EVPC3006 ENVIRONMENTAL CHEMISTRY (3-0-0)

Course Objectives:

- To acquire knowledge of effect of pollutants on structure of atmosphere
- To have idea about water quality parameters and its purification process
- To understand soil characteristics and its Pollution
- To know about major ecological disasters and understand the principles of sustainable chemical processes

Module-I (8 hours)

Structure of atmosphere, Properties of Air, Types of Air Pollution Sources: Natural and Anthropogenic Sources, Classification and Chemistry of Major Air Pollutants, Thermodynamics of air pollutants, Atmospheric photochemistry, Chemical and Photochemical Reactions in atmosphere, PAH, VOCs, Acid Rain, Depletion of Stratospheric Ozone. Control of Gaseous Pollutants, Green fuel and their environmental impacts.

Module-II (8 hours)

Principles and Application of Water Chemistry: Unique Properties of Water, Water Quality Parameters: physico-chemical, biological and bacteriological parameters, Water Quality Criteria and Standards, Water Pollution: Heavy Metal Pollution and its Abatement, Detergents and Phosphates, Eutrophication, Chemical Methods of Water and Wastewater Treatment, Removal of Dissolved Organics and Inorganics, Removal of Nitrogen and Phosphates, Water disinfection, Xenobiotics.

Module-III (8 hours)

Nature and Importance of Soil, Soil Properties, Acid-Base and Ion-exchange Reactions in Soils, Macro and Micronutrients, Colloidal chemistry of Soils, Fertilizers and Other Soil Amendments, Soil Pollution: Heavy Metals and Radio- nuclides in Soil, Degradation of natural substances, Remediation of Metal Contaminated Soil.

Module-IV (8 hours)

Hazardous Wastes, Effects and fate of Hazardous wastes. Bioaccumulation of pollutants, ecotoxicology, and major industrial or ecological disasters, Principles of sustainable chemical processes, waste minimization, and eco-friendly alternatives in everyday life

Couse outcomes: At the end of the course students will be able to:

- Characterise air pollution and provide its remedial measures
- Apply the principles water chemistry to characterise water
- Minimize water pollution adopting various novel methodologies
- Provide information for soil reclamation process
- Implement principles of sustainable chemical processes for reducing ecological disasters

Books:

- Sawyer C., Mccarty P., Parkin G., Chemistry for Environmental Engineering and Science. McGraw-Hill Education
- Beard, J.M., Murphy R.M. Environmental Chemistry in Society. CRC Press.2021
- Stumm W. & Morgan J.J. Aquatic Chemistry. John Wiley & Sons, Inc, 3rd Ed., NY-1995.
- Snoeyine V.L. and Jenkins D. Water Chemistry -, John Wiley and Sons, Inc, NY-1980.
- De A., & De A.K. Environmental Chemistry. New Age International Private Limited.2023.
- Banerjee S.K., Environmental Chemistry. Prentice Hall India Learning Private Limited.