

## COURSE OUTLINE

### 1. GENERAL

<b>SCHOOL</b>	<b>UNIVERSITY OF THESSALY</b>		
<b>ACADEMIC UNIT</b>	DEPARTMENT OF CIVIL ENGINEERING		
<b>LEVEL OF STUDIES</b>	UNDERGRADUATE		
<b>COURSE CODE</b>	<b>FK0401</b>	<b>SEMESTER</b>	2 <sup>nd</sup>
<b>COURSE TITLE</b>	RIGID BODY MECHANICS		
<b>INDEPENDENT TEACHING ACTIVITIES</b> <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>		<b>WEEKLY TEACHING HOURS</b>	<b>CREDITS</b>
		4	6
<i>Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).</i>			
<b>COURSE TYPE</b> <i>general background, special background, specialized general knowledge, skills development</i>	General background		
<b>PREREQUISITE COURSES:</b>	Physics I, Linear Algebra and Analytic Geometry, Infinitesimal Calculus I		
<b>LANGUAGE OF INSTRUCTION and EXAMINATIONS:</b>	GREEK		
<b>IS THE COURSE OFFERED TO ERASMUS STUDENTS</b>	YES		
<b>COURSE WEBSITE (URL)</b>	<a href="https://eclass.uth.gr/courses/CULT_U_213">https://eclass.uth.gr/courses/CULT_U_213</a>		

### 2. LEARNING OUTCOMES

#### Learning outcomes

*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.*

*Consult Appendix A*

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

- Application of the fundamental principles of Mechanics in the equilibrium of 2-D and 3-D bodies.
- Calculation of reactions of isostatic structures.
- Formation of complex isostatic structures.
- Analysis of 2-D isostatic trusses, beams and frames.
- Calculation of the Centroids of Areas and Lines.

#### 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?*

*Search for, analysis and synthesis of data and information, Project planning and management with the use of the necessary technology Respect for difference and multi culturalism Adapting to new situations Respect for the natural environment*

*Decision-making Showing social, professional and ethical responsibility and Working independently sensitivity to gender issues*

*Team work Criticism and self-criticism*

*Working in an international environment Production of free, creative and inductive thinking Working in an interdisciplinary environment .....*

*Production of new research ideas Others...*

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- **ANALYSIS AND SYNTHESIS - DESIGN OF STRUCTURES**  
References are made in the course regarding the design of civil engineering projects.
- **DECISION-MAKING**  
In addition to formal skills, the course is oriented towards cultivating decision-making skills regarding optimal design of structures.
- **WORKING INDEPENDENTLY - TEAM WORK**  
The course cultivates skills for independent work as well as the culture of teamwork. Moreover, during the lectures, critical questions are posed to encourage creative and critical thinking among students.
- **WORKING IN AN INTERNATIONAL ENVIRONMENT - WORKING IN AN INTERDISCIPLINARY ENVIRONMENT**  
Lectures highlight young graduates' ability to work internationally, citing past examples. They also promote interdisciplinary collaboration, essential for creating high-quality projects.

### 3. SYLLABUS

1	Fundamental Concepts and Principles in Mechanics.
2	Vector Analysis.
3	Rigid Bodies: Equivalent System of Forces
4	Free Body Diagram. Equilibrium of 2-D bodies.
5	Equilibrium of 3-D bodies.
6	Distributed Forces.
7	Truss Analysis (statically determinant).
8	Internal Forces in Members.
9	Beam Analysis (statically determinant).
10	Frame Analysis (statically determinant).
11	Curved Beams.
12	Centroids of Areas and Lines.
13	Work and Energy. Virtual Work Theorem.
14	Stability. Friction.

### 4. TEACHING and LEARNING METHODS - EVALUATION

<b>DELIVERY</b> <i>Face-to-face, Distance learning, etc.</i>	Face-to-face lectures	
<b>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY</b> <i>Use of ICT in teaching, laboratory education, communication with students</i>	Communication via email, use of an online classroom system (eclass).	
<b>TEACHING METHODS</b> <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, 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>	<i>Activity</i>	<i>Semester workload</i>
	Lectures	56 hours
	Study of course material	42 hours
	Extra examples for practice at home	41 hours
	Term project	
	Exam preparation	38 hours
	Final exam	3 hours
	Course total	180 hours
<b>STUDENT PERFORMANCE EVALUATION</b>	<b>Language of Evaluation:</b>	

<p><b>Description of the evaluation procedure</b></p> <p><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></p> <p><i>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</i></p>	<p>Greek (or English for Erasmus+ students)</p> <p>The performance evaluation is conducted through: Final written examination at the end of the semester</p> <p><b>Evaluation Breakdown:</b></p> <ul style="list-style-type: none"> <li>• Written exams (100% of the final grade)</li> </ul> <p><b>Evaluation Criteria</b> (applicable to both the semester project and written exams):</p> <p>The evaluator assesses the candidate's ability to:</p> <ul style="list-style-type: none"> <li>• Understand the fundamental concepts and principles of Mechanics.</li> <li>• Analyze 2D trusses, beams and frames (statically determinate).</li> <li>• Understand the way that a complex isostatic structure is formed</li> <li>• Calculate Centroids of Areas and Lines.</li> </ul> <p>The evaluation criteria are explained in class at the beginning of the semester.</p>
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## 5. ATTACHED BIBLIOGRAPHY

### **-Suggested bibliography:**

- Vardoulakis J. and Giannakopoulos A. E., 2008, *Technical Mechanics I*, Publisher Symmetria.
- Beer E. P. and Johnston E. R., 1977, *Vector Mechanics for Engineers. Statics and Dynamics*, McGraw-Hill.
- P. Vouthounis, 2017, *Statics*, Publisher A. Vouthouni.