COURSE OUTLINE

(1) GENERAL

SCHOOL	School of Engineering		
ACADEMIC UNIT	Department of Naval Architecture		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	NA0ME1211	**SEMESTER**	2nd
COURSE TITLE	**MECHANICS II**		

INDEPENDENT TEACHING ACTIVITIES	**WEEKLY TEACHING HOURS**	**CREDITS (ECTS)**
Lectures	5	6

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

(2) COURSE GOALS / LEARNING OUTCOMES

Students after successful attendance of the course shall be familiar with notions and techniques of various problems encountered in structure analysis, as:

- Tension
- Shear
- Bending
- Torsion
- Buckling
- Hardness measurement

(3) COURSE CONTENT / SYLLABUS

- Introduction – Basic principles, Stress and strain diagrams, failure stress, safety factor, fatigue of materials.
- Axial tension-compression. Hooke's law, Poisson ratio, thermal stresses, statically indeterminate problems.
- Simple shear loading.
- Plane stress and strain, Mohr's circle, Generalized Hooke's law.
- Pure and general bending of beams. Radius of curvature, maximum normal stresses, beams made of composite materials, distribution of shear stresses, principal stresses. Method of Elastic Beam Curve, method of superposition, method of conjugate beam.
- Torsion of circular shafts, of thin-walled section and of cellular section.
- Statically indeterminate problems.
- Complex loadings: Buckling, Double and/or non-symmetric bending, eccentric axial loading.
- 3D loading condition, stress and strain tensors, generalized Hooke's law.
- Energy methods: Deflection energy in axial loading, bending moment, shear force, torsion moment and complex loading. Introduction to virtual work principle. Castigliano's theorem.
- Failure analysis tests.

(4) TEACHING and LEARNING METHODS - EVALUATION

<table>
<tr><td>DELIVERY
Face-to-face, Distance learning, etc.</td><td>Face-to-face</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY
Use of ICT in teaching, laboratory education, communication with students</td><td>Homework assignments, Lectures</td></tr>
<tr><td>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</td><td>
<table>
<tr><th>Activity</th><th>Workload (hours)</th></tr>
<tr><td>Lectures</td><td>65</td></tr>
<tr><td>Homework assignments</td><td>39</td></tr>
<tr><td>Study of Lectures</td><td>52</td></tr>
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<tr><td>Course total</td><td>156</td></tr>
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<tr><td>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</td><td>Final written examination : 60%
Homework assignments: 40%</td></tr>
</table>

(5) ATTACHED BIBLIOGRAPHY

1. S. Timoshenko, “Strength of materials – Part 1: Elementary theory and problems”, D. Van Nostrand Company,1948
2. Beer, Johnston, DeWolf, Mazurek, “Mechanics of Materials”, Mac Graw Hill, 2015
3. P. Vouthounis, «Mechanics of deformable bodies-Strength of materials», 2013 (In Greek).

- Related Journals:

1. Journal of Mechanics, Cambridge University Press.
2. European Journal of Mechanics, Elsevier.
3. Journal of Applied Mechanics, ASME.