	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 579	**Simulation & Modeling Lab-I**	**NIL**	**0**	**1**	**2**	**2**			**100**	**100**

Course Objectives

1. To train students in the application of software tools for environmental data analysis and system modeling.
2. To provide practical exposure to simulation tools for air, water, and waste systems.
3. To develop skills in decision-support and scenario analysis for environmental planning.

Course Outcomes

CO1	Able to Utilize simulation software for modeling environmental processes.
CO2	Able to Analyze environmental datasets using statistical and computational tools.
CO3	Able to Model water distribution and wastewater treatment systems.
CO4	Able to Simulate air quality and pollutant dispersion using standard tools.
CO5	Able to Apply modeling results for environmental impact assessments and planning.

No.	COs	Mapping with Program Outcomes (POs)											Mapping with PSOs			
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	CO1	**0**	**3**	**3**	**2**	**3**	**2**	**0**	**0**	**3**	**0**	**3**	**3**	**0**	**3**	**2**
2	CO2	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**3**	**0**	**3**	**3**	**0**	**3**	**2**
3	CO3	**0**	**3**	**3**	**2**	**3**	**0**	**0**	**0**	**3**	**0**	**3**	**3**	**0**	**3**	**2**
4	CO4	**0**	**3**	**3**	**2**	**3**	**0**	**0**	**0**	**3**	**0**	**3**	**3**	**0**	**3**	**2**
5	CO5	**0**	**3**	**3**	**2**	**3**	**2**	**0**	**0**	**3**	**0**	**3**	**3**	**0**	**3**	**2**

SYLLABUS

No.	Content	Hours	COs
I	Environmental data visualization and trend analysis	**3**	**CO1, CO3, CO5**
II	Simulation of water distribution systems using EPANET	**3**	**CO1**
III	Basic pollutant transport modeling in groundwater	**3**	**CO1**
IV	Modeling of wastewater treatment process units	**3**	**CO1, CO3, CO5**
V	Air dispersion modeling using meteorological datasets	**3**	**CO1, CO3, CO5**
VI	Life Cycle Inventory modeling using openLCA	**3**	**CO1, CO3, CO5**
VII	GIS-based mapping of environmental indicators	**3**	**CO1, CO3, CO5**
VIII	Scenario analysis for EIA using simulation tools	**3**	**CO1, CO3, CO5**
	Total Hours	**24**	

Essential Readings

1. **Software Manuals & References:**
2. **Rossman, L. A.** – *EPANET 2 Users Manual*, U.S. Environmental Protection Agency

Chin, D. A. – *Water-Resources Engineering*, Pearson Education

1. **Rao, C. S.** – *Environmental Pollution Control Engineering*, New Age International
2. **USEPA** – *SWMM User's Guide*, U.S. Environmental Protection Agency
3. **Vensim & STELLA User Guides** – from vensim.com and iseesystems.com

For GIS & Air Quality Modeling:

4. **Chang, K.** – *Introduction to Geographic Information Systems*, McGraw-Hill