Soil and Site Improvement

Course Code	Credit Hours
CE- 427	3-0

Course Description

The urbanization, industrialization and rising environmental concerns have forced the engineers to develop those lands for construction purpose which were once considered as useless. To enable construction on such lands, the soil properties are required to be improved. Therefore it is important for civil engineers to access different soil conditions, the degree up to which a particular soil can be improved and suggest suitable improvement measures.

Text Book:

Reference Book:

1. Bell, F.G (1987), Ground Engineer's Reference Book, Butterworths, London.
2. Bowles, J.E., (1988), Foundation Analysis and Design, Chapter 2, McGraw Hill, New York.
3. Transportation Research Board, State of the Art: Lime Stabilization, Circular 180, Sep 1976.
4. Holtz, R.D., Kovacs, W.D, (1981), An Introduction to Geotechnical Engineering, Chapters 4 and 5, Prentice Hall, New Jersey.
5. Leonard, G.A., (1962), Foundation Engineering, Chapters 4 and 12, McGraw Hill, New York.
6. Mitchell, J.K., Foundation of Soil Behaviour, John Wiley and Sons, New York.
7. Lambe, T.M., and Whitman, R.V., (1969), Soil Mechanics, John Wiley and Sons, New York.
8. Hausmann, M.R. (1989), Engineering Principles of Ground Modification, McGraw Hills, USA.

Prerequisites :

CE-324 Soil Mechanics-II

ASSESSMENT SYSTEM FOR THEORY

	Without Project (%)	With Project/Complex Engineering Problems (%)
Quizzes	15	10-15
Assignments	10	5-10
Mid Terms	25	25

Project	-	5-10
End Semester Exam	50	45-50

ASSESSMENT SYSTEM FOR LAB

Lab Work/ Psychomotor Assessment/ Lab Reports	70%
Lab Project/ Open Ended Lab Report/ Assignment/ Quiz	10%
Final Assesment/ Viva	20%

Teaching Plan

Week No	Topics/Learning Outcomes
1	Basic Engineering Properties of Soil , Soil and site problems
2-3	Soil composition: Soil constituents and engineering properties Clay mineralogy: Origin and crystal structure of clays Clay-water: Interaction between water and clay minerals
3	Soil fabrics: fabrics of cohesive soils and fabrics of non-cohesive soils
4	Compaction: Surface Compaction, theory of compaction, properties and structure of compacted soils
5	Field compaction equipment and procedures, control and specifications
6	Estimating performance of compacted soils Deep Compaction, Vibroflotation of granular and cohesive soils
7	Compaction piles, Heavy vibratory rollers Blasting
8	Admixtures and Cementing agents: Portland Cement, lime, lime-fly ash, bitumen
9	**Mid Semester Exam**
10	Modifiers: Salt, calcium chloride, hydrofloric acid, phosphoric acid.
11	Field application methods: Site access, surface treatments (mix-in-place and plant mix), compaction and curing, deep and superficial stabilization.
12	Applications: Pavements, foundations, embankments, open excavations.
13	Reinforced Earth Technology, Principles and mechanism of reinforced earth, Friction in reinforced earth, Reinforced earth technology and materials, Design, construction and instrumentation
14	Geotextiles Introduction, classification and testing of geotextiles Nature and engineering properties of geotextiles
15	Drainage and Consolidation, Preloading and surface piles, Vertical drains
16	Electro-osmotic energy efficiency, Granular trenches, Slurry trench cutt-off walls, Leachate transport across clay barriers, Biotechnical slope protection measures Soil Erosion: Prevention and control, mechanics of erosion, erosion control principles

17-18	End Semester Exam

Practical: Nil.