

1.1.1 Engineering Mechanics I

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΔOM004	SEMESTER	2nd
COURSE TITLE	Engineering Mechanics I		
INDEPENDENT TEACHING ACTIVITIES <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>	WEEKLY TEACHING HOURS	CREDITS	
	4	5	
<i>Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).</i>			
COURSE TYPE <i>general background, special background, specialised general knowledge, skills development</i>	Scientific Field		
PREREQUISITE COURSES:			
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek		
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No		
COURSE WEBSITE (URL)			

LEARNING OUTCOMES

<p>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.</p> <p>Consult Appendix A</p> <ul style="list-style-type: none"> • 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 			
<p>Students' understanding of the effect of forces and moments on the static equilibrium of planar linear undeformed structures. The development of static sensing on the adequacy of links with the view to achieve rigid and determinate truss structures. The ability to calculate and evaluate the axial forces developed in the members of truss structures and the displacements of the nodes.</p>			
<p>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?</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none;"> <p>Search for, analysis and synthesis of data and information, with the use of the necessary technology</p> <p>Adapting to new situations</p> <p>Decision-making</p> <p>Working independently</p> <p>Team work</p> <p>Working in an international environment</p> <p>Working in an interdisciplinary environment</p> <p>Production of new research ideas</p> </td> <td style="width: 50%; border: none;"> <p>Project planning and management</p> <p>Respect for difference and multiculturalism</p> <p>Respect for the natural environment</p> <p>Showing social, professional and ethical responsibility and sensitivity to gender issues</p> <p>Criticism and self-criticism</p> <p>Production of free, creative and inductive thinking</p> <p>.....</p> <p>Others...</p> </td> </tr> </table>		<p>Search for, analysis and synthesis of data and information, with the use of the necessary technology</p> <p>Adapting to new situations</p> <p>Decision-making</p> <p>Working independently</p> <p>Team work</p> <p>Working in an international environment</p> <p>Working in an interdisciplinary environment</p> <p>Production of new research ideas</p>	<p>Project planning and management</p> <p>Respect for difference and multiculturalism</p> <p>Respect for the natural environment</p> <p>Showing social, professional and ethical responsibility and sensitivity to gender issues</p> <p>Criticism and self-criticism</p> <p>Production of free, creative and inductive thinking</p> <p>.....</p> <p>Others...</p>
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Creating the necessary background to enable a full understanding of the concepts and techniques of static solution of truss structures and of the calculation of the center of gravity of surfaces.

SYLLABUS

- Introduction to Engineering. Principles of vector calculus. Force and moment. Moment of a force with reference to a point and about an axis. Force couple. Parallel force transfer. Reduction of a system of forces.
- Composition of concurrent and parallel forces – graphic and analytical calculation of the resultant. Decomposition of forces into components. Forces in space.
- Calculation of the area of surfaces and determining the center of gravity of simple and complex surfaces.
- Rigid body equilibrium conditions. Mechanisms, determinate and indeterminate structures, degrees of freedom, types of supports of structures.
- Free-body diagram. Calculation of support reactions.
- Truss structures. Formation - members. Analytical method of nodes. The method of Ritter sections.
- Complex trusses. Three-hinge trusses.
- Principle of virtual work. Calculation of node displacements of truss

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY <i>Face-to-face, Distance learning, etc.</i>	Face to face.	
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY <i>Use of ICT in teaching, laboratory education, communication with students</i>	Powerpoint presentations, E-learning platform for educational material.	
TEACHING METHODS <i>The manner and methods of teaching are described in detail. 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. 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>	Activity	Semester workload
	Lectures	52
	Individual study	78
	Course total (26 hours workload per ECTS credit)	130
STUDENT PERFORMANCE EVALUATION <i>Description of the evaluation procedure 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 Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</i>	<ol style="list-style-type: none"> 1. Assignment of tasks in order to investigate the understanding of the concepts taught. 2. Final written exam at the end of the semester (in Greek). 3. Each student is given the opportunity to check his examination paper and have his mistakes analyzed. 	

ATTACHED BIBLIOGRAPHY

- <http://users.teilar.gr/~p.lokkas/Stat.pdf>
- [in Greek] Βαρδουλάκη Ι., Γιαννακόπουλου Α. «Τεχνική Μηχανική Ι», Εκδόσεις Συμμετρία 2004.
- [in Greek] Ν. Αραποστάθη, Δ. Αραποστάθη. «Τεχνική Μηχανική – Μηχανική Ι», Εκδόσεις Ίων, 2007.
- [in Greek] Π. Βουθούνη. «Μηχανική Απαραμόρφωτου Στερεού», Εκδόσεις Α. Βουθούνη, 2017.
- [in Greek] Beer F., Johnston E.R., Mazurek D., «Στατική – Τεχνική Μηχανική», Εκδόσεις Τζιόλα, 2018
- [in Greek] Θ. Γεωργόπουλου, «Στατική του απαραμόρφωτου σώματος», Έκδοση Π. Γεωργόπουλος, 2018.
- Hassan Al Nageim, «Structural Mechanics: Loads, Analysis, Design and Materials», Prentice Hall, 2003.
- R. Hulse, «Structural Mechanics», Red Globe Press, 2000.
- Hulse, R. Cain, J., «Structural Mechanics», Macmillan, 1994.