

Foundation Engineering

Course Code	Credit Hours
CE- 406	2-0

Course Description

This course begins with review of soil mechanics and introduction to subsurface exploration. Then it covers bearing capacity of shallow foundation, stress distribution and foundation settlement. This course ends with the design application pile foundation system in geotechnical engineering. It includes computer applications where some of the most convenient software practice on the assignments.

Text Book:

1. Das & Sobhan (2018). Principles of Geotechnical Engineering. 9th .
2. Das & Sivakugan (2018). Principles of foundation engineering. 9th .
3. Foundation Analysis and Design. Joseph E. Bowles, Fifth Edition, McGraw-Hill. Inc., 1997.
4. Geotechnical Engineering Principles and Practices by Donald P. Coduto (1999)

Reference Book:

1. Murthy (2007). Advanced Foundation Engineering
2. Das (2014) Advanced Soil Mechanics. 4th.
3. Coduto (2001) Foundation Design – Principles and Practices.
4. Liu & Evett (2013) Soil and Foundations

Prerequisites :

CE-324 Geotechnical Engineering.

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 Assessment/ Viva	20%

Teaching Plan

Week No	Topics/Learning Outcomes
1-2	Soil Exploration Significance/objectives of soil exploration Planning of soil exploration program Soil exploration methods: probing, test pits, auger boring, wash percussion, rotary drilling, and geophysical methods, Types of soil samplers Sampling techniques
3-4	Introduction to Foundations Propose and types of foundations Selection of foundation type and depth Design requirements for the foundations Foundation design Criteria Allowable settlements and angular distortion
5	Foundation Settlement. Effective zone. Numerical application of settlement calculation (Settle 3D).
6-8	Bearing Capacity and Design of shallow foundations Types of bearing capacities: gross and net bearing capacity/pressures Modes of bearing capacity failures Development of bearing capacity theory. Methods to evaluate soil bearing capacity: Terzaghi's, Meyerhof's, Vesic's methods Effects of water table on bearing capacity of soils. Bearing capacity from in-situ tests; SPT, CPT, Plate load test Related numerical problems.
9	Mid Semester Exam
10-11	Shallow foundation

	<p>Special cases of shallow foundations.</p> <p>Numerical design of shallow foundation and AI applications.</p>
12-15	<p>Pile Foundations</p> <ul style="list-style-type: none"> • Introduction to deep foundations • Types of deep foundations • Reasons to use deep foundations. • Classification of piles • Methods of installation of Piles • Load transfer mechanism of piles • Load carrying capacity of piles in different soils. • Empirical correlations for pile capacity evaluation • Settlement of Piles. • Pile group capacity, group efficiency, elastic, and consolidation settlement of group of piles.
16	Case studies related to Foundation Design
17-18	End Semester Exam

Practical: Nil.