

8th Semester

ENVIRONMENTAL ENGINEERING (3-0-0)

Objective: This course introduces the students to the environmental consequences of Industries, development actions etc. and the methods of minimizing their impact through technology and legal systems.

Module – I

Ecological Concepts and Natural Resources: Ecological perspective and value of environment. Environmental auditing, Biotic components, Ecosystem Process: Energy, Food Chain, Water cycle, Oxygen cycle, Nitrogen cycle etc., Environmental gradients, Tolerance levels of environment factor, EU, US and Indian Environmental Law, Global Perspective.

Chemistry in Environmental Engineering: Atmospheric chemistry, Soil chemistry, Material balances and Reactor configurations.

Module – II

Water Pollution: water quality standards and parameters, Assessment of water quality, Aquatic pollution, Estuarine water quality, Marine pollution, Organic content parameters, Ground water Contamination, Water table and Aquifer, Ground water recharge. Water quality parameter and standards.

Water Treatment: Water treatment processes, Pre-treatment of water, Conventional process, Advanced water treatment process.

Waste Water Treatment: DO and BOD of Waste water treatment process, pretreatment, primary and secondary treatment of waste water, Activated sludge treatment: Anaerobic digestion and its microbiology, Reactor configurations and methane production. Application of anaerobic digestion.

Air Pollution : Air pollution and pollutants, criteria pollutants, Acid deposition, Global climate change –green house gases, non-criteria pollutants, emission standard form industrial sources, air pollution meteorology, Atmospheric dispersion.

Industrial Air Emission Control:

Characterization of air stream, Equipment selection, Equipment design, Special Methods: Flue gas desulphurization, NO_x removal, Fugitive emissions.

Module – III

Solid Waste Management Source classification and composition of MSW: properties and separation, storage and transportation, MSW Management, Waste minimization of MSW, Reuse and recycling,

Hazardous Waste Management, Hazardous waste and their generation, Transportation and treatment of hazardous waste: Incinerators, Inorganic waste treatment, handling of treatment plant residue. Waste minimization techniques.

Noise Pollution: Physical Properties of sound, Noise criteria, Noise Standards, Noise measurement, Noise control.

Environment impact Assessment, Origin and procedure of EIA, Project Screening for EIA, Scope studies, Preparation and review of EIS.

Text Book

1. Environmental Engineering Irwin/ McGraw Hill International Edition, 1997, G. Kiely,
2. Environmental Engineering & Safety by Prof B.K. Mohapatra, Seven Seas Publication, Cuttack

Reference Books

1. Environmental Engineering by Arcadio P. Sincero & Gergoria A.Sincero PHI Publication
2. Principles of Environmental Engineering and Science, M. L. Davis and S. J. Masen, McGraw Hill International Edition, 2004
3. Environmental Science, Curringham & Saigo, TMH,
4. Man and Environment by Dash & Mishra
5. An Introduction to Environmental Engineering and Science by Gilbert M. Masters & Wendell P. Ela - PHI Publication.