

COURSE OUTLINE

(1) GENERAL

SCHOOL	UNIVERSITY OF THESSALY		
ACADEMIC UNIT	DEPARTMENT OF CIVIL ENGINEERING		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	ΔΟ1201	SEMESTER	7 th
COURSE TITLE	Experimental Strength of Materials		
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
		4	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, specialized general knowledge, skills development</i>	General background and skills development		
PREREQUISITE COURSES:			
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek. If there are English Speaking Erasmus Students the material is provided in English and the examination is conducted in English.		
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes		
COURSE WEBSITE (URL)	https://eclass.uth.gr/courses/CULT_U_179/		

(2) LEARNING OUTCOMES

Learning outcomes <i>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.</i> <i>Consult Appendix A</i> • <i>Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area</i> • <i>Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B</i> • <i>Guidelines for writing Learning Outcomes</i>
The aim of the course is to understand and interpret the mechanical properties of materials with the help of corresponding experiments, such as tensile test, compression test, hardness test (Brinell, Vickers, Rockwell), fatigue test, creep/relaxation test, impact test. Assessment and prediction of the behavior of materials according to the type of stress. Knowledge On completion of the course the student will have an advanced knowledge which implies a critical understanding of theories and principles - mechanical properties of structural materials, - In experimental methods of structural materials and elements, Skills Upon completion of the course, the student will have advanced skills in the processing, analysis and solution of complex problems in the science of structural materials related to: - Use of experimental methods for the characterisation of construction materials - Appropriate selection of experimental methods.

Competences

The student will be able to manage problems related to the use of structural materials and be able to make decisions on the design and operation of civil engineering projects.

Students will be able to:

- evaluate and judge technical and economic factors in the selection of experimental methods; and
- synthesize and propose optimal or new solutions based on this evaluation.

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?

<i>Search for, analysis and synthesis of data and information, with the use of the necessary technology</i>	<i>Project planning and management</i>
<i>Adapting to new situations</i>	<i>Respect for difference and multiculturalism</i>
<i>Decision-making</i>	<i>Respect for the natural environment</i>
<i>Working independently</i>	<i>Showing social, professional and ethical responsibility and sensitivity to gender issues</i>
<i>Team work</i>	<i>Criticism and self-criticism</i>
<i>Working in an international environment</i>	<i>Production of free, creative and inductive</i>
<i>thinking Working in an interdisciplinary environment</i>	<i>.....</i>
<i>Production of new research ideas</i>	<i>Others...</i>
	<i>.....</i>

The students acquire the following general competences:

1. *Search for, analysis and synthesis of data and information with the use of the necessary technology*
2. *Adapting to new situations*
3. *Decision-making*
4. *Team work*
5. *Production of new research ideas*
6. *Criticism and self-criticism*
7. *Respect for the natural environment*

(3) SYLLABUS

The course emphasizes the mechanical properties of the most basic experimental methods related to the strength of structural materials. A series of experiments are carried out using different methods to evaluate the behavior of materials subjected to a range of different loadings. It is stated in each case how the methods are chosen and how all available experimental means are used to collect data.

In addition, students carry out a series of laboratory exercises and present their findings both orally and in writing.

The course covers the following material:

- 1 - Introduction to the mechanical properties of materials
- 2 - Experimental tests - Devices used for measurements
- 3 - Strain gauge theory - Use of strain gauges
- 4 - Compression test (experiment)
- 5 - Bending test (experiment)
- 6 - Tensile test (experiment)
- 7 - Torsion test (experiment)
- 8 - Creep test (experiment)
- 9- Hardness test (experiment)
- 10 – Non destructive experimental methods

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY <i>Face-to-face, Distance learning, etc.</i>	Face-to-face	
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY <i>Use of ICT in teaching, laboratory education, communication with students</i>	Use of ICT in teaching, laboratory education, communication with students via E-class	
TEACHING METHODS <i>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.</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	14*2= 28
	Laboratory Exercises	14*2 =28
	Writing assignments	14*2= 28
	Preparation of assignments	14*2 = 28
	Presentation of assignments	20
	Examination	2
	Course total	134
STUDENT PERFORMANCE EVALUATION		
Description of the evaluation procedure <i>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</i> <i>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</i>	Language of Evaluation Greek (English for Erasmus students) Evaluation methods 40% Written assignment: Group laboratory exercises 30% Oral Examination: Group presentations 30% Written examination: Closed books and notes. Short answer questions, short answer questions, problem solving. The examination is designed to test both the knowledge and judgment of students.	

(5) SUGGESTED BIBLIOGRAPHY

- Suggested bibliography:
1. Papakonstantinou, C. (2024). *Experimental Mechanics of Materials* [Undergraduate textbook]. Kallipos, Open Academic Editions. <https://dx.doi.org/10.57713/kallipos-1009>
 2. J. ZANIEWSKI, M. MAMLOUK, «Materials for civil and construction engineers», Pearson Education, (US) 2005
 3. Ι. ΠΡΑΣΙΑΝΑΚΗΣ, Σ. ΚΟΥΡΚΟΥΛΗΣ, «Εργαστήριο Πειραματικής Αντοχής των Υλικών», Αθήνα 1999.