

Course	CE 48100 – Foundation Engineering
Type of Course	Required for Civil Engineering Program
Catalog Description	The Foundation Engineering course focuses on geotechnical design of shallow and deep foundations and includes review of selected topics on geotechnical properties of soil, natural soil deposits and subsurface exploration, seepage, bearing capacity of shallow foundations, lateral earth pressure theories, retaining walls, and deep foundations.
Credits	3
Contact Hours	3
Prerequisite Courses	CE 38000 and CE38100
Prerequisites by Topics	Soil Mechanics
Textbook	Braja M. Das, <i>Principles of Foundation Engineering</i> , Cengage Learning, Current Edition
Course Objectives	To introduce students to the fundamental concepts of foundation analysis and design and to provide students with methods of analysis of geotechnical systems based on field and laboratory data.
Course Outcomes	Students who successfully complete this course will be able to: <ol style="list-style-type: none">1. Work efficiently in problem-solving teams. [5]2. Understand the basic concepts of geotechnical engineering and apply the concepts in the foundation design. [1, 2, 4, 6, 7]3. Understand the basic functioning and use of selected field exploration methods as applicable to foundation analysis [1, 6, 7]4. Evaluate laboratory and field data for appropriate selection of design parameters. [6, 7]5. Understand the bearing capacity concepts and apply bearing capacity equations for different soil and loading conditions. [1, 6, 7]

6. Evaluate effect of layered soil system and water on bearing capacity analysis. [1, 6, 7]
7. Understand the lateral earth pressure theories including Rankin's theory of active and passive earth pressures apply the theories to design. [1, 2, 7]
8. Apply the lateral earth pressure theories and bearing capacity concepts for proper stability control of retaining structures against overturning, sliding, and bearing capacity failure. [1, 2, 6, 7]
9. Identify appropriate deep foundation types for soil conditions. [1, 2, 7]
10. Understand the load transfer mechanism in pile foundations and determine the bearing capacity in clay and sand. [1, 2, 7]

Lecture Topics

1. Natural soil deposits
2. Subsurface exploration (planning, reconnaissance, drilling/sampling, and in-situ testing)
3. Bearing capacity
4. Seepage analysis
5. Lateral earth pressures
6. Earth retaining structures
7. Introduction to shallow and deep foundations
8. Foundation design and analysis
9. Foundation settlement calculations

Computer Usage

Medium

Laboratory Experience

None

Design Experience

High

Coordinator

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Date

July 1, 2018