

COURSE OUTLINE

(1) GENERAL

SCHOOL	UNIVERSITY OF THESSALY		
ACADEMIC UNIT	DEPARTMENT OF CIVIL ENGINEERING		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	FK0106	SEMESTER	5 th
COURSE TITLE	CONSTRUCTION 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		
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_144/		

(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 this course is to provide an understanding of the fundamental properties and behavior of key materials used in engineering construction. It focuses on the physical and mechanical characteristics of building materials, with particular attention to how they are selected for construction purposes. Knowledge By the end of the course, students will have gained advanced knowledge, enabling them to critically understand theories and principles related to: • The properties of construction materials. • Methods for selecting appropriate building materials. Skills Upon course completion, students will have developed advanced skills in processing, analyzing, and resolving complex issues in the field of construction materials, particularly in: • The application of materials in construction projects. • Selecting suitable materials based on environmental conditions. Competencies By the end of the course, students will be equipped to handle challenges related to the use of construction materials and make informed decisions regarding the design and execution of civil

engineering projects. More specifically, students will be able to:

- Assess and evaluate technical, environmental, social, and economic factors in material selection.
- Formulate and propose optimal or innovative solutions based on their assessments.

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 thinking</i>
<i>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. *Production of free, creative and inductive thought*
5. *Respect for the natural environment*

(3) SYLLABUS

The course emphasizes the physical and mechanical properties of the most essential building materials. It covers how these materials are selected and utilized in civil engineering projects.

Week-by-week teaching outline:

Week 1: • Introduction – Basic concepts of physical and mechanical properties.
 Week 2: • Rocks – Minerals – Natural stones.
 Week 3: • Lime – Mortars – Plasters.
 Week 4: • Artificial Stones – Ceramics.
 Week 5: • Wood – Physical and Mechanical properties.
 Week 6: • Steel – Production – Physical and Mechanical properties.
 Week 7: • Reinforced Concrete Steel • Other metals.
 Week 8: • Cement – Production – Properties.
 Week 9: • Aggregates – Properties, Aggregates – Particle size distribution (exercise).
 Week 10: • Concrete – Physical & Mechanical properties.
 Week 11: • Concrete additives / admixtures – Concrete mix design study
 Week 12: • Quality control of fresh concrete, Quality control of hardened concrete.
 Week 13: • On-site concrete quality control.
 Week 14: • Polymers – Composite materials – Physical and Mechanical properties – Usage.

(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.</i> <i>Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop,</i>	<i>Activity</i>	<i>Semester workload</i>
	Lectures	14*4= 56 hours
	Field Trip	6 hours
	Study	14*5= 70 hours
	Examination	2 hours

<i>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>		
	Course total	134 hours
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 100% Written exam (closed book) <i>multiple choice questionnaires</i> <i>short-answer questions</i> The examination is designed to test both the knowledge and judgment of students.	

(5) SUGGESTED BIBLIOGRAPHY

- Suggested bibliography:
1. Triantafyllou Thanasis. Construction Materials, ISBN:9789609427685
 2. Papakonstantinou, C. (2024). *Experimental Mechanics of Materials* [Undergraduate textbook]. Kallipos, Open Academic Editions. <https://dx.doi.org/10.57713/kallipos-1009>
 3. J. ZANIEWSKI, M. MAMLOUK, «Materials for civil and construction engineers», Pearson Education, (US) 2005