

GUJARAT TECHNOLOGICAL UNIVERSITY

PDDC - CIVIL ENGINEERING

Semester: IV

Subject Name: **Environmental Engineering**

Sr. No.	Course content
1.	Water Demands: Various types of water demands, the per capita demand, factors affecting per capita demand, waste and losses, variations in demand, design periods, population forecasting methods.
2.	Collection and Conveyance of Water: Intakes, types of intakes, design of intakes, conveyance of water, design of pump and rising mains.
3.	Water Treatment Processes: Water supply scheme, plain sedimentation, types of sedimentation, sedimentation tank & its design, sedimentation with coagulation, types of coagulants, optimum dose of coagulants, mixing devices, design of flocculator. Theory of filtration, types of filters and their comparison, design of rapid sand filter, washing of filter, troubles in filter. Methods of disinfection, action of chlorine, types of chlorination. Methods of removing temporary and permanent hardness.
4.	Distribution System: Layout of distribution networks, methods of water distribution, storage capacities of elevated service reservoirs, and under ground service reservoir.
5.	Collection and Estimation of Sewage: Different types of sewers, design period, variations in sewage flow, estimation of waste water discharge.
6.	Hydraulic Design of Sewer: Hydraulic formulae, maximum and minimum velocities in sewer, hydraulic characteristics of circular sewer in running full and partial full conditions, laying and testing of sewer, sewer appurtenances and network.
7.	Unit Operations for Waste Water Treatment: Physical unit operation-Screening, flow equalization, mixing, flocculation, sedimentation. Chemical unit processes-Chemical precipitation. Biological unit processes: Aerobic attached growth and aerobic suspended growth treatment processes, anaerobic

	suspended growth treatment process.
8.	Design of Facilities for Physical, Chemical & Biological Treatment of Waste Water: Design of racks, screens, grit chamber, aeration units, sedimentation tanks, activated sludge and trickling filter processes, rotating biological contactors, sludge digesters and drying beds,
9.	Low Cost Sanitation System: Septic tanks, soak pit, stabilization ponds, packaged treatment plant.
10.	Introduction to tertiary waste water treatment.

Term Work:

Term work shall be based on the above mentioned course content.

Field Visit:

Field visits based on course content are suggested.

Reference Books:

1. Environmental Engg. Vol. 1 &2 by B.C.Punmia
2. Environmental Engg. Vol. 1 &2 by S.K.Garg
3. Environmental Engg. by Peavy, Rowe, Tchobanoglous