

Soil & Site Improvement

Code CE-821	Credit Hours 3-0
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Course Description

The subject provides an insight into the soil mineralogy its chemical composition and micro structure in order to understand the mechanism of improving the soil and site conditions. The course also equips the students with various soil improvements techniques and methods. Students will be able to apply the gained knowledge in research in the field of Soil and Site improvement. Students will be able to apply various soil improvements techniques and methods in the field.

Text Book:

1. Bell, F.G (1987), Ground Engineer's Reference Book, Butter worths, London.

Reference Book:

2. Bowles, J.E., (1988), Foundation Analysis and Design, Chapter 2, McGraw Hill, New York.
3. Geotechnical Investigations, Engineering and Design, US Army Corps of Engineers, EM 1110-1-1804, January 01, 2001
4. McLean A.C., and Gribble C.D., Geology for Civil Engineers, Second Edition, Revised by C.D. Gribble; ISBN 0-203-36215-2 Master e-book ISBN
5. Das, B.M., (2005), Fundamentals of Geotechnical Engineering, Third edition, ISBN 0-534-37114-0
6. McCarthy, D.F., (2015), Essentials of Soil Mechanics and Foundations, Basics Geotechniques, Seventh Edition, ISBN 978-93-325-4202-0
7. Coduto, D.P., (2001), Foundation Design, Principles and Practices, Second Edition, Prentice Hall, Upper Saddle River, New Jersey 07458
8. Transportation Research Board, State of the Art: Lime Stabilization, Circular 180, Sep 1976.
9. Holtz, R.D., Kovacs, W.D, (1981), An Introduction to Geotechnical Engineering, Chapters 4 and 5, Prentice Hall, New Jersey.
10. Leonard, G.A., (1962), Foundation Engineering, Chapters 4 and 12, McGraw Hill, New York.
11. Mitchell, J.K., Foundation of Soil Behavior, John Wiley and Sons, New York.
12. Lambe, T.M., and Whitman, R.V., (1969), Soil Mechanics, John Wiley and Sons, New York.
13. Hausmann, M.R. (1989), Engineering Principles of Ground Modification, McGraw Hills, USA

Prerequisites:

NIL

Assessment System for Theory

Quizzes	10-15%
Assignments	5-10%
Mid Terms	25-30%
Project	0-10%
ESE	45-50%

Teaching Plan

Week No	Topics	Learning Outcomes
1	Introduction and Soil Formation	Course Outline, objectives, teaching plan, assessment method, Introduction, Origin and processes of soil formation, Weathering, Erosion, Rock cycle.
2-3	Soil Composition	Soil classification based on geological and engineering characteristics. Origin and crystal structure of clays, Interaction between water and clay minerals.
4-5	Basic Engineering Properties of Soil	Soil plasticity, Shear strength, Compressibility, Permeability, fabrics of cohesive and non-cohesive soils.
6-8	Compaction	Fundamentals of compaction, laboratory compaction, Factors affecting compaction, Properties and structure of compacted soils.
9	MID TERM EXAM	
10-12	Compaction	Field compaction techniques, compaction equipment, compaction specifications, deep compaction, Blasting, Performance evaluation of in-situ compacted soils.
13-17	Reinforced Soil and Site technologies	Reinforced earth technology, Geosynthetic, Classification and properties of geotextiles, Drainage and consolidation, Vertical drains, Erosion control principles, Dynamic compaction, Grouting, Admixtures, Modifiers, Stone columns, Sand drains, Preloading, Vibroflotation.
18	End Semester Exams	