COURSE OUTLINE

1. GENERAL

SCHOOL	ENGINEERING SCHOOL		
DEPARTMENT	ARCHITECTURE		
LEVEL OF COURSE	UNDERGRADUATE		
COURSE CODE	ARC_E203	**SEMESTER OF STUDIES**	7TH
COURSE TITLE	Special Topics in Building Technology		

INDEPENDENT TEACHING ACTIVITIES	**TEACHING HOURS PER WEEK**	**ECTS CREDITS**
Lectures	4	4
laboratory assignments and semester project	2	

COURSE TYPE	Elective
PREREQUISITE COURSES:	There are no 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/ARCH304/

2. LEARNING OUTCOMES

Learning outcomes

1. Develop an understanding of the term structural morphology though experimentation with form and structural behavior in combination with the concepts of tectonic expression and materiality.
2. Develop an understanding of the conditions that affect the design of temporary and rapidly assembled structures.
3. Develop an understanding of methods and systems of transformable geometry that can be used in kinematic structures.
4. Experience in the design of innovative structure of changing configuration that is based on the methods discussed in class.
5. Acquire skills in the use of kinematic simulation software that applies to special types of structures and are encouraged to also encouraged to use kinematic simulations for other types of structures.

General Abilities
1. Innovative and inventive approach to architectural technology topics 2. Encouragement of the cross disciplinary approach to innovative design projects

3. COURSE CONTENT

The lectures cover a wide range of examples of kinematic systems encountered in the nature and in several scientific and technological research fields. Topics related to the design of such structures as well as to state-of- the- art research in the general area of transformable systems are also discussed in class. An introduction to kinematic simulation methods applicable to transformable building structures are also covered in the course lectures.

4. TEACHING AND LEARNING METHODS - ASSESSMENT

<table>
<tr><td>TEACHING METHOD</td><td>Face to face.
The course instruction combines lectures, weekly assignments and a semester design project.

The semester project involves the design of an innovative space-structure. Students are expected to build a model of the proposed structure, develop architectural drawings, detail drawings, renders, photos of the structure's' development phases, and optionally a kinematic simulation of the structure.</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES</td><td>The learning process is supported by the e-class platform.

Throughout the semester students use graphical software and/or a parametric software with graphical interface.
Also for the completion of class assignments and project, students need to use state-of-the-art software as well as digital fabrication lab equipment and processes.</td></tr>
<tr><td>TEACHING ORGANIZATION</td><td><table><tr><th>Activity</th><th>Semester Work load</th></tr><tr><td>Lectures (4 conduct hours per week x 13 weeks)</td><td>56</td></tr><tr><td>Laboratory work (2 conduct hours per week x 13 weeks) +semester project development</td><td>26</td></tr><tr><td>Total number of hours for the Course</td><td>100 hours (total student work-load)</td></tr></table></td></tr>
<tr><td>STUDENT ASSESSEMNT</td><td>Student assignments- class participation 25%

Semester project 75%

The semester project involves the development of a novel space structure. The final project should include a scaled model of the proposed transformable structure, a powerpoint presentation, and a folder with digital pictures and animations.

For the evaluation of the projects, the inventive utilization of the methods discussed in class, proper documentation and the level of completion of the drawings, are taken into consideration.</td></tr>
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5. RECOMMENDED LITERATURE

1. Λαουρέντσα, Ντ.: *Οι μηχανές του Λεονάρντο Μυστικά και εφευρέσεις στους κώδικες Ντα Βίντσι*, μετάφραση: Βαγγέλης Κεφαλλονίτης, επιμέλεια: Mario Taddei, Edoardo Zanon, Εκδοτικός Οίκος Α. Α. Λιβάνη, 2008.

A series of scientific articles from journals or conference proceedings are distributed in the content units that follow the structure of the class lectures και τη σειρά των διαλέξεων έχουν αναρτηθεί στο e-class. i.e.

1. Douthe, C. & Baverel, O.: "Morphological and mechanical investigation of double layer reciprocal structures", Proceedings, IASS 2013 Symposium, Sep 2013, Lodz, Poland.

2. Falk, A. : "Form Exploration of Folded Plate Timber Structures based on Performance Criteria", Proceedings, IASS 2012 Symposium, Sep 2013, Seoul, S. Korea.

3. Micheletti, A. & Nicotra, V. : "Tensegrity Modules for Cable-Strut Systems" , Proceedings, IASS 2004 Symposium, Sept 2004, Montpellier, France.

4. Popovic- Larsen, O.: Reciprocal Frame Architecture, Elsevier, Architectural Press, 2008.

5. Tachi, T. : "One-DOF Rigid Foldable Structures from Space Curves", Proceedings, IASS 2016 Symposium, Sept 2016, Tokyo, Japan.