Programme

National Institute of Technology Meghalaya

An Institute of National Importance

CURRICULUM

Programme	ogramme Master of Technology						Year of Regulation				2025	
Department	artment Civil Engineering				Semester				II			
Course	Course Name		Pre requisites		Credit S	Structure		Marks Di		istribution		
Code					Т	P	С	INT	MID	END	Total	
CE 582	Fundamentals of Geoenvironmental Engineering	Non	ie	3	0	0	3	50	50	100	100	
Course Objectives	 To enable the students to learn emerging topics rela Geotechnical and Geoenvironmental engineering. To make students aware about sources of contamina and remediation of contaminated sites. To make the students understand and explore the fe of rehabilitation of waste dumps and re-use of waste 	ation asibility		ourse comes	CO1 CO2 CO3 CO4 CO5	To ide	water-wa prehend inants inated la gn the W	eraction. the factoriste polluthe metal in the nd mana Vaste Ma	ntion. nods for one geogement. nagement	ecting t	S.	

SYLLABUS

No.	Content	Hours	COs
I	Introduction: Need and scope for Geoenvironmental Engineering; Sources of Contamination, Environmental impacts of contaminants within soils- Multiphase behaviour of soil.	8	CO1
II	Soil-Waste interaction: Physical, chemical, and biological characteristics of wastes; Soil-waste interaction; Impact of pollution on clay mineralogy.	7	CO1, CO2
III	Transport of Contaminants: Contaminant transport in sub surface; Transport Mechanisms and Principles- Advection, Diffusion, Dispersion; Contaminant transformation, Assess exposure pathways in environment-Contaminant mobility and its impacts on contaminated land management and remediation.	8	CO2, CO3
IV	Design of Waste Management Facilities: Waste containment facilities and disposal practices, Landfills: Types of landfills, Guidelines and recommendations for waste containment system, Site Selection, Layers of waste containment liners, Types of barrier materials; Leachate collection system, Cover system, Gas collection system, Continuous Environmental monitoring around landfills, Case studies.	11	CO3, CO4
V	Waste Utilization: Engineering Properties of mined waste and geotechnical reuse, mine-site restoration; Regulations; Case studies.	8	CO4, CO5
	Total Hours	42	

Essential Readings

- 1. A. Sharma and R. K. Srivastava, Geoenvironmental Engineering: Site Remediation, Waste Containment, and Emerging Waste Management Technologies, Springer, 2021.
- 2. K. Reddy and H. T. Dubey, Sustainable Engineering: Drivers, Metrics, Tools, and Applications, Wiley, 2021.

Supplementary Readings

- 1. R. M. Koerner, Designing with Geosynthetics 6th Edition, Xlibris Corporation, 2013.
- 2. G. Reddy and A. Sridharan, Geoenvironmental Engineering: Principles and Applications, New Age International, 2018.
- 3. D. E. Daniel and R. M. Koerner, Waste Containment Facilities: Guidance for Construction, Quality Assurance, and Quality Control of Liner and Cover Systems, ASCE Press, 2016.
- 4. C. A. Brebbia, Risk Analysis and Pollution Control, WIT Press, 2021.