1.1.1 Soil mechanics I

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΓΕΩ002	**SEMESTER**	4th
COURSE TITLE	Soil mechanics I		

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**
	4	5
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*	Scientific Field
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	https://elearning.cm.ihu.gr/course/view.php?id=427

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*

The aim of the course is to help the student understand the basic principles of Soil Mechanics, to consolidate knowledge regarding the behavior of the "soil" as a civil engineering material and to develop the ability to computationally address basic problems in classic applications of Soil Mechanics. Upon successful completion of the course, the student will be able to:

• Recognize, comprehend and be able to classify the basic physical and mechanical properties of soil.
• Distinguish and understand the parameters related to soil behavior.
• Calculate the stresses developing in the soil deposit due to the weight of the soil itself as well as due to external loading, and also estimate the soil shear strength and the stability of soil slopes.
• Combine individual soil characteristics and be able to differentiate and adapt the assessment and computation procedures based on the particular parameters of each case under consideration.

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 *Project planning and management*

information, with the use of the necessary technology *Adapting to new situations* *Decision-making* *Working independently* *Team work* *Working in an international environment* *Working in an interdisciplinary environment* *Production of new research ideas*	*Respect for difference and multiculturalism* *Respect for the natural environment* *Showing social, professional and ethical responsibility and sensitivity to gender issues* *Criticism and self-criticism* *Production of free, creative and inductive thinking* *……* *Others…* *…….*

The course contributes to the following skills:

- Search, analysis and synthesis of data and information
- Decision-making
- Working independently
- Project planning

SYLLABUS

Description of the fundamental principles of soil behavior and introduction to the topics of soil stresses, soil deformations, and soil stability. Introduction to theoretical Soil Mechanics concepts aimed at using appropriate soil parameters for each type of problem.

Content of theory lectures:

- Physical and mechanical properties of soils.
- Laboratory measurements and field tests.
- Water flow in porous soils and its effect on he mechanical behavior of the soil.
- Soil stresses and deformations.
- Shear strength of soil.
- Stability of soil slopes.

Content of laboratory exercises:

- Introduction to issues related to the control and testing of the physical and mechanical soil properties.
- Laboratory determination of soil moisture content.
- Laboratory determination of soil specific weight and unit weight.
- Particle size analysis of soil.
- Laboratory determination of Atterberg limits (liquid limit, plastic limit, shrinkage limit).
- Soil Proctor compaction test.
- Determination of soil density.
- Unconfined compression test (determination of soil uniaxial compression strength).
- Direct shear test (determination of soil shear strength).

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Lecture presentations using computer and projector, in person or by teleconference (remotely) if required. Support of the learning process through the e-learning platform and electronic communication with students (online announcements and comments, e-mail, announcements on the Department's website etc.). If required, support of students by using teleconference tools and software.
TEACHING METHODS *The manner and methods of teaching are described in detail.*	

Activity	*Semester workload*
Lectures	26
Practice/exercises	26

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*	Project(s) 30 Individual study 48 Course total (26 hours workload per ECTS credit) ***130***
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.*	Final written exam that includes: • Theoretical judgment questions on course subjects (short answer questions and multiple-choice questions). • Solving of theory problems-exercises. • Solving of laboratory exercises. Submission of assignments and oral examination that includes: • Laboratory exercises solving. • Solving of theory problems-exercises. • Examination of understanding of course basic concepts.

ATTACHED BIBLIOGRAPHY

- [In Greek] Barnes G.E. (2014), "Εδαφομηχανική: Αρχές και Εφαρμογές (3η έκδοση)", Εκδόσεις Κλειδάριθμος, Αθήνα, ISBN: 978-960-461-578-0
- [In Greek] Καββαδάς Μ. (2016), "Στοιχεία Εδαφομηχανικής (2η έκδοση)", Εκδόσεις Τσότρας, ISBN: 978-618-5066-62-8
- [In Greek] Κολέτσος Κ., (2004), "Γεωτεχνική Μηχανική", Εκδόσεις University Studio Press, ISBN: 978-960-12-1256-2
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- [In Greek] Χρηστάρας Β., Χατζηαγγέλου Μ. (2011), "Απλά βήματα στην Εδαφομηχανική", University Studio Press, Θεσσαλονίκη, ISBN: 978-960-12-1935-6
- [In Greek] Budhu M. (2020), "Εδαφομηχανική και Θεμελιώσεις", Εκδόσεις Gotsis, Πάτρα, ISBN: 978-960-9427-90-6
- Das B.M. (2019), "Advanced Soil Mechanics" , Taylor and Francis (5th edition), New York.
- Verruijt A. (2018), "An Introduction to Soil Mechanics", Springer.