

CORE COURSE - I (CC): ENVIRONMENTAL CHEMISTRY

UNIT 1 - Fundamentals of Environmental Chemistry : Stoichiometry, Gibb's energy, chemical potential, chemical equilibria, acid-base reactions, solubility product, solubility of gases in water , the carbonate system, unsaturated and saturated hydrocarbons, radionuclides.

UNIT 2 - 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 matter. Thermochemical and photochemical reactions in the atmosphere. Oxygen and ozone chemistry. Chemistry of air pollutants. photochemical smog.

UNIT 3 - Water Chemistry: Physico-Chemical parameters of water, concept of DO, BOD, COD, sedimentation, coagulation, filtration, Redox potential, water cycle, types of water, sampling techniques.

UNIT 4 - Chemistry of the soil: Structure of lithosphere, Nature of soil - physical properties of soil - soil water - soil air - soil temperature - mechanical composition- structure and texture. Chemical properties of soil: Minerals of soil - colloids in soil; ion exchange reactions in soil. Soil fertility and evaluation - organic matter in soil and their transformation - soil pH and its effect on fertility.

UNIT 5 - Toxic Chemicals in the environment-Xenobiotics- in Air, Water and soil. Biochemical aspects of Arsenic, Cadmium, Lead, Mercury, Carbon Monoxide, O₃ and PAN, Pesticides, Insecticides, MIC, carcinogens. **Principles and Applications:** Titrimetry, Gravimetry, Colourimetry, Spectrophotometry, Atomic Absorption Spectrophotometry, Flame photometry, Electrophoresis. X-ray fluorescence, X-ray diffraction, Chromatography-GC, GLC and HPLC,.

REFERENCES

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4. Cunningham, P, Cooper, H, Eville, G, and M.T. Hepworth. 1999. Environmental Encyclopedia. Jaico Publishing House, Mumbai.
5. De A.K. 1990. Environmental Chemistry. Wiley Eastern Ltd., New Delhi.
6. Gilreath, E.S. Fundamentals of Inorganic Chemistry.
7. Glasstone, S and Lewis. Essentials of Physical Chemistry.
8. Johnson, D.O. Netteville, J.T. Wood, J.C. and James M. 1973. Chemistry and the Environment W.B. Saunders Co., Philadelphia.
9. Sharma, B.K. and Kaur, H. 1994. Environmental Chemistry. Goel Publishing House, Meerut.
10. Sindhu, P.S, 2002. Environmental chemistry. New age international publishers, New Delhi.
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12. Warne, R.P. 1985. Chemistry of Atmospheres. Clarendon Press, Oxford.
13. Weigbery, Instrumentation manual. McGraw Hill, New York.
14. Williamson, S.J. 1971. Fundamentals of air pollution. Wesley publishing company.