

TISHK INTERNATIONAL UNIVERSITY
FACULTY OF ENGINEERING
Department of CIVIL ENGINEERING,
2020-2021 Spring
Course Information for CE 438 PILE FOUNDATION

Course Name:	PILE FOUNDATION				
Code	Regular Semester	Theoretical	Practical	Credits	ECTS
CE 438	8	3	-	3	
Name of Lecturer(s)- Academic Title:	Yousif Abdulllah -				
Teaching Assistant:	N/A				
Course Language:	English				
Course Type:	Area Elective				
Office Hours	Thursday (13:00 - 15:00)				
Contact Email:	yousif.abdullah@tiu.edu.iq				
	Tel:07501380640				
Teacher's academic profile:	Ph.D. in Geotechnical Engineering				
Course Objectives:	Understanding the behavior of pile foundations and their interaction with the surrounding soil (granular soils or cohesive soils), and studying the various methods to calculate the skin resistance and the point bearing capacity of piles to calculate the ultimate capacity of piles when the piles are subjected to vertical loading, horizontal loading and uplift forces. Also, studying the various methods to calculate the settlement of piles. The bearing capacity of piles groups and their settlement also will be covered during this semester.				
Course Description (Course overview):	Deep foundations. Piles and pile foundations, types of piles, pile foundation design. Types of sheet pile walls. Single wall, double wall and cellular cofferdams. Design and construction methods of cofferdams. Box open, monolithic and pneumatic or compressed air caissons. Underpinning of existing structures.				

COURSE CONTENT

Week	Hour	Date	Topic
1	3	31/1-4/2/2021	Introduction to pile foundations
2	3	7-11/2/2021	Types of pile foundations (Steel, concrete, timber) and their properties/advantages/disadvantages
3	3	14-18/2/2021	Pile capacity determination (Meyerhof's Method) in (1)sand and (2) clay
4	3	21-25/2/2021	Pile capacity determination (Vesic's Method) in (1)sand and (2) clay
5	3	28/2-4/3/2021	Pile capacity determination (Correlation with Standard Penetration Test Results)
6	3	7-11/3/2021	Frictional (Skin) Resistance in Clay/ (1) lamda-method (2) beta-method)
7	3	28/3-1/4/2021	Capacity of piles resting on rocks
8	3	4-8/4/2021	Pile load testing (Skov and Denver method, Guang-Yu method, Svinkin method)
9	3	11-15/4/2021	Midterm Exam
10	3	18-22/4/2021	Midterm Exam
11	3	25-29/4/2021	Pile settlement
12	3	2-6/5/2021	Laterally Loaded Piles ((1) Elastic Solution (2) Broms's Method)
13	3	9-13/5/2021	Negative Skin Friction ((1) Clay Fill over Granular Soil (2) Granular Soil Fill over Clay)
14	3	16-20/5/2021	Ultimate Capacity of Group Piles in Saturated Clay

15	3	23-27/5/2021	Elastic Settlement of Group Piles
16	3	30/5-3/6/2021	Consolidation Settlement of Group Piles
17	3	6-10/6/2021	Final Exam
18	3	13-17/6/2021	Final Exam

COURSE/STUDENT LEARNING OUTCOMES

- 1 Be able to recognize various types of piles
- 2 Be able to determine the skin resistance and the point bearing capacity of piles and hence calculating the allowable bearing capacity of the pile
- 3 be able to determine the settlement of single pile and pile groups
- 4 be able to analyze the data obtained from the field load test to determine the allowable bearing capacity

COURSE'S CONTRIBUTION TO PROGRAM OUTCOMES

(Blank : no contribution, I: Introduction, P: Proficient, A: Advanced)

Program Learning Outcomes

	Cont.
1 Apply principles of mathematics, science, and engineering	A
2 Design and conduct experiments, as well as analyze and interpret data accurately.	I
3 Design an engineering system, component, or process to meet desired industrial needs.	P
4 Identify, formulate and solve complex engineering problems	A
5 Apply, in design and construction, the most modern design codes, standards and specifications such as; AISC, ACI, ASCE 7, IBC, etc.	A
6 Use the techniques, skills, and modern engineering tools, such as surveying instruments, and designing software that are necessary for engineering practices.	P
7 Apply knowledge and skills in construction project management and recognition of international standards and methodologies	
8 Manage to work with multi-disciplinary teams and communicate effectively.	P
9 Identify the moral values that ought to guide the Civil Engineering profession and resolve the moral issues in the profession.	I
10 Apply the principles of sustainable development in their professional duties which go in line with the paramount safety, health and welfare of the public.	P
11 Analyze the impact of engineering solutions in a global and social context	I
12 Identify the need and have the ability to engage in lifelong learning and knowledge of contemporary issues.	I

Prerequisites (Course Reading List and References):

Soil Mechanics I (CE 317) Soil Mechanics II (CE 322)

Student's obligation (Special Requirements):

Lecture Notes, Scientific Calculator

Course Book/Textbook:

Braja M. Das (2010) "Principles of Foundation Engineering", Cengage Learning, 794 pages
Carlo Viggiani, Alessandro Mandolini, Gianpiero Russo (2014) "Piles and Pile Foundations", CRC Press, 296 pages. Wei Dong Guo (2012) "Theory and Practice of Pile Foundations", CRC Press, 576 pages
Lymon C. Reese, William M. Isenhowe, Shin-Tower Wang (2005) "Analysis and Design of Shallow and Deep Foundations, Volume 10", John Wiley & Sons, 608 page

Other Course Materials/References:

V.N.S. Murthy, "Geotechnical Engineering: Principles and Practices of Soil Mechanics and Foundation Engineering"(2002)

Teaching Methods (Forms of Teaching):

Lectures, Excercises, Presentation, Assignments

COURSE EVALUATION CRITERIA

Method	Quantity	Percentage (%)
Participation	1	2
Quiz	3	8
Homework	1	4
Midterm Exam(s)	1	30
Final Exam	1	40
Total		100

Examinations: Essay Questions, Fill in the Blanks, Short Answers

Extra Notes:

ECTS (ALLOCATED BASED ON STUDENT) WORKLOAD

Activities	Quantity	Workload Hours for 1 quantity*	Total Workload
Theoretical Hours	18	3	54
Practical Hours	18	0	0
Final Exam	1	20	20
Participation	1	4	4
Quiz	3	9	27
Homework	1	5	5
Midterm Exam(s)	1	18	18
Total Workload			128
ECTS Credit (Total workload/25)			5.12

Peer review

Signature:

Name:

Lecturer

Signature:

Name:

Head of Department

Signature:

Name:

Dean