COURSE OUTLINE

1. GENERAL

SCHOOL	POLYTECHNIC		
DEPARTMENT	ARCHITECTURE		
LEVEL OF COURSE	UNDERGRADUATE		
COURSE CODE	ARC_620	**SEMESTER OF STUDIES**	FOURTH
COURSE TITLE	**BUILDING TECHNOLOGY 2**		
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 aims to provide a thorough examination of conventional and advanced structures, exterior envelopes and contemporary production technologies of unusual, complex and refined buildings. It concerns the specific field of advanced building technology and digital science. It answers the question of how can a building acquire -beyond the necessary prescriptions for comfort, health, resistance to the weather, time and strain- high architectural quality through the designer's selections for construction materials and methods.
Building Technology 2 is the continuation of the corresponding course from previous semester (third) and is one of the main courses of architectural studies. The purpose remains to bring students into contact with natural and artificial materials and the Art of Construction, for the production of architectural work. In this spring semester examines the remaining elements of a conventional construction like window frames (wood, aluminum, steel, etc.), building envelope and skin, light partitions – curtain walls, partitions, basic electromechanical facilities, etc.

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

- Appreciate the properties of building materials and the way they co-exist with other materials.
- Be acquainted with the materials available in the market and their different use.
- Be aware of new inventions and experiments presently conducted for the future introduction of new, more advanced and complex systems and technologies.
- Acquire the ability of analysis and critical thinking on issues related to the structure, style and construction methods of these structures.
- Represent and symbolize different materials in plan, elevation and section drawings.

- Develop more design and representation skills in designing sections and details, deepening at small scales of design.
- Select the proper building methods and materials for a project and communicate their design proposals choosing the appropriate means.
- 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:

- The concept of element, component and system in construction.
- The structure of elements, components and systems in different materials
- Architectural Shell Issues. Sections-Facades. Structural system and Building Shell. Classification and ranking of systems.
- Stairs and elevators (Vertical Circulation) – Fire Protection, Accessibility, etc.
- Frame Systems-Methods
- Bearing Walls (frame of wall, load-bearing, curtain, shear, light partitions) Floors, Roofing (flat, single pitch, double pitch, multiple ridges)
- 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.)
- Integrated Design methods.
- Conventional Construction Materials. Uses and coexisting materials.
- Contemporary building frame and envelope: high-performance, energy-efficient, zero-energy, carbon neutral and environmentally responsible building design (climate and comfort parameters, renewable sources of energy and systems).
- Contemporary building frame and envelope: adaptation and reuse, long life cycle, embodied energy, weatherproofing and resistance to extreme climatic phenomena.
- 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 employs a range of teaching methods such as lectures, lab work and visits to worksites. Exercises for this course may be based on the work completed in previous studios.</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
- Ballard Bell, Victoria and Rand, Patrick (2006), Materials for Architectural Design, Lawrence King.
- Braham, W.W. and Hale, J.A. (2007), Rethinking Technology, Routledge/ Taylor and Francis Group.
- Daniels, K. (2000), Advanced Building Systems: A technical Guide for Architects and Engineers, Birkhauser
- Deplages, Andrea (2005) Constructing Architecture. *Materials, Processes, Structures. A Handbook.* Birkhauser.

- 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.
- Hall, Andrew (ed), (2009), Details in Architecture. Creative Detailing by Leading Architects. Images publishing.
- Lyons, Arthur (2007), Materials for Architects and Builders, 3rd edition, Butterworth-Heinemann.

SUPPLEMENTARY READING

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