OC S 465: ENVIRONMENTAL CHEMISTRY

Course Outcome

- This course enlighten the students about environmental pollutions like Air pollution, toxic chemicals in the environment.
- Hydrologic cycle, BOD, COD, radioactive waste management, sewage and industrial effluent treatment, water purification.
- Biochemical effects of Pesticides and heavy metals.
- Students learn effect of toxic chemicals in environment.

UNIT-I **[12 Hours]**

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 Hours]**

Hydrologic cycle, sources, chemistry of sea water, criteria and standards of water quality- safe drinking water, maximum contamination levels of inorganic and organic chemicals, radiological contaminants, turbidity, microbial contaminants. Public health significance and measurement of colour, turbidity, total solids, acidity, alkalinity, hardness, chloride, residual chlorine, sulphate, fluoride, phosphate and different forms of nitrogen in natural and polluted water. Chemical sources of taste and odour, treatment for their removal, sampling and monitoring techniques. Determination and significance of DO, BOD, COD and TOC. Water purification for drinking and industrial purposes, disinfection techniques, demineralization, desalination processes and reverse osmosis.

UNIT-III **[12 Hours]**

Toxic chemicals in the environment, impact of toxic chemicals on enzymes. Detergents-pollution aspects, eutrophication. Pesticides - pollution of surface water. Sewage and industrial effluent treatment, heavy metal pollution. Chemical speciation- biochemical effects of pesticides, insecticides, particulates, heavy metals (Hg, As, Pb, Se), carbon monoxide, nitrogen oxides, sulphur oxides, hydrocarbon, particulates, ozone, cyanide and PAN. Solid pollutants and its treatment and disposal. Radioactive waste management.

References

1. Environmental Chemistry, A. K. De, New Age International (2016).
2. Environmental Chemistry, S. K. Banerji, Prentice Hall India (1993).
3. Chemistry of Water Treatment, S.D. Faust and O. M. Aly, Butterworths (1983).
4. Chemistry for Environmental Engineering, 5th edn., C. N. Sawyer, P. L. McCarty and G. F. Parkin, McGraw Hill (2017).
5. Environmental Chemistry, I. Williams, John Wiley (2001).
6. Environmental Pollution Analysis, 2nd edn., S. M. Khopkar, New Age International (2020).