

Ministry of Higher Education and Scientific research



Department of Water Resources Engineering

College of Engineering

Salahaddin University - Erbil

Subject: Foundation Engineering

Course Book –Year 4

Lecturer's name: Hawkar Hashim Ibrahim

Academic Year: 2020-2021

Course Book

1. Course name	Foundation Engineering
2. Lecturer in charge	Hawkar Hashim Ibrahim
3. Department/ College	Water Resources Eng. / 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	8

7. Course overview:

Foundation is the substructure, which transfers the weight of a structure to the underlying 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 underlying soil or rock layer. The loads transmitted by the foundation to the underlying soil must not cause soil shear failure or damaging settlement of the superstructure. Generally, Foundations can be divided into two main groups: shallow foundation and deep foundation.

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 bearing capacity for shallow foundations.
- Students will learn how to find a settlement of foundations over layered soil.
- Students should be able to analysis 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 the whiteboard will be used to elucidate details of the course and solving examples. In addition, During the rick of COVID-19, online teaching will be used through Zoom Software. Set of printed lectures will be provided before lectures.

11. Assessment scheme

Students are required to do the first semester exam in January, second-semester exam in April, classroom activities, quizzes, home works and final exam in June. The final grading will be based on the following table:

First-semester exam	15 %
Second-semester exam	15 %
Activities	10 %
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.

30 Weeks: From the 4th of October

1st Week	Foundation Engineering-Course Book
2nd Week	Introduction to Foundation Engineering
3rd Week	Terzaghi's Ultimate Bearing Capacity Theory

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4th Week	The General Bearing Capacity Equation
5th Week	Modification of Bearing Capacity Equations for Water Table
6th Week	Eccentrically Loaded Foundations
7th Week	Bearing Capacity of Layered Soils
8th Week	Solving Examples
9th Week	Introduction to Settlement of Shallow Foundations
10th Week	Calculation of Increase in Stress ($\Delta\sigma$)
11th Week	Immediate settlement (S_i)
12th Week	Solving Examples
13th Week	Consolidation settlement (S_c)
14th Week	Solving Examples
15th Week	First semester exam
16th Week	Structural Design of Shallow Foundations
17th Week	Design of Isolated Footings
18th Week	Solving Examples
19th Week	Design of Combined Footings
20th Week	Solving Examples

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21st Week	Design of mat Footings
22nd Week	Earth-Retaining Structures
23rd Week	Types of retaining walls
24th Week	Stability of Retaining Walls
25th Week	Solving Examples
26th Week	Stability of Retaining Walls
27th Week	Second Semester exam
28th Week	Solving Examples
29th Week	Solving Examples
30th Week	Review