

Ground Improvement Techniques - Video course

COURSE OUTLINE

The soils at construction sites are not always totally suitable for supporting physical infrastructure such as buildings, bridges, highways, tunnels and dams.

Under these conditions, soil needs to be treated using ground improvement techniques.

Similarly specific types of soil improvement techniques are required in the case of expansive soils and collapsible soil and in the case of earthquake prone areas.

The course addresses various ground improvement techniques along with principles, design issues and construction procedures.

Contents:

I Need for Ground Improvement, Different types of problematic soils, Emerging trends in ground Improvement, Shallow and deep compaction requirements, Principles and methods of soil compaction.

Shallow compaction and methods, Properties of compacted soil and compaction control, Deep compaction and Vibratory methods, Dynamic compaction.

Ground Improvement by drainage, Dewatering methods, Design of dewatering systems, Preloading, Vertical drains, vacuum consolidation, Electro-kinetic dewatering, design and construction methods.

Cement stabilization and cement columns, Lime stabilization and lime columns, Stabilization using bitumen and emulsions, Stabilization using industrial wastes.

Construction techniques and applications, Permeation grouting, compaction grouting, jet grouting, different varieties of grout materials, grouting under difficult conditions, Soil nailing, rock anchoring, micro-piles, design methods, construction techniques, Case studies of ground improvement projects.

COURSE DETAIL

Sl. No.	Module	Contents	Number of lectures (39)
1	Introduction	Need for Ground Improvement, Different types of problematic soils, Emerging trends in ground Improvement.	3
2.	Mechanical stabilization	Shallow and deep compaction requirements, Principles and methods of soil compaction, Shallow compaction and methods. Properties of compacted soil and compaction control, Deep compaction	8



NP-TEL

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<http://nptel.iitm.ac.in>

Civil Engineering

Pre-requisites:

1. Soil Mechanics (Geotechnical Engineering I).
2. Foundation Engg (Geotechnical Engineering II).

Additional Reading:

1. Literature and journals such as Ground Improvement, Ground Engineering, Geotextiles and geomembranes, Geosynthetics International.

Hyperlinks:

www.geotechlinks.com/gi.php

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		and Vibratory methods Dynamic compaction.	
3	Hydraulic modification	Ground Improvement by drainage, Dewatering methods. Design of dewatering systems, Preloading, Vertical drains, vacuum consolidation, Electro-kinetic dewatering, design and construction methods.	8
4	Modification by admixtures	Cement stabilization and cement columns, Lime stabilization and lime columns. Stabilization using bitumen and emulsions, Stabilization using industrial wastes Construction techniques and applications.	8
5	Grouting	Permeation grouting, compaction grouting, jet grouting, different varieties of grout materials, grouting under difficult conditions.	4
6	In situ soil treatment methods	Soil nailing, rock anchoring, micro-piles, design methods, construction techniques.	4
7	Case studies	Case studies of ground improvement projects.	4

References:

1. Manfred R. Hausmann, Engineering Principles of Ground Modification, McGraw-Hill Pub, Co., 1990.
2. M C. R. Davies, F.Schlosser Ground improvement geosystems.
3. Koerner, R. M., Designing with geosynthetics, Prentice Hall Inc. 1998.