

COURSE OUTLINE

(1) GENERAL

SCHOOL	SCHOOL OF ENGINEERING		
DEPARTMENT	CIVIL ENGINEERING		
LEVEL OF STUDIES	UNDER GRADUATE		
COURSE CODE	2305515	SEMESTER	5 th
SO	SOIL MECHANICS		
INDEPENDENT TEACHING ACTIVITIES <i>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</i>	WEEKLY TEACHING HOURS	CREDITS	
Lectures	3	5	
Laboratory	2		
Total	5		
<i>Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).</i>			
COURSE TYPE <i>general background, special background, specialised general knowledge, skills development</i>	SPECIAL BACKGROUND COURSE		
PREREQUISITE COURSES:	NO		
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek (official)		
IS THE COURSE OFFERED TO ERASMUS STUDENTS	NO		
COURSE WEBSITE (URL)	http://vplace.teipir.gr/2305515		

(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

THE COURSE IS AN INTRODUCTION TO BASIC CONCEPTS OF SOIL MECHANICS, METHODS OF GEOTECHNICAL INVESTIGATION AND TO PHYSICAL, DYNAMIC AND MECHANICAL PROPERTIES OF SOIL. SIMULTANEOUSLY, IT DEEPENS IN SPECIALIZED KNOWLEDGE AND CONCEPTS REQUIRING CAPACITY AND SKILLS DEVELOPMENT BOTH IN UNDERSTANDING AND IN USE OF NEW TECHNOLOGY. SPECIFICALLY, IT DEALS WITH MECHANIC OF SOIL AND THE UNDERSTANDING OF ITS BEHAVIOUR.

OBJECTIVE OF COURSE IS THE UNDERSTANDING OF SOIL CONDITIONS AND CHARACTERISTICS OF SOIL WITH THE AIM OF THE BETER WAYS OF FOUNDATION DETERMINATION.

UPON COMPLETION OF LECTURE, STUDENTS WILL BE ABLE TO:

1. PERCEIVE THE COMPACTION AND THE SETTLEMENTS OF COHESIVE AND INCOHESIVE SOILS.
2. COMFORTLY MAKE USE OF THE CONDITION OF SOIL HYDRAULIC.
3. CALCULATE THE TOTAL NORMAL STRESS, PORE WATER PRESSURE, AND EFFECTIVE NORMAL STRESS.
4. DETERMINE THE DISTRIBUTION OF STRESSES IN SUBSOIL UNDER THE ENERGY OF EXTERNAL LOADS (METHOD BOUSSINESQ).
5. DESCRIBE THE MECHANICAL BEHAVIOR AND THE MOHR – COULOMB FAILURE CRITERION.
6. IDENTIFY LATERAL EARTH PRESSURE BY RANKINE AND COULOMB AND THE BEARING CAPACITY OF SHALLOW FOUNDATIONS BY TERZAGHI.

AFTER THE END OF LAB TESTS, THE STUDENTS WILL BE ABLE TO PERCEIVE, INTERPRET AND CLEARLY EXPLAIN ISSUES RELATED TO: PHYSICAL CHARACTERISTICS OF SOIL, WATER CONTENT, SPECIFIC WEIGHT, ATTERBERG LIMITS, PARTICLE SIZE ANALYSIS, COMPACTION (PROCTOR TEST), PERMEABILITY, CONSOLIDATION, UNIAXIAL COMPRESSIVE STRENGTH, DIRECT SHEAR TEST, TRIAXIAL TEST.

GENERALLY, THE COURSE OF SOIL MECHANICS HELPS TO THE INVESTIGATION OF ACTUAL PROBLEMS AND GIVES SOLUTIONS.

WITH REGARD TO THE SKILLS, STUDENTS, AFTER THE END OF THE COURSE, BE ABLE TO:

1. ENGAGE CRITICAL ANALYSES RELATIVE WITH THE OBJECT OF THE COURSE
2. ANALYZE PROBLEMS TAKING INTO CONSIDERATION THE LACK OR THE EXCESSIVE SUPPLY OF DATA

3. RECEIVE AND EVALUATE DATA AND COMPOSE THEM FOR THE RESOLUTION OF PROBLEMS
4. THINK CREATIVELY AND WITH THE USE OF THEIR EXPERIENCE, RESOLVE PROBLEMS
5. INVESTIGATE SUITABLY THE BIBLIOGRAPHY, DRAW AND EXECUTE INDIVIDUAL RESEARCH OR IN TEAMS.
6. HAVE A PROVEN CRITICAL ABILITY SO THEY CAN COMPARE AND EVALUATE DIFFERENT STATEMENTS ON THE BEHAVIOUR OF THE SOIL.

WITH REGARD TO THE FACULTIES, STUDENTS MIGHT:

1. ENGAGE STUDIES OF SOIL MECHANICS FOR CONSTRUCTION PROJECTS USING MODERN METHODS AND REGULATIONS
2. EXPRESS OPINIONS WITH REGARD TO THE SOIL MECHANIC PROBLEMS OF EXISTING CONSTRUCTIONS.

