COURSE OUTLINE

1. GENERAL

SCHOOL	POLYTECHNIC		
DEPARTMENT	ARCHITECTURE		
LEVEL OF COURSE	UNDERGRADUATE		
COURSE CODE	ARC_4300	**SEMESTER OF STUDIES**	THIRD
COURSE TITLE	BUILDING TECHNOLOGY 1		
INDEPENDENT TEACHING ACTIVITIES		**TEACHING HOURS PER WEEK**	**ECTS CREDITS**
Lectures, seminars		**2**	
Studio Work & Assignments		**6**	
			6
COURSE TYPE	Field of Science (Architecture and Building Science) and Skills Development (Building Technology)		
PREREQUISITE COURSES:	-		
TEACHING AND ASSESSMENT LANGUAGE:	Greek. Teaching may be however performed in English in case foreign students attend the course.		
THE COURSE IS OFFERED TO ERASMUS STUDENTS	Yes		
COURSE WEBPAGE (URL)	https://eclass.upatras.gr/courses/ARCH404/		

2. LEARNING OUTCOMES

The course focuses on the analysis and appreciation of the architectural materiality. Every design proposition is materialized through construction. Therefore, the choice of materials according to their properties is a decisive factor for the completion of any architectural idea. The course attempts an overall review of building materials and the way they are utilized in the design and structure process. The aim of the course is also to inform students of the construction details, while it also insists on the quality of the architectural result that arises from any construction choice. Another objective is to teach students the various components of a building, not only the building frame and envelope or the most usable spaces in a building, but also the services that ensure the smooth operation and good use of a building. The course stresses the need for a pre-mediated and thorough design that offers solutions to all components of the construction of a building.

On successful completion of the module, students will be able to:

- Appreciate the properties of building materials.
- Appreciate the basic building materials and the way they co-exist with other materials.
- Be acquainted with the materials available in the market and their different use.
- Represent and symbolize different materials in plan, elevation and section drawings.
- Develop more design and figurative abilities on the basis of the following: observation–measuring – sketching, in order to be able to reflect with greater ease their ideas and options.
- Understand the significance of material choices to the aesthetic result of their project.
- Acquire the ability of analysis and critical thinking on issues related to the structure, style, manner of construction and conventional construction materials.

- Develop more design and representation skills in designing sections and details, and start to have contact with small design scales.
- Understand the multiple factors influencing architectural design (health, safety, fire escape, unhindered and clear access etc.).
- Understand the need for an interdisciplinary approach and collaboration to the design process to ensure a successful project and a desirable use of the building.

General Abilities

Generally, by the end of this course the student will, furthermore, have develop the following general abilities (from the list above):

- *Searching, analysis and synthesis of facts and information, as well as using the necessary technologies*
- *Adaptation to new situations*
- *Decision making*
- *Autonomous (Independent) work*
- *Group work*
- *Excercise of criticism and self-criticism*
- *Promotion of free, creative and inductive thinking*
- *Respect to natural environment*
- *Work design and management*

3. COURSE CONTENT

The course refers to the construction details of a simple building. The following topics are covered during lectures:

- Properties of materials: strength in compression and tension, resistance, embodied energy, cost of extraction, fabrication and manufacturing, texture and colour, volume and mass, malleability and plasticity.
- The concept of element, component and system in construction.
- The structure of elements, components and systems in different materials
- Introduction to basic construction elements. (Stone, Wood, Bricks, concrete blocks, glass bricks, Wood, Metal profiles, glass, etc.)
- The structure of constructions. The elements of which they consist. Foundations (loads, settlement, excavation, types of foundations, underpinning and retaining walls, waterproofing and drainage, foundation design and building codes), Bearing Walls (frame of wall, load-bearing, curtain, shear, light partitions) Floors (concrete slab, metal framing, wood-framing), Building Shell, roofing (flat, single pitch, double pitch, multiple ridges), Stairs and elevators (vertical circulation), Accessibility, etc.
- Introduction to basic construction systems. Choosing a building system (constraints, information resources, recurring concerns).
- Construction systems based on materials, (location, climate, flexibility, etc.), on the form (kind of building, symbolism, etc.) and on operation (scale, requirements, regulations, etc.)
- The Design of the Bearing Structure.
- Conventional Construction Materials. Uses and coexisting materials.
- Construction methods of conventional shell premises.
- Structural system and Building Shell. Classification and ranking of systems.
- Introduction to the concept of Synthesis of Detail

