

COURSE OUTLINE

1. GENERAL

SCHOOL	ENGINEERING SCHOOL		
DEPARTMENT	ARCHITECTURE		
LEVEL OF COURSE	Undergraduate		
COURSE CODE	ARC_E208	SEMESTER OF STUDIES	8 th
COURSE TITLE	Special Topics in Building Technology – Natural building		
INDEPENDENT TEACHING ACTIVITIES		TEACHING HOURS PER WEEK	ECTS CREDITS
		2	4
COURSE TYPE	Elective		
PREREQUISITE COURSES			
TEACHING AND ASSESSMENT LANGUAGE	Greek. In case foreign students attend the course teaching may be however performed in English.		
THE COURSE IS OFFERED TO ERASMUS STUDENTS	Yes		
COURSE WEBPAGE (URL)	https://eclass.upatras.gr/courses/ARCH205/		

2. LEARNING OUTCOMES

Learning outcomes
<p>The course aims at offering an opportunity to the students to acquire both the basic theoretical background, as well as practical, hands-on experience in alternative natural building techniques with earth (rammed earth, adobe, wattle and daub, etc.) Throughout the course we shall survey historic precedents of natural building methods and their application in specific buildings, cover the theoretical background of earth sample analysis and assessment, and examine each one of the different natural building techniques, with a particular focus on the construction parameters, layouts and details; we shall</p>

also explore the contemporary use of these techniques in modern buildings. Another part of the course will be an overview of the existing international building codes that apply to natural building, as well as Greek building standards. Lectures will be followed by hands-on exercises in the collection and assessment of soil and other building materials, and the construction of specimens using each of the different natural building techniques.

The final semester project will include the structural design of selected areas of a building using natural building techniques, with an emphasis on the design and resolution of construction details.

General abilities

- Encouragement of the cross disciplinary approach to innovative design projects
- Innovative and inventive approach to architectural technology topics
- Design and project management
- Appreciation of the natural environment

3. COURSE CONTENT

Lectures

1. Survey of natural building techniques with earth
2. Historic use of natural building
3. Raw material properties (clay, lime, hydraulic lime, Portland cement, aggregate, etc.)
4. On-site and laboratory testing
5. Rammed earth
6. Cob, adobe
7. Wattle and daub
8. Light straw construction
9. Earthen plasters and renders
10. Earthen floors
11. Pathology and restoration of earthen structures

4. ΔΙΔΑΚΤΙΚΕΣ και ΜΑΘΗΣΙΑΚΕΣ ΜΕΘΟΔΟΙ - ΑΞΙΟΛΟΓΗΣΗ

ΤΡΟΠΟΣ ΠΑΡΑΔΟΣΗΣ	Διαλέξεις στην τάξη. Πρόσωπο με πρόσωπο για την εκπόνηση των ασκήσεων.	
ΧΡΗΣΗ ΤΕΧΝΟΛΟΓΙΩΝ ΠΛΗΡΟΦΟΡΙΑΣ ΚΑΙ ΕΠΙΚΟΙΝΩΝΙΩΝ	Υποστήριξη Μαθησιακής διαδικασίας μέσω της ηλεκτρονικής πλατφόρμας e-class Επικοινωνία με τους φοιτητές μέσω διαδραστικής πλατφόρμας του Μαθήματος σε μέσα κοινωνικής δικτύωσης	
ΟΡΓΑΝΩΣΗ ΔΙΔΑΣΚΑΛΙΑΣ	Δραστηριότητα	Φόρτος Εργασίας Εξαμήνου
	Διαλέξεις (1 ώρες x 11 εβδομάδες)	11
	Άσκηση (1 ώρες x 11 εβδομάδες)	11
	Εργασία πεδίου (2 ώρες X 5 ημέρες)	10
	Βιβλιογραφική έρευνα	10
	Σχεδιάσεις	24
	Ατομική μελέτη	30
	Τελική Παρουσίαση	4
	Σύνολο Μαθήματος (25 ώρες φόρτου εργασίας ανά πιστωτική μονάδα)	100 ώρες
STUDENT ASSESSMENT	Συμμετοχή στο μάθημα, τις συζητήσεις και στην εργασία πεδίου 50% Γραπτή εξέταση (20%) Εργασία (30%)	

5. RECOMMENDED LITEARURE

- Kamfingier Otto, Sauer Marko (ed.), *Martin Rauch: Refined Earth: Construction & Design with Rammed Earth*, 2015, DETAIL
- Minke Gernot, *Building with Earth: Design and Technology of a sustainable architecture*, 2006, Birkhäuser - Publishers for Architecture
- Rael Roland, *Earth Architecture*, 2009, Princenton Architectural Press
- Steele Ames, *Ecological Architecture. A Critical History*, 2005, Thames & Hudson
- Minke Gernot, *Construction manual for earthquake-resistant houses build of earth*, 2001, GATE – BASIN
- A.VV., *Engineering Design of Earth Buildings*. NZS 4297:1998, 1998
- Volhard Franz, *Light Earth Building - A hand. A Handbook for Building with Wood and Earth*, 2016, Birkhäuser Verlag GmbH, Basel
- Minke Gernot , Mahlke Friedemann, *Building with Straw. Design and Technology of a Sustainable Architecture*, 2005, Birkhäuser - Publishers for Architecture
- Mousourakis Apostolos, et al, *Earthen Architecture in Greece: Traditional Techniques and Revaluation*, Heritage 2020, 3, 1237–1268

All class lectures presented will be uploaded in pdf format to the e-class platform. Additionally, a series of scientific articles from journals or conference proceedings are distributed in the content units that follow the structure of the class lectures.