IV B.Tech I Semester

15ACE53-GROUND IMPROVEMENT TECHNIQUES
(CBCC (DEPARTMENTSPECIFIC))

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Course Objective:

To have knowledge on the problems posed by the problematic soils and the remedies to build the various structures in problematic soils.

1. *To introduce the various types of improvement methods of engineering properties soils.*
2. *To introduce the application of engineering methods to ground improvement projects.*

UNIT I

Dewatering: Methods of de-watering- sumps and interceptor ditches- single, multi stage well points - vacuum well points- Horizontal wells-foundation drains-blanket drains- criteria for selection of fill material around drains –Electro-osmosis .

Grouting: Objectives of grouting- grouts and their properties- grouting methods- ascending, descending and stage grouting- hydraulic fracturing in soils and rocks- post grout test.

UNIT II

Densification Methods

Granular Soils:-In – situ densification methods in granular Soils: – Vibration at the ground surface, Impact at the Ground Surface, Vibration at depth, and Impact at depth.

Cohesive Soils: – In – situ densification methods in Cohesive soils:– preloading or dewatering, Vertical drains – Sand Drains, Sand wick geo-drains – Stone and lime columns – thermal methods.

UNIT III

Stabilization: Methods of stabilization-mechanical-cement- lime-bituminous-chemical stabilization with calcium chloride, sodium silicate and gypsum

UNIT IV

Reinforced Earth: Principles – Components of reinforced earth – factors governing design of reinforced earth walls – design principles of reinforced earth walls. **Geosynthetics:** Geo-textiles-Types, Functions and applications – geogrids and geomembranes – functions and applications. **Geoenvironmental** application of geosynthetic: geomembranes for landfills and ponds, Geosynthetics clay liner, filtration, erosion control, slope protection

UNIT V Expansive Soils: Problems of expansive soils – tests for identification – methods of determination of swell pressure. Improvement of expansive soils – Foundation techniques in expansive soils – under reamed piles.

Course outcomes

- *Student will be able to understand soil dewatering techniques with respect to field conditions.*
- *Student will be able to understand grouting techniques with respect to field conditions.*
- *Student will be able to understand soil dewatering techniques with respect to field conditions.*
- *Student will be able to understand and design principles of reinforced soil walls.*
- *Student will be able to understand geo synthetics and their field applications.*

TEXT BOOKS:

1. Haussmann M.R. (1990), Engineering Principles of Ground Modification, McGraw-Hill International Edition.
2. Dr.P.Purushotham Raj. Ground Improvement Techniques, Laxmi Publications, New Delhi / University science press, New Delhi
3. NiharRanajanPatra. Ground Improvement Techniques, Vikas Publications, New Delhi

REFERENCE BOOKS:

4. Moseley M.P. (1993) Ground Improvement, Blackie Academic and Professional, Boca Taton, Florida, USA.
5. Xanthakos P.P, Abramson, L.W and Brucwe, D.A (1994) Ground Control and Improvement, John Wiley and Sons, New York, USA.
6. Robert M. Koerner, Designing with Geosynthetics, Prentice Hall New Jersey, USA