4. TEACHING AND LEARNING METHODS - ASSESSMENT

<table>
<tr><td>TEACHING METHODS</td><td>Lectures, seminars and Studio Work Face to Face.
The module uses a variety of learning means such as lectures on special topics of construction and construction details, practical laboratory exercises on construction and architectural measure drawing and visits to worksites in different phases of construction.</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES</td><td>Use of Information and Communication Technologies (ICTs) (e.g. powerpoint) in teaching providing information on the theory and practice of the laboratory assignments and the methodology for multi-step syntheses. The lectures content of the course for each chapter are uploaded on the internet, in the form of a series of .pdf files, where from the students can freely download them.</td></tr>
<tr><td>TEACHING ORGANIZATION</td><td>
<table>
<tr><th>Activity</th><th>Work Load per Semester</th></tr>
<tr><td>Lectures (2 conduct hours per week x 13 weeks)</td><td>26</td></tr>
<tr><td>Studio Work (6 hours per week x 13 weeks)</td><td>78</td></tr>
<tr><td>Hours for private study of the student and preparation of assignments (150-78-26)</td><td>46</td></tr>
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<tr><td>Total number of hours for the Course (25 hours of work-load per ECTS credit)</td><td>150 hours (total student work-load)</td></tr>
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<tr><td>STUDENT ASSESSMENT</td><td>The form of assessment for this module is coursework and examination.

Final Written Examination (35%) that includes:
Multiple Choice Questions
Drawing Exercises
Critical thought and understanding of Theory Questions
Delivering of Autonomous Project Assignments (65%) including:
Studio Project Work
Theory Assignments
The criteria of assessment are listed in the course syllabus (outline and timeline of course) posted on the e-class platform. The criteria listed are the following: "the evaluation of students will be based on the degree of development, the ability of analytical thinking, understanding and assimilating the concepts, on creativity, on synthetic and design capability, as well as on participation in the educational process»</td></tr>
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5. RECOMMENDED LITERATURE

PRIMARY READING (incl. Books in Greek)

- Τσινίκας, Νίκος, Π. (2016) *Αρχιτεκτονική Τεχνολογία* Γ' Έκδοση. University Studio Press A.E.
- Καλογεράς, Ν., και άλλοι (1999) *Θέματα Οικοδομικής,* Εκδόσεις Συμμετρία, Αθήνα.
- Κουκής, Σ. (2001) *Δομική Τεχνολογία.* Αθήνα
- Αθανασόπουλος, Χ. (2000). *Κατασκευή Κτιρίων. Σύνθεση και Τεχνολογία.* Αθήνα
- Deplages, Andrea (2005) Constructing Architecture. *Materials, Processes, Structures. A Handbook.* Birkhauser.
- Ballard Bell, Victoria and Rand, Patrick (2006), Materials for Architectural Design, Lawrence King.
- Chudley, Stephen and Greeno, Roger (2010), Building Construction Handbook. Elsevier.
- Ching, D. K., Francis (2008),Building Construction Illustrated, 4th edition, J. Wiley & Sons
- Ching, D. K.Francis (2009), Building Structures Illustrated. Patterns, Systems & Design. J. Wiley & Sons.
- Farrelly, Lorraine (2009),*Construction and Materiality,* AVA Publishing SA, Switzerland.
- Lyons, Arthur (2007), Materials for Architects and Builders, 3rd edition, Butterworth-Heinemann.

SUPPLEMENTARY READING

- Cowan, H. and Smith, P. (2004), Dictionary of Architecture and Building Technology, Routledge Taylor and Francis Group.
- Allen, Edward and Iano, Joseph (1990) Fundamentals of Building Construction: Materials and Methods, Wiley
- Schodek, D.L. (2000), Structures, Prentice-Hall (4th edition)
- Garrison, P. (2005) Basic Structures for Engineers and Architects. Blackwell Publications
- Schierle, G., G. (2006) Architectural Structures, USC Custom Publishing.
- Charleson, W. Andrew (2005) Structure as Architecture. Architectural Press – Elsevier
- Macdonald, J. Angus (2001) Structure and Architecture. Architectural Press – Elsevier
- Watts, Andrew, (2001) Modern Construction Handbook. Springer-Verlag Wien New York
- Merritt, Frederick S., and Ricketts, Jonathan T. (2000), Building Design and Construction Handbook, 6th edition, McGraw-Hill.