

B. Tech. Civil Engineering/ Elective

Course code: Course Title	Course Structure.			Pre-Requisite
CE 330: Geotechnical Processes	L	T	P	Nil
	3	0	2	
Course Objective: Students can solve field-based problems in the geotechnical process to implement the design of civil infrastructure projects.				

S. No	Course Outcomes (CO)
CO1	Understanding of the principles of ground conditions.
CO2	Exposure to prevalent techniques such as prefabricated vertical drains, stabilisation, chemical modifications, and hydraulic modification, including geosynthetics.
CO3	Proficiency in dynamic stabilization techniques suitable for wide applications.
CO4	Proficiency in ground modification by reinforcement techniques in various applications.
CO5	Students can solve field-based problems in the ground improvement-related process and implement them in the design projects.

S. No	Contents	Contact hours
Unit 1	Introduction: importance and history of ground improvement. Mechanical Modifications: properties of compacted soil, compaction control tests, field compaction, and applications. Precompression: technique, procedure, and applications. Sand Drains: method, procedure, and applications.	8
Unit 2	Prefabricated vertical drains: method of installation and design. Soil Stabilisation: shallow stabilisation with additives- lime, fly ash cement, and other materials. Chemical modifications and Grouting. Hydraulic modification: dewatering systems, filtration, drainage, and seepage control with geosynthetics.	8
Unit 3	Vibroflotation technique, stone columns, sand compaction piles, dynamic compaction technique, ground freezing, and electro-osmosis.	8
Unit 4	Ground modification by soil reinforcement: reinforcement techniques, use of flexible geosynthetic reinforcement in bearing capacity improvement, slope stability, erosion control, retaining walls, and pavement.	8
Unit 5	Difficult soils: collapsible soils, physical parameters, and identification, collapse settlement, improvement techniques; expansive soils, general nature, swell test and swelling pressure tests, classification, improvement of expansive soils.	12
Total		42

S.N.	Name of Books/ Authors	Year of Publication
1	Das, B.M. (2011). Principles of Foundation Engineering. Cengage Learning. (ISBN 0-07-525486-7).	2007
2	Koerner, R.M. (2012). Designing with Geosynthetics, Vol. 1&2. Xlibris Corporation. (ISBN 0-25—755246-7).	2007