

PEN6I101 WATER AND WASTE WATER ENGINEERING

MODULE-I

Quality of raw water (turbidity, Suspended solid, odors, colours, organic matters) Aeration, Flocculation, Coagulation, Sedimentation, Filtration – Slow sand filter, Gravity and pressure filters, Disinfection – common disinfectants, types of chlorination – Breakpoint chlorination, chlorine demand and safety measures.

Removal of Refractory organics – Adsorption isotherm, Operation and design procedure for activated carbon adsorption column. Immobilized cells in waste water treatment, Enzymes and microbial cell immobilization, whole-cell immobilization, Immobilized cell reactors.

MODULE-II

Pretreatment (Screening and Grit removal), Bar Screens, Sedimentation, Suspended and fixed growth systems, Aerobic and Anaerobic system, Activated sludge process, Trickling filters, biological contactors, Biofilters, Secondary sedimentation tanks, Stabilization ponds – Aerobic, facultative, Anaerobic lagoons.

MODULE-III

Hydraulic design of septic tanks, up-flow anaerobic sludge. Blanket reactor (VASB), up-flow packed bed attached growth reactor. Anaerobic sludge digestion, digestion and stabilization, Gas generation, removal of dissolved inorganic substances – chemical precipitation, Nutrient removal, Iron exchange method, Reverse osmosis, Electro dialysis, membrane filtration.

MODULE-IV

Characterization of sludge - Quantity, Quality and volume, sludge mass balance, Sludge pumping, Thickening, Stabilization, Dewatering, Sludge Drying beds, Treated waste water disposal on land and its osmotic effects and toxic effects, Tertiary treatment of wastewater disinfection, Reuse of treated waste water as cooling water, Process water in industrial and agricultural sludge disposal.

Text Books :

1. Waste water engineering, by Metcalf & Eddy - McGraw Hill.

Reference Books

1. Design of waste water treatment systems - Quasim.
2. A text book of water supply and waste water engineering - Hammer et al

WATER AND WASTE WATER ENGINEERING (PRACTICAL)

Determination of Chloride, Sulphate, Total Kjeldhal Nitrogen (TKN), Nitrate, Oil and Grease, BOD, COD, Chlorine Demand, Break-point Chlorination and Free Residual Chlorine, TOC. Analysis of Sewage, determination of MLSS, MLVSS, SVI; Sludge Settling characteristics curve, Jartest, BTotal & Faecal Coliform in drinking water.