonate system, unsaturated and saturated hydrocarbons, radioisotopes in the environment.

Chemical reactions and equations, solutions, units, sampling, and analytical techniques.

UNIT II (13 hours)

Atmospheric chemistry: Chemical composition of Air. Classification of elements, chemical speciation. Particles, ions and radicals in the atmosphere. Chemical processes for formation of inorganic and organic particulate matters. Thermochemical and photochemical reactions in the atmosphere. CFCs, Oxygen and Ozone chemistry, chemistry of air pollutants, photochemical smog.

UNIT III (13 hours)

Chemical pollution and fundamentals of chemical reactions: Oxidation, reduction, precipitation. Toxic chemicals in the environment, biochemical aspects of As, Cd, Pb, Hg, CO, O₃, PAN, pesticides, MIC and carcinogens in air. Effects of Chemical Pollution.

UNIT IV (13 hours)

Water chemistry: Properties of water, types of reactions in various water bodies including marine environment. Chemistry of oil based and water based paints, physico-chemical basis of redox processes. Electrochemical theory of corrosion.

References:

1. Ajay Kumar Bhagi and Chatwal, G.R. Text book of Environmental Chemistry.
2. Bhatia, S.C. 2011. Environmental Chemistry, CBS Publishers.
3. Day, A.K. 1984. Environmental Chemistry, Willey Eastern, III Ed.
4. Faust, S.D. and Dly, O.M. 1983. Chemistry of water treatment.

