EN501: Theory of Water and wastewater engineering

Teaching Scheme			Credits	Marks Distribution				Total Marks
				Theory Marks		Practical Marks		
L	T	P	C	ESE	CE	ESE	CE	
4	0	2	6	70	30	30	20	150

Course Content:

Sr. No.	Topics	Teaching Hrs.
1	**Water Quality:** Physical, chemical and biological parameters of water, Water Quality Requirement for various uses, Drinking water standards –Wastewater disposal standards.	03
2	**Water Treatment Processes:** Introduction to Unit operations related to treatment of Ground water & surface water. Water treatment plant layout and flow diagram.	02
3	**Ground Water Treatment processes:** Aeration, Gas transfer. Surface Water Treatment processes: Plain sedimentation and sedimentation aided with coagulants. Colloids, Stability of Colloids and destabilization of Colloids. Coagulation and flocculation: Process and Mechanism, Various coagulants, Coagulants aids. Sedimentation: types, Ideal sedimentation Basin. Design of Flocculator and Sedimentation Basin, Clariflocculator.	08
4	**Filtration:** Theory of granular media filtration; Types of filters- slow sand filter and rapid sand filter; Working of RSF, Mechanism of filtration: Operational problems- Mud ball formation, negative head etc and their remedies; Dual and multimedia filtration, pressure filters, Design of RSF.	06

5	**Disinfection:** Factors affecting disinfection, Methods of disinfection, Disinfection by Chlorine; Residual Chlorine and Chlorine Dose, Ozonation.	05
6	**Waste Water Treatment:** Domestic Waste Water treatment plant layout and flow diagram. Theory, Working and Design: Parshall flume, Screen, Grit chamber, PST, Activated sludge unit, Trickling filter, Sludge digester and Sludge drying beds, Sludge dewatering unit.	10
7	Miscellaneous methods: Micro-filtration, Nano-filtration, Ultrafiltration.	06
	Total Hrs.	**40**

Reference Books:

1. Metcalf and Eddy, "*Wastewater Engineering, Treatment and Reuse"*, Tata McGraw-Hill Publication, New Delhi, 2003.
2. Fair, Geyer and Okun , "*Water & Waste Water Engineering",* Vol.-I & Vol.-II
3. Mackenzie, "*Introduction to Environmental Engineering".*
4. Weber W.J., John Wiley and sons, "*Physicochemical processes for water quality control"*, Network, 1983.
5. Peavey H.S., Rowe D.R. and Tchobanoglous, G., "*Environmental Engineering"*, McGraw Hills, New York, 1985.
6. *"Water Quality and Treatment"* (A handbook of community water supplies 5th edition): Published by American Water Works Association.
7. Clerk and Viessman, Hammer, "*Water supply engineering"*.
8. Ministry of urban Dev., "*Manual of Water supply",* New Delhi.
9. Ministry of urban Dev., "*Manual of Waste Water Treatment ",* New Delhi.