1.1.1 Engineering Mechanics II

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΔΟΜ008	**SEMESTER**	3rd
COURSE TITLE	Engineering Mechanics II		

INDEPENDENT TEACHING ACTIVITIES *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*	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Scientific Field
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	

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*

Students' understanding of the concept of external loads and their connection to the internal forces developed in planar solid undeformed structures. The possibility of identifying and forming statically determinate beams - frames. The ability to calculate and evaluate the axial - shear forces and bending moments that develop in the members of the solid structures. The ability to determine critical sections. The application of energy methods for the calculation of displacements - rotations of cross-sections of solid structures.

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, with the use of the necessary technology
Adapting to new situations
Decision-making
Working independently
Team work
Project planning and management
Respect for difference and multiculturalism
Respect for the natural environment
Showing social, professional and ethical responsibility and sensitivity to gender issues
Criticism and self-criticism

Working in an international environment *Working in an interdisciplinary environment* *Production of new research ideas*	*Production of free, creative and inductive thinking* *……* *Others…* *…….*
Acquisition of specialized knowledge for the conception, design and static solution of solid determinate structures, calculation of internal forces and critical sections.	

SYLLABUS

- Solid structures. Internal Forces. Beams – Frames.
- Concentrated and distributed loads. Method of sections. Diagrams of internal forces N, V, M and their properties.
- Simply supported beam and diagrams of internal forces for various types of loading. Single and double cantilever simply supported beam. Cantilever beam.
- Substitute beam. Construction of N, V, M beam diagrams with the beam substitute method and the method of integrals.

- Hinged beam (Gerber). Reactions, N, V, M diagrams.
- Static solution of solid and hinged determinate frame structures.
- Principle of virtual work. Calculation of displacements – rotations of cross sections of solid structures.
- Application of the direct stiffness method to calculate the displacements of trusses.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Powerpoint presentations, E-learning platform for educational material.
TEACHING METHODS *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*	
STUDENT PERFORMANCE EVALUATION *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.*	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.

Activity	***Semester workload***
Lectures	52
Individual study	78
Course total (26 hours workload per ECTS credit)	***130***

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.