COURSE OUTLINE

(1) GENERAL

SCHOOL	ENGINEERING SCHOOL			
DEPARTMENT	CIVIL ENGINEERING DEPARTMENT			
LEVEL OF STUDIES	UNDER GRADUATE			
COURSE CODE	2303512	SEMESTER	3	
COURSE TITLE	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
		Lectures	4	8 (total)
		Laboratory	2	
			6 (total)	
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*	General background, Specialized Knowledge, skills development			
PREREQUISITE COURSES:				
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek (official) (FOR THE RASMUS STUDENTS IN ENGLISH)			
IS THE COURSE OFFERED TO ERASMUS STUDENTS	YES			
COURSE WEBSITE (URL)	http:// vplace.teipir.gr/2303512			

(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*

The course introduces the student to the concepts of Strength of Materials.

The objective of the course is that the student understands the fundamental principles of mechanics and the various kinds of stresses and types of failure. The student must be able to calculate the stresses and strains of different load combinations and acquire the knowledge of the mechanics of deformable bodies.

Upon successful completion of this course the student is able to use mathematical tools to calculate the internal stresses and deformations caused to various loads.

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	*Project planning and management*
Adapting to new situations	*Respect for difference and multiculturalism*
Decision-making	*Respect for the natural environment*
Working independently	*Showing social, professional and ethical responsibility and 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…*
	…….

Search, analysis and synthesis of data and information, using the necessary technologies.

(3) SYLLABUS

Tension and compression of simple and compound bars. Hooke's law, Poisson's ratio. Compatibility equations. Equations of equilibrium. Simple indeterminate structures. Shear. Evaluation of stress and strain to members under shear forces. Plane stress (tensile and shear stresses, principal stresses and directions, Mohr's circle of stresses, differential equilibrium equations). Plane strain (strain, rotation, principal stresses, Mohr's circle of strains, compatibility relations). Elastic behaviour (3D state of stress, constitutive equations for isotropic materials). Properties of the strain and stress tensors. Stress-strain relations. Principal stress. Elastic beam bending theory and introduction to plastic behaviour of bending beams. Simple bending of composite beams. Torsion. The principle of Saint-Venant. Prismatic bodies subjected to pure torsion. Buckling of elastic structures. Evaluation of critical buckling load of simple members.

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face-to-face lectures, laboratories
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Teaching using Powerpoint software
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography,*	

Activity	*Semester workload*
Lectures	52
laboratory	26
Laboratory assignments	15

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 self study	107
	Course total	***20***
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.*	Written examination: 60% Laboratory 40% of the total mark The evaluation of the laboratory is done by weekly assignments (30% of the laboratory mark) and by written exams (70% of the laboratory mark)	

(5) ATTACHED BIBLIOGRAPHY

- Beer F.P., Johnson E. R. (1981), ‘‘Mechanics of Materials’’, McGraw-Hill Publishing Company.
- Grandall S., Dahl N., Lardner (1978), ‘‘An Introduction to the Mechanics of Solids’’, McGraw-Hill Publishing Company.
- Nash W. A. (1957), ‘‘Theory and Problems of Strength of Materials’’, Schaum Publishing Company, New York.
- Timoshenko S., (1940), ‘‘Strength of Materials Part I Elementary Theory and Problems’’,, D. Van Nostrand Company Inc., Princeton, New Jersey, 2nd Ed.
- Timoshenko S., (1956), ‘‘Strength of Materials Part II Advanced Theory and Problems’’,, D. Van Nostrand Company Inc., Princeton, New Jersey, 3rd Ed.
- Timoshenko S., Young D. H. (1962), ‘‘Elements of Strength of Materials’’,, D. Van Nostrand Company Inc., Princeton, New Jersey, 4th Ed.
- Tiomosenko S., Gere J. M. (1973), ‘‘Mechanics of Materials’’, D. Van Nostrand, London.
- Tiomosenko S. (1978), ‘‘An Introduction to the Mechanics of Solids’’, McGraw-Hill Publishing Company.

Greek bibliography

- Ανδριανόπουλος Ν., Κυριαζής Γ. και Λιακόπουλος Μ. (1991), ‘‘Πειραματική Αντοχή Υλικών’’, Εκδόσεις Άρης Συμεών.
- Βουθούνης Π. (2002), ‘‘Τεχνική Μηχανική Αντοχή των Υλικών’’, Αθήνα.
- Βουθούνης Π. (2002), ‘‘Μηχανική του Παραμορφωσίμου Στερεού Ι - Αντοχή των Υλικών - Ασκήσεις’’, Αθήνα.

