J.S. University, Shikohabad

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Value Added Course

(Ground Improvement Techniques)

Faculty of CIVIL ENGINEERING

	J.S. University, Shikohabad Faculty of Civil Engineering	Value Added Course
		AY: 2022-23

Ground Improvement Techniques

Learning Objective:

This Course will provide knowledge of Ground improvement methodology

Duration: 30 Hours. (Theory and Practical)

Course Outcomes: -

Maximum Exposure has to be given on Practical Oriented

On successful completion of the course students will be able to:

1) Identify the purpose of ground improvement techniques to obtain the suitable construction site for long-lasting structures.

2) List the problematic soils and its characteristics to select the suitable method for ground improvement.

3) Illustrate the various methods of ground improvement techniques to increase load bearing capacity of beneath and surface soils.

4) Apply the methods of physical, chemical, mechanical and hydraulic for obtaining void less soils.

5) Explain the various grouting techniques and its applications for improving loadbearing of beneath soils.

6) Outline the contribution of grouting materials and their influence on soils for greater load carrying capacity.

7) Recall the importance of admixtures and its composition for injecting the material into the soils.

8) Analyze the practical applications of reinforced soil and grid reinforced soils for better strength and durability of soils

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Syllabus Outline

1. **Module-1**

   Introduction

   Formation of soil, major soil types, collapsible soil, expansive soil, reclaimed soil, sanitary land fill, ground improvements; objective, potential. General principles of compaction: Mechanics, field procedure, quality control in field.

2. **Module-2**

   Ground Improvement In Granular Soil

   In-place densification by (a) Vibro floatation (b) Compaction piles in sand(c) Vibro compaction piles (d)Dynamic compaction (e) Blasting . Ground improvement in cohesive soil: Preloading with or without vertical drains. Compressibility vertical and radial consolidation, Rate of consolidation, Preloading methods. Types of drains, Design of vertical drains, Construction techniques. Stone column: Function, Design principles, load carrying capacity, construction techniques, settlement of stone column foundation.

3. **Module-3**

   Ground Improvement by Grouting & Soil Reinforcement

   Grouting in soil: Types of grout, desirable characteristics, Grouting pressure, Grouting methods. Soil Reinforcement – Mechanism, Types of reinforcing elements, Reinforcement- Soil interaction, Reinforcement of soil beneath roads, foundation. Soil Stabilization: Lime Stabilization – Base Exchange mechanism, Pozzolonic reaction, lime-soil interaction, lime columns, Design of foundation on lime column.

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References:-

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2. Rao,K.N.S.V.,(2006) Mechanical Vibrations of Elastic Systems,Asian Books Pvt Ltd, Delhi,India .
3. Rao,K.N.S.V.(2000) Dynamic Soil Tests And Applications, A.H. Wheeler & Co., New Delhi, India.
4. Rao,K.N.S.V.(1998) Vibration Analysis and Foundation Dynamics, A.H. Wheeler & Co., New Delhi, India.
5. Chandra, S.et.al., eds (1989)Computer and Physical Modelling in Geotechnical Engineering, A.A. Balakema Publishers, The Netherlands

(Name of Faculty)	(Name of Faculty)	(Name of Faculty)
Course Coordinator	Dean Academics	Director/Principle/Dean of Faculty/Department
Er. Chhavi Lal		Er. Amit Yadav