Geosynthetics and Reinforced Soil Structures - Video course

COURSE OUTLINE

This course introduces the students to the different types of geosynthetics, their manufacturing technique, testing methods and their applications in different types of Civil Engineering projects.

Detailed design techniques and construction methods will be covered in the course.

COURSE DETAIL

Sl. No.	Topic	No. of Hours
1	**Introduction:** Historical background of reinforced soil, Principles of reinforced soil through Mohr circle analysis.	2
2	**Different types of geosynthetics:** Types of geosynthetics like geotextiles, geogrids, geonets, geocells, geo-composites, their manufacturing methods.	4
3	**Testing methods for geosynthetics:** Techniques for testing of different index properties, strength properties, Apparent Opening Size, In-plane and cross-plane permeability tests, assessment of construction induced damage, extrapolation of long term strength properties from short term tests.	5
4	**Reinforced Soil retaining walls:** Different types of walls like wrap-around walls, full-height panel walls, discrete-facing panel walls, modular block walls Design methods as per BS-8006 and FHWA methods Construction methods for reinforced soil retaining walls.	9
5	**Reinforced soil slopes:** Basal reinforcement for construction on soft clay soils, construction of steep slopes with reinforcement layers on comptenet soils, Different slope stability analysis methods like planar wedge method, bi-linear wedge method, circular slip methods. Erosion control on slopes using geosynthetics.	7

NP-TEL

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Civil Engineering

Pre-requisites:

1. Geotechnical Engineering I.
2. Foundation Engineering.
3. Applied Soil Mechanics.

Additional Reading:

1. Design guidelines from FHWA, BS and other codal organizations.

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6	**Applications in foundations:** Binquet and Lee's approach for analysis of foundations with reinforcement layers.	4
7	**Drainage and filtration applications of geosynthetics:** Different filtration requirements, filtration in different types of soils and criteria for selection of geotextiles, estimation of flow of water in retaining walls, pavements, etc. and selection of geosynthetics.	3
8	**Pavement application:** Geosynthetics for separation and reinforcement in flexible pavements, design by Giroud-Noiray approach, reflection cracking and control using geosynthetics. Use of geosynthetics for construction of heavy container yards and raiway lines.	4
9	**Construction of landfills using geosynthetics:** Different components of modern landfills, collection techniques for leachate, application of different geosynthetics like geonets, geotextiles for drainage in landfills, use of geomembranes and Geosynthetic Clay Liner (GCL) as barriers.	2

References:

1. Koerner, R.M. "Designing with Geosynthetics", Prentice Hall, New Jersey, USA, 4th edition, 1999.
2. Jewell, R.A., "Soil Reinforcement with Geotextiles", Special Publication No. 123, CIRIA, Thomas Telford. London, UK, 1996.
3. Geosynthetics - New Horizons, Eds. G.V. Rao, PK Banerjee, J.T. Shahu, G.V. Ramana, Asian Books Private Ltd., New Delhi, 2004.