- Γδούτος Ε. (2004), ‘‘Αντοχή των Υλικών’’, Εκδόσεις Μ. Αθανασοπούλου-Σ.Αθανασόπουλος Ο.Ε.
- Θεοχάρη Π. Σ., (1961), ‘‘Μηχανική Αντοχή Υλικών’’, Εκδόσεις ΕΜΠ.
- Κακαβάς Π. και Λέμης Π. (2008), ‘‘Τεχνολογία δομικών υλικών’’, Εκδόσεις Ζήτη Πελαγία & ΣΙΑ Ο.Ε.
- Κερμανίδης Θ. (2009), ‘‘Αντοχή Υλικών 1’’, Εκδόσεις Εταιρεία Αξιοποίησης και Διαχείρισης Περιουσίας Πανεπιστημίου Πατρών.
- Κερμανίδης Θ. (2009), ‘‘Αντοχή Υλικών 2’’, Εκδόσεις Εταιρεία Αξιοποίησης και Διαχείρισης Περιουσίας Πανεπιστημίου Πατρών
- Κουτρουμάνου - Σερέφογλου Ε. (1995), ‘‘Αντοχή Υλικών. Θεωρία, Εφαρμογές, Εργαστήριο’’, Εκδόσεις Στέλλα Παρίκου & Σια Ο.Ε.
- Κωνσταντέλλος Β. (2009), ‘‘Πειραματική Αντοχή Υλικών’’, Αθήνα.
- Μαρκέτος Ε., (1998), ‘‘Τεχνική Μηχανική ΙΙ, Αντοχή των Υλικών’’, Μ. Αθανασοπούλου-Σ. Αθανασόπουλος Ο.Ε..
- Μυλωνάς Κ., (1982), ‘‘Μηχανική Παραμορφωτών Σωμάτων Ι, ΙΙ’’, Εκδόσεις Άρης Συμεών.
- Πανταλέων Ε. (2010), ‘‘Αντοχή υλικών’’, Εκδόσεις Γ. Φούντας
- Παπαδόπουλος Β. Γ. και Βαδαλούκας Β. Γ. (2009), ‘‘Μηχανική των υλικών’’, Εκδόσεις Αφοι Βαδαλούκα Σύμβουλοι Μηχανικοί.
- Πανταλέων Ε. (2010), ‘‘Αντοχή υλικών’’, Εκδόσεις Γ. Φούντας.
- Παπαμίχος Ε. και Χαραλαμπάκης Ν. (2004), ‘‘Αντοχή των υλικών’’, Εκδόσεις Α. Τζιολα & Υιοι Α.Ε.
- Πρασιανάκης Ι., Κωνσταντέλλος Β. και Μηλιός Ι. (1988), ‘‘Πειραματική Αντοχή Υλικών’’, Εκδόσεις Άρης Συμεών,.
- Πρασιανάκης Ι. και Κουρκούλης Σ. (1999), ‘‘Πειραματική Αντοχή Υλικών’’, Εκδόσεις Μ. Αθανασοπούλου- Σ. Αθανασόπουλος Ο.Ε.
- Σωτηροπούλου Α., Πασσά Δ. (2009), ‘‘Αντοχή Υλικών - Εργαστηριακές Εφαρμογές’’, Εκδόσεις Στέλλα Παρίκου & Σια Ο.Ε.
- Τσαμασφύρος Γ. (1991), ‘‘Μηχανική Παραμορφωσίμων Σωμάτων Ι’’, Εκδόσεις Συμμετρία.
- Τσαμασφύρος Γ. (1991), ‘‘Μηχανική Παραμορφωσίμων Σωμάτων ΙΙ’’, Εκδόσεις Συμμετρία.
- Τσαμασφύρος Γ., Δήμου Γ. (1991), ‘‘Μηχανική Παραμορφωσίμων Σωμάτων Ι – Προβλήματα - Ασκήσεις’’, Αθήνα.
- Φούντας Γ. (2007), ‘‘Αντοχή των Υλικών, Τόμος Ι και ΙΙ’’, Εκδόσεις Γ. Φούντας.
- Φούντας Γ. (1995), ‘‘Πειραματική Αντοχή Υλικών, Τόμος Ι και ΙΙ’’, Εκδόσεις Γ. Φούντας.
- Χαραλαμπάκης Ν. (2004), ‘‘Αντοχή υλικών και δομικών στοιχείων’’, Εκδόσεις Α. Τζιολα & Υιοι Α.Ε.
- Herr Horst (1999), ‘‘Τεχνική Μηχανική και Αντοχή Υλικών’’, Εκδόσεις Γ.&Σ. Παρίκου & Σια Ε.Ε.
- Nash W. (1988), ‘‘Αντοχή των Υλικών’’, Εκδόσεις): ΕΣΠΙ Εκδοτική.