8.16 CE0842 – Experimental Soil Mechanics

(1) GENERAL

SCHOOL	ENGINEERING SCHOOL		
ACADEMIC UNIT	CIVIL ENGINEERING DEPARTMENT		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	**CE0842**	**SEMESTER**	**8**
COURSE TITLE	**Experimental Soil Mechanics**		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	2	3
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Specialization Course
PREREQUISITE COURSES:	Soil Mechanics (CE0540) Geotechnical Engineering (CE0620)
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	https://eclass.uniwa.gr/courses/CIV194/

(2) LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

In the course Experimental Soil Mechanics, the various methods for the assessment and determination of the physical characteristics and mechanical properties of soil materials are applied and demonstrated. Emphasis is placed on laboratory tests, and reference is made to field tests.

Upon successful completion of the course the student:

1. will be able to participate in the performance of laboratory soil mechanics tests,

2. will be able to process - evaluate experimental test recordings,
3. will be able to evaluate the physical characteristics and mechanical properties of soils,
4. have an understanding of the role of laboratory and field testing in the context of a geotechnical evaluation,
5. have an understanding of the statistical treatment of results (characteristic values and standard deviations) and the method of determining errors in laboratory tests,
6. be able to apply soil classification systems.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?;.

Search for, analysis and synthesis of data and information, with the use of the necessary technology	*Search for, analysis and synthesis of data and information, with the use of the necessary technology*
Adapting to new situations	*Adapting to new situations*
Decision-making	*Decision-making*
Working independently	*Working independently*
Team work	*Team work*
Working in an international environment	*Working in an international environment*
Working in an interdisciplinary environment	*Working in an interdisciplinary environment*
Production of new research ideas	*Production of new research ideas*

The course aims that the student acquires - practice the following general skills:

- Search for, analysis of, and synthesis of data and information, implementing appropriate technologies
- Independent work - Team work - Working in an international / interdisciplinary environment
- Project planning and management
- Proact free, creative and inductive thinking

(3) **SYLLABUS**

Physical characteristics of soils:

1. Experimental determination of moisture content (w). Relationships between the phases of the soil material. Experimental determination of the specific weight (specific gravity) of the solid soil particles (γs).
2. Experimental determination of porosity, n, void ratio, e, and apparent (specific) soil weight (γ) of a soil sample.
3. Soil particle size analysis and evaluation of the particle size distribution curve.
4. Experimental determination of Atteberg limits:
    (a) Determination of the liquid limit
    (b) Determination of the plastic limit.
    (c) Casagrande plasticity chart.
5. Soil compaction: experimental determination of optimum moisture content, wopt, and maximum density, dry weight, using the (standard) Proctor method.

Mechanical properties of soils:

6. Strength tests: direct shear of cohesive soils
7. Strength tests: uniaxial compression (unconfined)
8. Strength tests: standard triaxial compression, drained and undrained conditions
9. Compressibility tests: oedometer
10. Permeability tests: constant and variable load
11. Design and evaluation of geotechnical investigations: field investigation, correlation of the geotechnical investigation set up with the peculiarities of the project and on-site conditions, geotechnical model.

(4) TEACHING and LEARNING METHODS - EVALUATION

<table>
<tr><td>DELIVERY
Face-to-face, Distance learning, etc.</td><td>Face-to-face in-class teaching. When needed, distance teaching (synchronous/asynchronous)</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY
Use of ICT in teaching, laboratory education, communication with students</td><td>Use of I.C.T. in Teaching and Student Communication</td></tr>
<tr><td>TEACHING METHODS
The manner and methods of teaching are described in detail.
Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.

The student's study hours for each learning activity are given as well as the hours of non- directed study according to the principles of the ECTS</td><td>
<table>
<tr><th>Activity</th><th>Semester workload</th></tr>
<tr><td>In Class (/Distance) Teaching</td><td>26</td></tr>
<tr><td>Literature Study</td><td>25</td></tr>
<tr><td>Exercises / Paradigms</td><td>24</td></tr>
<tr><td>Project assignmenet / Essay</td><td>15</td></tr>
<tr><td></td><td></td></tr>
<tr><td>Course total</td><td>90</td></tr>
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</td></tr>
<tr><td>STUDENT PERFORMANCE EVALUATION
Description of the evaluation procedure

Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open- ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other

Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</td><td>Language of evaluation: Greek

Written examination, 2,5-hours
Problem solving, Multiple choice test, Questions and Answers, Written Essay / Project

The evaluation criteria are announced to the students well before the examination; weights per subject /exercise are explicitly indicated.

The examination results (including total / partial grading) are announced on the web. Students may require to have access to their tests, they may ask for clarifications on mistakes, grading etc.</td></tr>
</table>

(5) ATTACHED BIBLIOGRAPHY

Greek Bibliography:

1. Παπαχαρίσης Ν., Γραμματικόπουλος Ι., Ανδρεάδου-Μάνου Ν., Γεωτεχνική Μηχανική. Έρευνα-Γεωτρήσεις-Εργαστήριο. Εκδόσεις Κυριακίδη ΙΚΕ., 2015.
2. Κωστόπουλος Σ., Πειραματική Γεωτεχνική Μηχανική. Εκδόσεις ΣΤΕΛΛΑ ΠΑΡΙΚΟΥ & ΣΙΑ ΟΕ., 2005.

Foreign Bibliography:

1. Head K.H., 1980, Manual of Soil Laboratory Testing, Volumes 1, 2 and 3, Pentech Press