



MANGALORE UNIVERSITY

**Department of Biosciences
MSc Environmental Science**

ESH401 ENVIRONMENTAL CHEMISTRY

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 Study about chemical pollution and reactions.

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, radionuclides.

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.

UNIT IV (13 hours)

Water chemistry: Properties of water, water pollutants - sources & types - heavy metals-metalloids, 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 & Chatwal, G.R. Text book of Environmental Chemistry.
2. Day, A.K. Environmental Chemistry, Willey Eastern, III Ed. (1984)
3. Faust, S.D. and Dly, O.M. Chemistry of water treatment (1983)
4. Manahan, S.E. Environmental Chemistry, Lewis Publications, Florida, U.S.A, (7th Ed.) (2000)
5. Sharma, B.K. & Kaur. Environmental Chemistry, Goel Publishing House, Meerut (1995)
6. Sawyer, C.N., Mc Marty, P.L. and Perkin G.F. Chemistry for Environmental Engineering, Mc Graw Hill (II Ed.) (1994)
7. Tyagi, O.D. and Mehra, M. Environmental Chemistry, Anmol Publications (1990)