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

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

Project planning and management

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

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Others...

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1. SEARCH, ANALYSIS AND SYNTHESIS OF DATA AND INFORMATION, USING THE NECESSARY TECHNOLOGIES.
2. TEAMWORK
3. PROJECT PLANNING AND MANAGEMENT

(3) COURSE CONTENT

THEORY:

THE CORE MODULES OF THE COURSE INCLUDE:

1. INTRODUCTION,
2. METHODS OF GEOTECHNICAL INVESTIGATION,
3. PHYSICAL CHARACTERISTICS OF SOIL.
4. CLASSIFICATION,
5. COMPACTION,
6. HYDRAULIC,
7. SETTLEMENTS OF COHESIVE AND INCOHESIVE SOILS,
8. DISTRIBUTION OF STRESSES IN SUBSOIL UNDER THE ENERGY OF EXTERNAL LOADS (METHOD BOUSSINESQ),
9. MECHANICAL BEHAVIOR AND THE MOHR – COULOMB FAILURE CRITERION,
10. LATERAL EARTH PRESSURE BY RANKINE AND COULOMB,
11. BEARING CAPACITY OF SHALLOW FOUNDATIONS BY TERZAGHI.

LAB:

THE WORKSHOP INCLUDES THE FOLLOWING LABORATORY EXERCISES:

1. PHYSICAL CHARACTERISTICS OF SOIL,
2. WATER CONTENT,
3. SPECIFIC WEIGHT,
4. ATTERBERG LIMITS,
5. PARTICLE SIZE ANALYSIS,
6. COMPACTION (PROCTOR TEST),
7. PERMEABILITY,
8. CONSOLIDATION,
9. UNIAXIAL COMPRESSIVE STRENGTH,
10. DIRECT SHEAR TEST,
11. TRIAXIAL TEST.

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY <i>Face-to-face, Distance learning, etc.</i>	LECTURES, LABORATORIES , FACE TO FACE	
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY <i>Use of ICT in teaching, laboratory education, communication with students</i>	<p>► USE OF THE WEBSITE OF THE COURSE WHICH PRESENTED INFORMATION FOR TEACHING COURSE (BIBLIOGRAPHY), USING ELECTRONIC MEDIA PRESENTATION (VIEW SLIDES IN POWERPOINT).</p> <p>► THE INDIVIDUAL WORKS INCLUDE USE SOFTWARE MICROSOFT OFFICE (WORD, EXCEL, POWERPOINT)</p> <p>► QUESTIONS AND ANSWERS CAN BE GIVEN THROUGH EMAILS OR SKYPE.</p>	
TEACHING METHODS <i>The manner and methods of teaching are described in detail.</i> <i>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.</i> <i>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</i>	<i>Activity</i>	<i>Semester workload</i>
	LECTURES	26
	LABORATORIES	39
	PREPARATION FOR WRITING LABORATORY REPORTS-HOMEWORK	10
	PREPARATION FOR PROJECTS ON CASE STUDIES (GROUP WORK)	8
	PERSONAL STUDY	42
	TOTAL COURSE	125
STUDENT PERFORMANCE EVALUATION <i>Description of the evaluation procedure</i> <i>Language of evaluation, methods of evaluation, summative or conclusive, multiple choice</i>	<p>LANGUAGE OF EVALUATION: GREEK</p> <p><u>THEORY 60%:</u></p> <p>1. FINAL WRITTEN EXAMINATION (80%)</p>	

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.

INCLUDES:

- QUESTIONS ON THEORETICAL PART
- JUDGEMENT QUESTIONS AND
- EXERCISES ABOUT CASE STUDIES.

2. PROJECTS (20%).

LABORATORY 40%:

1. FINAL WRITTEN EXAMINATION (80%)

INCLUDES:

- JUDGEMENT QUESTIONS
- MULTIPLE CHOICE QUESTIONS AND
- EXERCISES ABOUT CASE STUDIES

2. WRITING LABORATORY REPORTS (20%).

DESCRIPTION OF LABORATORY EXERCISE AND THE WAY OF IMPLEMENTATION, PRESENTATION OF MEASUREMENTS, PRESENTATION OF RESULTS (CALCULATIONS, DIAGRAMS, ETC.), COMMENTS ON RESULTS, CONCLUSIONS AND COMPARISON WITH INTERNATIONAL REFERENCES.

(5) ATTACHED BIBLIOGRAPHY

1. G.E. BARNES (2005), SOIL MECHANICS: PRINCIPLES AND PRACTICE, SECOND EDITION, KLIDARITHMOS, ATHENS.
2. M. KAVADAS (2009), SOIL MECHANICS DATA, ARIS SIMEON, ATHENS (IN GREEK).
3. R.F. CRAIG (2002), SOIL MECHANICS, SPON PRESS, U.K.
4. D. VALALAS (2001), SOIL MECHANICS, KIRIAKIDES, THESSALONIKI (IN GREEK),
5. JOHN ATKINSON (2006), THE MECHANICS OF SOILS AND FOUNDATIONS, TAYLOR & FRANCIS LTD, U.K.