

Advanced Geotechnical Design

Code CE-828	Credit Hours 3-0
-----------------------	----------------------------

Course Description

This course is designed to allow the students to practice the shallow and deep foundation under various cases.

Course Objectives

1. To equip the students with the design of shallow and deep foundations.
2. Student should be able to understand the design methodology and limiting conditions.

References / Textbooks

3. Bowles J E, (1992). Foundation Analysis & Design. 5th ed. McGraw Hill, New York.
4. Das, B. (20XX). Principles of Foundation Engineering. Xth ed. Cengage Learning. UK
5. Fang, H. Y. (2013). Foundation engineering handbook. Springer Science & Business Media.
6. Coduto, D. (2001). Foundation design: principles and practices. 2nd ed. Upper Saddle River: Prentice Hall

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	Course Outline, objectives, teaching plan, assessment method, concepts review
2-3	Bearing Capacity of Foundation	Ultimate Soil-Bearing Capacity for Shallow Foundations. Terzaghi's Bearing Capacity Theory. General Bearing Capacity Equation
4-7	Special cases of shallow foundations	One-eccentricity, two-eccentricity and inclined loads Special cases of shallow foundations. Foundation Supported by a Soil with a Rigid Base at Shallow Depth. Stronger Soil Underlain by Weaker Soil. Weaker Soil Underlain by Stronger Soil. Closely Spaced Foundations Effect on Ultimate Bearing Capacity. Foundations on Top of Slope. Foundations on the Slope. Seismic Bearing Capacity and

		Settlement in Granular Soil. Foundations on Rock. Uplift Capacity of Foundations - In Granular / Cohesive soils
8	Foundation Settlement	Total settlement. Elastic settlement. Consolidation settlement. Primary Consolidation. Calculation of Settlement under foundation. Time Rate of Consolidation. Tolerable Settlement of Buildings. Differential Settlement
9	MID TERM	
10-11	Selection the foundation	Factors to Consider in Foundation Design. Spreading Footing Design. Mat Foundation.
12-17	Deep foundation	Deep foundation; types, selection criteria, installation criteria. Single Pile Capacity-Point bearing capacity: Meyerhof (1976), Coyle and Castello (1981), Berezantsev (1961) /Tomlinson (1986), Vesic (1977), Janbu (1976). Single Pile Capacity- Frictional resistance: Frictional capacity coefficient (λ Method), Coyle and Castello (1981), Adhesion factor (α Method), The Effective Stress Method (β Method), Meyerhof's method (1976). Pile load test: Static load, Cyclic load, Dynamic load. Prediction bearing capacity using correlations (e.g. SPT). Pile Foundation Groups. Drilled Piers or Caissons
18	End Semester Exams	

