

20CE4703B - GROUND IMPROVEMENT TECHNIQUES

Offering branch: CE			
Course Category:	Professional Elective	Credits:	3
Course Type:	Theory	Lecture-Tutorial-Practical:	3-0-0
Prerequisites:	20CE3402- Geotechnical Engineering	Continuous Evaluation:	30
		Semester End Evaluation:	70
		Total Marks:	100

Course Outcomes

Upon successful completion of the course, the student will be able to:

CO1	Explain the interaction between clay and water and how the clay will be normalized using various methods	K4
CO2	Explain what factors will be taken into account when designing for impact and shock resistance	K4
CO3	Formulate the amount of time necessary to accelerate the dissipation of excess pore water pressure	K6
CO4	Calculate the design factors for reinforced soil	K3
CO5	Identify the design factors that will be considered when constructing a foundation on reinforced soil	K1

Contribution of Course Outcomes towards achievement of Program Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2	2		3	3	3				3	2	3
CO2	2	2	2	2		3	3	3				3	2	3
CO3	3	3	3	3		3	3	3				3	3	3
CO4	2	2	2	2		2	2	2				2	2	2
CO5	2	2	2	2		1	1	1				1	2	1
Avg.	2	2	2	2		3	3	3				3	2	3
	1- Low				2-Medium				3-High					

Course Content

UNIT-1	Introduction: Role of ground improvement in foundation engineering, geotechnical problems in alluvial. Stabilization of Soils: Clay Chemistry, Reaction Dynamics, Methods of soil stabilization, clay salt interaction	CO1
UNIT-2	Theory of Vibration: Harmonic Motion, Vibrations of single Degree Freedom system, Earthquake Loading Methods: Insitu densification of cohesionless soil, vibrofloatation, Sand pile compaction, stone columns and Three-Dimensional Consolidation of clay, lime piles	CO2
UNIT-3	Drainage and Dewatering: Vacuum and electro osmotic methods, criteria for choice of filler material around drains, Seepage analysis(simple case only)	CO3
UNIT-4	Reinforced soil: Basic components, soil reinforcement interface friction, Internal and external stability	CO4
UNIT-5	Foundation of Reinforced soil bed: Analysis of strip footing on reinforced soil bed; Analysis of isolated square footing on reinforced soil bed, Ultimate bearing capacity of footing on reinforced earth slab	CO5

Learning Resources

Text Books	<ol style="list-style-type: none"> 1. Ground Improvement Techniques, Purushotham Raj, Laxmi Publications, New Delhi. 2. Ground Improvement Techniques, Nihar Ranjan Patro, Vikas Publishing House (p) limited, New Delhi. 3. An introduction to Soil Reinforcement and Geosynthetics, G. L. Siva Kumar Babu, Universities Press.
Reference Books	<ol style="list-style-type: none"> 1. Ground Improvement, M.P. Moseley, Blackie Academic and Professional, USA. 2. Designing with Geosynthetics, R. M Koerner, Prentice Hall

**e-Resources &
other digital
material**

1. <https://nptel.ac.in/courses/105106052/>