

## Module (Course Syllabus) Catalogue 2023-2024

College/ Institute	College of Engineering		
Department	Civil Engineering		
Module Name	Soil Mechanics -1		
Module Code	SOE505		
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	5 <sup>th</sup> (Fifth )		
Qualification	BSc		
Scientific Title	Engineer		
ECTS (Credits)	7		
Module type	Prerequisite <input type="checkbox"/>	Core <input checked="" type="checkbox"/>	Assist. <input type="checkbox"/>
Weekly hours	5		
Weekly hours (Theory)	(3)hr Class	(189)Total hrs Workload	
Weekly hours (Practical)	(2)hr laboratory		
Number of Weeks	15		
Lecturer (Theory+Practical)	Mrs. Zina M. Dawood		
E-Mail & Mobile NO.	Zina.dawood@epu.edu.iq		
Lecturer (Tutorial+ Practical)	Mr. Mohamed Moafak Aziz		
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Websites			

# Course Book

<p><b>Course Description</b></p>	<p>Soil Engineering mechanics is a branch of soil physics and applied mechanics that describes the behavior of soils. Soil mechanic aims to analyze the deformations of flow of fluids within natural and man-made structures that are supported on/in soil. Example of its application including building, bridge foundations, retaining walls, dams and buried pipeline systems.</p> <p>Many important contents will be discussed in the theoretical hours such as soil composition and classification, flow of fluid through soil. This is to give a clear understanding of soil engineering properties and behavior. Practical hours will be helpful to the students to have a chance of doing several laboratory tests to test different types of soils. Also, the students will be able to conduct laboratory tests and obtain soil properties and parameters from the tests observations and results. To conclude, the students will have the knowledge of understanding the engineering properties of soil to deal with /solve any problem which might face during the site investigation.</p>
<p><b>Course objectives</b></p>	<ol style="list-style-type: none"> <li>1. Introduce the students with the essential concepts of the engineering properties of soils as a civil engineer.</li> <li>2. Understanding of soils as engineering materials.</li> <li>3. Studying the engineering behaviour of soils.</li> <li>4. Helping the students to be familiar with the soil sampling, soil testing and site investigation.</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>Textbooks, handouts, folders, stationaries and printing and copying facilities.</p>

<b>Evaluation</b>	<b>Task</b>	<b>Weight (Marks)</b>	<b>Due Week</b>	<b>Relevant Learning Outcome</b>	
	Paper Review				
	Assignments	Homework <sup>2</sup>	5	2	Cognitive skills
		Class Activity	2	2	Intellectual skills
		Report	-		
		Seminar	10	2	Presentation skills
		Essay	-		
		Project	10	2	Writing skills
	Quiz <sup>2</sup>	8	2	understanding skills	
	Lab. Report	10	2	Experience of writing and practical skills	
	Midterm Exam	10(theo.)+15(Prac.)	2	Knowledge and understanding skills	
Final Exam	20(theo.)+10(Prac.)	1	Knowledge and understanding skills		
Total	100				
<b>Specific learning outcome:</b>	<ol style="list-style-type: none"> <li>1. Understand and evaluate the site investigations</li> <li>2. Study the physical properties of soil.</li> <li>3. Classify the soil according to the standards.</li> <li>4. Assess the stresses and increase in stress that effect on soil.</li> <li>5. Test and evaluate the soil properties in the soil laboratory.</li> <li>6. Fluid flow into soil</li> </ol>				
<b>Course References:</b>	<ul style="list-style-type: none"> <li>➤ Key reference: Soil Mechanics - William Lam and Robert Whitman</li> <li>➤ Useful references: <ol style="list-style-type: none"> <li>7. Aysen; soil mechanics basic concept and engineering application.</li> <li>8. C.R. scott; soil mechanics and foundation. Third edition.</li> <li>9. T. William Lamb and Robert V. Whitman. Soil Mechanics.</li> <li>10. Joseph Bowels. Laboratory testing Manual.</li> </ol> </li> <li>➤ Magazines and review (internet)</li> </ul>				

<b>Course topics (Theory)</b>	<b>Week</b>	<b>Learning Outcome</b>
<i>Introduction of soil</i>	1	Soil mechanism description
<i>Clay minerals</i>	2	Knowledge skills
<i>Soil Classification</i>	3	Knowledge skills
<i>Weight – volume relations</i>	4	Knowledge skills
<i>Atterberg Limits</i>	5	Knowledge skills
<i>Particle Sieve analysis</i>	6	Knowledge skills
<i>Geostatic stress within a soil mass</i>	7	Knowledge skills
<i>Stress increase due to external load</i>	8	Knowledge skills
<i>Total and effective vertical stress of soil</i>	9	Knowledge skills
<i>Soil permeability</i>	10	Knowledge skills
<i>One dimensional fluid flow</i>	11	Knowledge skills
<i>Two-dimensional fluid flow</i>	12	Knowledge skills
<b>Practical Topics</b>	<b>Week</b>	<b>Learning Outcome</b>
<i>Introduction</i>	1	Writing report skills
<i>Water content test</i>	2	Experience in practical tests
<i>Atterberg limit test - shrinkage limit test liquid limit test plastic limit test</i>	3,4	Experience in practical tests
<i>Hydrometer test</i>	5,6,7	Experience in practical tests
<i>Sieve analysis test</i>	8,9	Experience in practical tests
<i>Soil Compaction test</i>	10,11,12	Experience in practical tests

## Questions Example Design

➤ **Compositional:**

1. If the voids of the soil sample are filled with water, the soil can be **defined as**:

A) Dry. B) Partially saturated. C) Fully saturated.

2. **Explain** a site investigation?

3. **Draw** the clay minerals structure. Summarize the bonding between their mineral sheets.

➤ **True or false type of exams:**

When soil particles having a diameter of 0.002 mm, then the soil can be classified as a clayey soil.

➤ **Multiple choices:**

If water content of the soil is between plastic limit and liquid limit, the soil defines in the state of

a. Solid b. Semi-solid c. Plastic d. Liquid

## Extra notes:

## External Evaluator

I reviewed the Coursebook of Soil Mechanics and all the contents compatible with the annual academic program 2022-2023. Good Luck for our dear students.