

EN682: Conveyance of Water and Waste water

Teaching Scheme			Credits	Marks Distribution				Total Marks
L	T	P		Theory Marks		Practical Marks		
			ESE	CE	ESE	CE		
3	2	0	5	70	30	30	20	150

Course Content:

Sr. No.	Topics	Teaching Hrs.
1	<p><u>Hydraulics and Measurement of flow:</u></p> <p>Fluid properties; fluid flow - continuity principle, energy principle and momentum principle; frictional head loss in free and pressure flow, minor heads losses, Carrying Capacity-Flow measurement, Venturimeter, Orificemeter, Nozzlemeter, Rotameter, Notches.</p>	08
2	<p><u>Transmission of Water:</u></p> <p>Need for Transport of water and wastewater-Planning of Water System -Selection of pipe materials, pipe thickness calculations. Water transmission main design- gravity and rising main; Selection of Pumps- characteristics-economics; Specials, Jointing, laying and maintenance, Water hammer phenomenon and analysis.</p>	10
3	<p><u>Water distribution System:</u></p> <p>Layout of distribution networks, methods of water distribution, storage capacity of ESR, and underground service reservoir, minimization of water losses, leak detection, Introduction to the use of computer software in water transmission, water distribution design.</p>	07
4	<p><u>Storm Water Drainage:</u></p> <p>Necessity, combined and separate system; Estimation of storm water runoff, Formulation of rainfall intensity duration and frequency relationships, Rational methods, Design of storm water drains.</p>	05

5 **Wastewater collection and conveyance:**

10

Planning factors, Design of sanitary sewer; partial flow in sewers, economics of sewer design; Wastewater pumps and pumping stations, sewer appurtenances; material, construction, inspection and maintenance of sewers; Design of sewer outfalls-mixing conditions; conveyance of corrosive wastewaters.

Total Hrs. 40

Reference Books:

1. G.S. Birdie and J.S. Birdie, “*Water Supply and Sanitary Engineering*”, DhanpatRai Publishing Co. - New Delhi.
2. A.K. Jain, “*Fluid Mechanics*” published by Khanna publication, New Delhi.
3. Metcalf and Eddy, “*Wastewater Engineering: Treatment, disposal Reuse*” (Revised by G. Tchobanoglous) Tata-McGraw Hill, New Delhi.
4. Viesman, Hammer, “*Water Supply and Pollution Control*” Dun Donnelley Publisher, New York
5. Bajwa, “*Practical Handbook on Public Health Engineering*” G.S. Deep Publishers, Shimla, 2003.
6. CPHEEO, “*Manual on water supply and Treatment*” Ministry of Urban Development, Government of India, New Delhi, Latest Edition.
7. CPHEEO, “*Manual on Sewerage and Sewage Treatment*” Ministry of Urban Development, Government of India, New Delhi, Latest Edition.
8. Steel and Mcghee, “*Water supply and sewerage*”.