

		National Institute of Technology Meghalaya An Institute of National Importance							CURRICULUM		
Programme		Master of Technology					Year of Regulation		2025-2026		
Department		Civil Engineering					Semester		1		
Course Code	Course Name	Pre-requisite	Credit Structure				Marks Distribution				
			L	T	P	C	INT	MID	END	Total	
CE 533	Water supply and Sanitation Engineering	NIL	3	0	0	3	50	50	100	200	
Course Objectives	- To gain knowledge on sources of water, importance of water quality and its standards for usage. - To understand objectives of water treatment. - To understand the design and operation of a Water treatment system - To understand about the purification process like, Sedimentation, Coagulation, Filtration and softening methodologies involved before supplying to Public	Course Outcomes	CO1	Able to understand the roll and importance of drinking water Quality and control of water borne diseases							
			CO2	Able to understand the reason for transmission of Various diseases in Urban and Rural Community							
			CO3	Able to understand the objectives and importance of treatment of water, so that standards of water can be judged before supplying to a community							
			CO4	Able to understand the Dynamics of Water treatment and type of treatment required with respect to water quality							
			CO5	Able to gain knowledge on water softening methods and utilization of water through rainwater harvesting process							
SYLLABUS											
No.	Content							Hours		COs	
I	Introduction – Sources of water, Importance of water quality and standards. Objectives of Water treatment. Flow chart on overall water supply project, Unit diagrams on water treatment systems. Suitability of Intake Structures.							8		CO1, CO2	
II	Treatment Operations – Gas transfer two film theory- Water in air system and Air in water system. Types of Aeration and limitations. Principles of Sedimentation. Design criteria and design of Sedimentation tanks.							9		CO3, CO4	
III	Coagulation and Flocculation- Theory of Coagulation. Types of Coagulants, reactions, Coagulant Aids, Determination of Optimum dose of Coagulants. Design Criteria and numerical problems on estimation of coagulants.							9		CO3, CO4	
IV	Filtration – Theory of Filtration, types of filters used in treatment plant, Hydraulics of Filter bed. Design criteria and Design of Filters, Filter Back wash, Operational troubles and trouble shooting. Water disinfection, methodologies. theory of disinfection, Chemistry of Chlorination and Break Point Chlorination							6		CO4	
V	Water Softening - Ions causing Hardness, Degree of Hardness, Removal techniques, Problems associated with hardness. Fluoridation and De-fluoridation techniques. Special requirements of Industrial water supply. Rural water supply systems. Rain water Harvesting processes and utilization.							10		CO5	
Total Hours							42				
Essential Readings											
1. Viessman Jr, Hammer J. M, Perez, E.M, and Chadik, P. A, Water Supply and Pollution Control, PHI Learning, New Delhi, 2009											
2. Lin, Shun Dar. Water and wastewater calculations manual (2nd ed.). New York: McGraw Hill, 2007.											
3. Kaleekkal, Noel Jacob (Ed.) Sustainable technologies for water and wastewater treatment. Boca Raton: CRC Press, 2021.											
Supplementary Readings											
1. Peavy, H.S., Rowe and Tchobonoglous,G., “Environmental Engineering”, McGraw Hill, 1985											
2. CPHEEO, Manual on Municipal Solid waste management, Central Public Health and Environmental Engineering Organization, Government of India, New Delhi, 2000.											
3. Eaton, Andrew D. (et al.) (Eds.) Standard methods for the examination of water and wastewater (21st ed.). Washington: American Public Health Association, 2005											