



**Department of Civil Engineering**

**College of Engineering**

**Salahaddin University-Erbil**

**Subject: *Experimental Soil Mechanics-II***

**Course Book: *Third Year***

**Lecturer's name: *Hawkar Hashim Ibrahim***

*BSc. in Civil Engineering*

*MSc. in Geotechnical Engineering*

**Academic Year: *2020/2021***

# Course Book

<b>1. Course name</b>	<b>Experimental Soil Mechanics-II</b>
<b>2. Lecturer in charge</b>	<b>Hawkar Hashim Ibrahim</b>
<b>3. Department/ College</b>	<b>Civil Engineering Department / College of Engineering</b>
<b>4. Contact</b>	<b>e-mail: hawkar.ibrahim@su.edu.krd Mob: 07501999899</b>
<b>5. Time (in hours) per week</b>	<b>Theory: 0 Practical: 1</b>
<b>6. Office hours</b>	<b>8</b>
<b>7. Course code</b>	<b>CE303 [Practical Part]</b>
<b>8. Teacher's academic profile</b>	<ul style="list-style-type: none"> <li>• <b>BSc</b> in Civil Engineering (University of Salahaddin)- Erbil / 2008</li> <li>• <b>MSc</b> in Geotechnical Engineering (The University of Nottingham) – Nottingham/2013</li> </ul>
<b>9. Keywords</b>	Soil Mechanics, Geotechnical Engineering, Soil Laboratory, Soil Properties, Consolidation of Soil, Shear Strength of Soil.
<b>10. Course overview:</b>	
<p>Soil mechanic is the branch of science that deals with the study of the physical properties of soil and the behaviour of soil masses subjected to various types of forces. Soil engineering is the application of the principles of soil mechanics to practical problems.</p> <p>A good understanding of soil behaviour is necessary for us to analyse and design support systems (foundations) for infrastructures (such as: roads, highways, pipelines, bridges, tunnels, embankments), energy systems (such as: hydroelectric power stations, wind turbines, solar supports, geothermal and nuclear plants) and environmental systems (such as: solid waste disposal, reservoirs, water treatment and water distribution systems, flood protection systems). The stability and life of any of these systems depend on the stability, strength, and deformation of soils. If the soil fails, these systems founded on or within it will fail or be impaired, regardless of how well these systems are designed. Thus, successful civil engineering projects are heavily dependent on our understanding of soil behaviour. The behaviour of these soils can be determined by site investigation and laboratory tests. Therefore, the experimental soil mechanics part is very important and it is the completion of theoretical part.</p>	

**11. Course objective:**

The Main objectives of the *Experimental Soil Mechanics* are

- To help students in understanding the concepts of soil mechanics which will be given in Soil Mechanics course (CE303).
- To be able to carry out all soil mechanics fundamental experiments according to standards.
- To collect, analyse and interpret experimental data
- To use communication skills to transfer their findings in a formal report format.
- To have a feeling of engineering properties of soil

**12. Student's obligation**

Students must attend the majority laboratory classes 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. A sign-in sheet will be provided at the end of every experiment. Attendance for laboratory sessions is mandatory.

**13. Forms of teaching**

Different methods will be used to explain all Experimental Soil Mechanics which related to this course. PowerPoints presentation will be used to illustrate the important points of the Experiments. The Microsoft Surface Pro 3 and white board will be used to elucidate details of the Experiments. Set of printed lectures will be provided before lectures.

**14. Assessment scheme**

All exams will be held in the classroom and will be closed book/notes. Only calculators will be permitted for use during exams. Use of electronics such as mobiles phones, laptops, or e-book readers is not permitted. Exams will be based on the course material covered and may include information given in the laboratory.

<b>Practical Part</b>	<b>Mark</b>
Reports	7%
Exam	3 %
Final Exam	10 %

**15. Student learning outcome:**

*When you complete this Course, you should be able to:*

1. Understand the principals of experimental soil mechanics and how to find them.
2. Apply these principals in the field (in construction engineering projects).
3. Classify different types of soils that are used in different projects such as roads, retaining walls, embankments, etc....
4. Find angle of internal friction, cohesion, unit weight of soils, which are useful to design different project types like foundations (Shallow and Deep), retaining walls, earth dams, embankment, etc...

**16. Course Reading List and References:**

- |  |                              |
|--|------------------------------|
| 1. Experimental Soil Mechanics_ 1997. (Text Book)          | By Jean-Pierre Bardet        |
| 2. Soil Properties   | By Cheng Liu & Jack B. Evett |
| 3. Soil Testing for Engineers.                             | By S. Mittal & J.P.Shukla    |
| 4. Soil Testing for Engineers.                             | By T. William Lambe          |
| 5. Engineering Properties of Soils and Their Measurements. | By Joseph E.Bowles           |
| 6. Manual of Soil Laboratory Testing                       | By K. H. Head                |
| 7. American Society for Testing and Materials (ASTM).      |                              |

**17. The Topics:**

**Lecturer's name**

All Experimental Soil Mechanics lectures are practical.

Hawkar H. Ibrahim

<b>18. Practical Topics</b>		
Week 1 and 2	Unconfined Compression Test	Hawkar H. Ibrahim  [Each experiment needs two hours]
Week 3 and 4	Triaxial Compression Test	
Week 5 and 6	Sieve Analysis Test	
Week 7 and 8	Exam	
Week 9 and 10	Consolidation Test	
Week 11 to 14	Consolidation Test	

**19. Extra notes:**

Here the lecturer shall write any note or comment that is not covered in this template and he/she wishes to enrich the course book with his/her valuable remarks.

**20. Peer review**

**پیداچونہوہی ھاوہل**

This course book has to be reviewed and signed by a peer. The peer approves the contents of your course book by writing few sentences in this section.

*(A peer is person who has enough knowledge about the subject you are teaching, he/she has to be a professor, assistant professor, a lecturer or an expert in the field of your subject).*

ئەم كۆرسبووكە دەبىت لەلایەن ھاوھلئىكى ئەكادىمىيە سەیر بكرىت و ناوھرۆكى بابەتھانى كۆرسەكە پەسەند بكات و چەند ووشەيەك بنوسىت لەسەر شىاوى ناوھرۆكى كۆرسەكە و واژووى لەسەر بكات. ھاوھل ئەو كەسەيە كە زانىارى ھەبىت لەسەر كۆرسەكە و دەبىت پلەى زانستى لە مامۇستا كەمتر نەبىت.