

III SEMESTER

HARD CORE COURSES

ESH 513 WATER AND WASTEWATER MANAGEMENT 52 hrs.

Course Outcomes:

CO1 Describe water pollution parameters and to learn various methods wastewater treatment.

CO2 Realize the importance of water and water crisis and to understand the water purification methods.

CO3 Get the knowledge of ground water quality.

CO4 Understand pollution scenario of Indian rivers.

CO5 Understand the method of water and wastewater management which support employability in pollution control boards and industries.

UNIT I (13 hours)

Hydrology: Sources of water and its characteristics, Distribution of water on Earth. Physical and Chemical properties of Water, types of water demands - per capita demand, water quality standards for various uses. Water Pollution parameters, sources and types of Pollution, pollution scenario of Indian Rivers, water harvesting and watershed management.

UNIT II (13 hours)

Groundwater Hydrology: Occurrence of groundwater, Ground water zones and Groundwater System. Porosity, permeability and types of Aquifers. Water Table, ground water flow, functions and Topography, Ground water depletion, Ground water Quality, Ground water pollution, Saltwater Intrusion, Changes in Ground water Quality.

UNIT III (13 hours)

Water purification: Screening – Treatment system- sedimentation, coagulation, filtration rapid sand filter, slow sand filter, advantages and disadvantages. Disinfections – Methods of disinfections, water softening process. Taste and odor removal (Aeration).

UNIT IV (13 hours)

Wastewater treatment: Characteristics of wastewater, Primary treatment – Screening & Grit chambers, sedimentation and flocculation, equalization, neutralization, secondary treatment – Aerated lagoons, Trickling Filters, Activated Sludge process, Membrane bioreactor, Oxidation pond, Aerobic and Anaerobic decomposition of wastewater, UASB, tertiary treatment, sludge drying beds.

References:

1. American Public Health Association. 1980. Standard Methods for Examination of Water and Wastewater, 5th Ed.
2. Fair, G.M., Geyer, T.C. and Okun, D.A. 1984. Water and waste water Engineering, Vol. I and II, John Wiley and Sons, Strauss.
3. Khoiyangbam, R.S and Gupta, N 2020. Introduction to Environmental Science. TERI.
4. Metcalf and Eddy. Waste Water Engineering, Tata Mc Graw Hill.
5. Shirdel, B. 2017. Environmental groundwater and Engineering geology, CBS