

Ministry of Higher Education and Scientific research



Department of Water Resources Engineering

College of Engineering

Salahaddin University - Erbil

Subject: Foundation Engineering

Course Book of Third Year

Lecturer's name: Hawkar Hashim Ibrahim

Academic Year: 2022-2023

Course Book

1. Course name	Foundation Engineering (E)
2. Lecturer in charge	Hawkar Hashim Ibrahim
3. Department/ College	Water Resource Engineering Department/ College of Engineering
4. Contact	e-mail: hawkar.ibrahim@su.edu.krd Tel: 07501999899
5. Time (hr. / week)	Theory: 3 Practical: 0
6. Office hours	12 hrs/week
7. Course code	6140
8. Teacher's academic profile	More than ten years of experience in teaching different subjects
9. Keywords	Shallow Foundation, Bearing Capacity, Settlement, Retaining walls

7. Course overview:

Foundation is the substructure, which transfers the weight of a structure to the underling soil or rock. The term "foundation engineering" is used to include the design of foundations for buildings and other structures. In addition, this term is also used for non-foundation problems such as designs of retaining walls, bulkheads, cofferdams, tunnels, and earth dams, as well as the design of natural slopes, dewatering of soils, and stabilization of soils mechanically and chemically.

Foundation is the interfacing element between the superstructure and the underling soil or rock layer. The loads transmitted by the foundation to the underling soil must not cause soil shear failure or damage the settlement of the superstructure. Generally, Foundations can be divided into two main groups: shallow and deep foundations.

8. Course objective:

The main objectives of the Foundation Engineering course are:

- Students should be able to classify types of foundations. What are the differences between them?
- Students should be able to determine and check the bearing capacity for

shallow foundations.

- Students will learn how to find a settlement of foundations over layered soil.
- Students should be able to analyse and design single foundations, combined foundations, mat foundations and retaining structures.

9. Student's obligation

Students must attend the majority of lectures on time. Those who fail to attend a certain number of classes would face the department decision of being considered as failed in the course.

10. Forms of teaching

Different methods will be used to explain the principle of foundation engineering which related to this course. PowerPoints presentation will be used to illustrate the important points of the course. The Microsoft Surface Pro 3 and a whiteboard will be used to elucidate details of the course and solve examples. A set of printed lectures will be provided before lectures.

11. Assessment scheme

Students are required to do the midterm exam, classroom activities, quizzes, home works and the final exam. The final grading will be based on the following table:

Midterm exam	20 %
All activities	20 %
Final exam	60 %

12. Course Reading List:

- DAS, B. M. (2016). Principles of foundation engineering. Stanford, CT, Cengage Learning.
- Bowles, J. E. (1997). Foundation analysis and design. New York: McGraw-Hill.
- Kameswara, R. N. S. V. (2011). Foundation design: Theory and practice. Hoboken, N.J: Wiley.

- Tomlinson, M. J., & Boorman, R. (1986). Foundation design and construction. Burnt Mill, Harlow, Essex, England: Longman Scientific & Technical.
- Varghese, P. C. (2009). Design of reinforced concrete foundations. New Delhi: PHI Learning.
- Gunaratne, Manjriker, ed. The foundation engineering handbook. CRC Press, 2006.
- Das, B. M. (1999). Fundamentals of geotechnical engineering. Pacific Grove, CA: Brooks/Cole.
- Cernica, J. N. (1995). Geotechnical engineering. New York: Wiley.
- Coduto, D. P. (2012). Foundation design: Principles and practices. Upper Saddle River, N.J [u.a.: Prentice Hall.

16 Weeks: From the 12th of February	
1st Week	Foundation Engineering-Course Book
2nd Week	Introduction to Foundation Engineering, Terzaghi's Ultimate Bearing Capacity Theory
3rd Week	The General Bearing Capacity Equation
4th Week	Modification of Bearing Capacity Equations for Water Table
5th Week	Eccentrically Loaded Foundations
6th Week	Introduction to Settlement of Shallow Foundations
7th Week	Calculation of Increase in Stress ($\Delta\sigma$)
8th Week	Immediate settlement (S_i)
9th Week	Consolidation settlement (S_c)
10th Week	Structural Design of Shallow Foundations
11th Week	Design of Isolated Footings
12th Week	Design of Combined Footings
13th Week	Design of mat Footings
14th Week	Retaining Structures
15th Week	Final Exam
16th Week	Final Exam