	National Institute of Technology Meghalaya An Institute of National Importance	**CURRICULUM**

Programme	**Master of Technology**	Year of Regulation	**2025**
Department	**Civil Engineering**	Semester	**I**

Course Code	Course Name	Pre-requisite	Credit Structure				Marks Distribution			
			L	T	P	C	INT	MID	END	Total
CE 531	**Physico Chemical Processes in Environmental Engineering**	**NIL**	**3**	**0**	**0**	**3**	**50**	**50**	**100**	**200**

Course Objectives	Course Outcomes		
1. To understand various terms used in wastewater treatment 2. To understand basics of wastewater treatment. 3. To acquaint with different steps involved in primary treatment of wastewater. 4. To expose the students to understand the characteristics of water and its measurement. 5. To understand the design of basic components of water supply lines 6. To depict the information on water treatment processes and its design		CO1	Able to understand the principles and operation of water treatment systems and get concept of a unit operation and a unit process
		CO2	Able to appraise the suitability of the design of treatment plants and unit processes
		CO3	Able to understand coagulation, flocculation, and sedimentation, filtration, and disinfection processes.
		CO4	Be able to apply water distribution processes.
		CO5	Be able to discuss the accuracy of the Finite Element solutions
		CO6	Able to design of a wastewater treatment plant and operation of wastewater treatment plant

SYLLABUS

No.	Content	Hours	COs
I	**Introduction:** Physical, Chemical and Biological quality Parameters of surface and sub-surface waters and wastewater, Potable Water Standards, Wastewater Effluent Standards	**10**	CO1, CO2
II	**Water Quality Indices** Water Purification in Natural Systems - Primary, Secondary and Tertiary Treatment	**10**	CO2, CO3, CO4
III	**Unit Operations** Unit Processes, theory and design of physicochemical unit operations, screening, grit chamber, equalization, sedimentation, floatation, coagulation, flocculation, filtration, disinfection, water softening, adsorption, ion exchange, 4	**11**	CO2, CO3, CO4
IV	**Applications & Design water treatment Plant** Applications of Unit Operations in Water Treatment and Design of Physical Facilities, Design water treatment Plant	**11**	CO4, CO5, CO6
	Total Hours	**42**	

Essential Readings

1. Metcalf and Eddy Inc, Wastewater Engineering: Treatment, and Reuse, 4th edition, Tata McGraw Hill, 2007.
2. Peavy, H. S., Rowe, D. R., Tchobanoglous, G. Environmental Engineering, McGraw Hills, New York, 2013.
3. Bui, Xuan-Thanh... (et al). (Eds.) Water and wastewater treatment technologies. Singapore: Springer, 2019.

Supplementary Readings

1. Schroeder E D. Water and Wastewater Treatment, McGraw-Hill, 1997
2. Ministry of Urban development, Govt of India – Manual for Water Treatment.
3. Droste, Ronald & Gehr, Ronald, Theory and practice of water and wastewater treatment (2nd ed.). New Jersey: John Wiley, 2019.