

## Module (Course Syllabus) Catalogue 2023-2024

College/ Institute	College of Engineering		
Department	Civil Engineering		
Module Name	Foundation Engineering and Piles		
Module Code	FPE703		
Degree	Technical Diploma <input type="checkbox"/>	Bachelor <input checked="" type="checkbox"/>	High Diploma <input type="checkbox"/> Master <input type="checkbox"/> PhD <input type="checkbox"/>
Semester	7 <sup>th</sup> (seventh)		
Qualification	BSc		
Scientific Title	Engineer		
ECTS (Credits)	6		
Module type	Prerequisite <input type="checkbox"/>	Core <input checked="" type="checkbox"/>	Assist. <input type="checkbox"/>
Weekly hours	4	(162)Total hrs Workload	
Weekly hours (Theory)	(4) hr Class		
Weekly hours (Practical)	(0)hr laboratory		
Number of Weeks	15		
Lecturer (Theory)	Mrs. Zina M. Dawood		
E-Mail & Mobile NO.	Zina.dawood@epu.edu.iq		
Lecturer (Practical)	N/A		
E-Mail & Mobile NO.	N/A		
Websites	N/A		

# Course Book

<p><b>Course Description</b></p>	<p>This course is an undergraduate course. The course will focus on the design of shallow foundation and axially loaded pile foundation. The field and laboratory soil testing methods will be discussed to determine the required design parameters. Lateral earth pressures theories and design of various retaining structures will be covered. Design of sheet piles and bracing system will also be discussed. The selection of proper foundation or characteristics of foundations for different soils will be discussed. The students can also be benefited from this course by visiting a foundation site worked with field engineers.</p>
<p><b>Course objectives</b></p>	<ol style="list-style-type: none"> <li>1) Specify and deduce appropriate soil parameters, where a thorough understanding of the in-situ sampling and characterization from site investigation methods for the foundation design purposes.</li> <li>2) Geotechnical theory and practice regarding the design/analysis of, shallow and deep foundations including spread/strip footings, mats, driven piles, and drilled shafts, and also on slope stability investigations of natural and man-made slopes.</li> <li>3) Design/analysis of pile foundation as single pile and as group piles to support the superstructure.</li> <li>4) Calculation of loads due to lateral earth pressures on structures that retain them and appropriate considerations for designing various earth retaining structures will be presented and studied.</li> </ol>
<p><b>Student's obligation</b></p>	<p>Attending the lecture is a fundamental part of the course. You are responsible for material presented in the lecture whether or not it is discussed in the textbook. You should expect questions on the exams to test your understanding of concepts discussed in the lecture and in the homework assignments.</p> <p>It can be very helpful to study with a group. This type of cooperative learning is encouraged; however, be sure that you have a thorough understanding of the concepts besides the mathematical steps used to solve a problem. You must be able to work through the problems on your own.</p> <p>In addition to that, the students should write a scientific project and prepare a nice presentation which this can be discussed in campus.</p>
<p><b>Required Learning Materials</b></p>	<p>books, handouts, folders, stationaries and printing and copying facilities.</p>

Evaluation	Task		Weight (Marks)	Due Week	Relevant Learning Outcome
	Paper Review				
	Assignments	Homework <sup>2</sup>	10	2	Cognitive skills
		Class Activity	2	2	Intellectual skills
		Report	-		
		Seminar	8	4	Presentation skills
		Essay	-		
		Project	8	2	Writing skills
	Quiz 2		8	2	understanding skills
	Lab. Report		N/A		Experience of writing and practical skills
	Midterm Exam		24	2	Knowledge and understanding skills
Final Exam		40	1	Knowledge and understanding skills	
Total		100			
Specific learning outcome:	<ol style="list-style-type: none"> <li>1. Plan a subsurface exploration, and select appropriate drilling, sampling and field property measurement tools for different soil profiles.</li> <li>2. Study bearing capacity of shallow and deep foundation. Settlement for design with applicable correction factors with a consideration of water effects and layering.</li> <li>3. Study pile capacity for a pile foundation and for a group of piles.</li> <li>4. Design earth retaining structures and determine the lateral loads from soils.</li> <li>5. Evaluate slope stability of natural and man-made excavations (fills and excavations) under varying conditions.</li> </ol>				
Course References:	<p>Key reference: Principles of Foundation Engineering - SI Edition - 8th Ed. (2016) by B. M. Das Cengage Learning.</p> <p>Useful references:</p> <ol style="list-style-type: none"> <li>1) Coduto, D. P. (2001). Foundation Design-Principles and Practices, 2/e, Prentice Hall, 2001.</li> <li>2) Tharwat M. Baban (2016). Shallow Foundations: Discussions and Problem Solving 1st Edition.</li> <li>3) Additional hand-outs will be given in class as deemed necessary.</li> <li>4) Magazines and review (internet)</li> </ol>				

Course topics (Theory)	Week	Learning Outcome
<i>Introduction to Geotechnical Engineering</i>	1	Foundation Eng. description
<i>Subsurface exploration – field tests and sampling</i>	2	Knowledge skills
<i>Bearing capacity of Shallow foundation</i>	3	Knowledge skills
<i>Vertical stress increase in soil</i>	4	Knowledge skills
<i>Settlement of shallow foundation</i>	5	Knowledge skills
<i>Structural design of shallow foundations; single pad foundation with eccentricity, continuous foundation, and soil compressibility.</i>	6	Knowledge skills
<i>Mat foundation</i>	7	Knowledge skills
<i>Pile foundation Pile group</i>	8	Knowledge skills
<i>Pile group efficiency</i>	9	Knowledge skills
<i>Elastic settlement of single pile</i>	10	Knowledge skills
<i>Stability analysis of retaining walls</i>	11	Knowledge skills
<i>Lateral earth pressure</i>	12	Knowledge skills
<b>Practical Topics</b>	<b>N/P</b>	<b>Learning Outcome</b>
<p><b>Questions Example Design</b></p> <ol style="list-style-type: none"> <li>1. Design a pile foundation based on some geotechnical properties.</li> <li>2. Compute the settlement of shallow foundation.</li> <li>3. Calculate the increase in vertical stress under the foundation</li> </ol>		

**Extra notes:**

**External Evaluator**

It has reviewed the Coursebook of Foundation Engineering and all the contents compatible with the annual academic program 2022-2023. Good Luck for our dear students.