COURSE OUTLINE

1. GENERAL INFORMATION

SCHOOL	MARITIME AND INDUSTRIAL STUDIES		
DEPARTMENT	INDUSTRIAL MANAGEMENT AND TECHNOLOGY		
LEVEL OF STUDY	UNDERGRADUATE		
COURSE UNIT CODE	TEHMX05-1	**SEMESTER OF STUDY**	3rd
COURSE TITLE	INTRODUCTION TO MECHANICS OF MATERIALS		

INDEPENDENT TEACHING ACTIVITIES *in case in which credits are awarded for separate components/parts of the course, e.g. in lectures, laboratory exercises, etc. If credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
Lectures Tutorial Exercises	4 1	5.5
Add rows if necessary. The organization of teaching and the teaching methods used are described in detail at section 4.		

COURSE TYPE *general background, special background, specialized general knowledge, skills development*	General background
PREREQUISITE COURSES:	Introduction to Engineering Mechanics (for students with student ids starting from T22 and later)
LANGUAGE OF INSTRUCTION and EXAMINATION/ASSESSMENT:	Greek / English (in ERASMUS class)
THE COURSE IS OFFERED TO ERASMUS STUDENTS	Yes
COURSE WEBSITE (URL)	https://eclass.unipi.gr/courses/BDT238/

2. LEARNING OUTCOMES

LEARNING OUTCOMES

The course learning outcomes, specific knowledge, skills and competences of an appropriate (certain) level, which students will acquire upon successful completion of the course, are described in detail. It is necessary to consult:

APPENDIX A

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

The aim of the course is to introduce students to fundamentals of mechanics of deformable materials and to the basic tools for stress, strain and deformation analysis. Methods for determining the stresses, strains and deformations produced by applied loads are presented.

Upon successful completion of the course, the students will be able to:

- Analyze and design components and structural members subjected to tension, compression, torsion, bending and combined loads using fundamental concepts of stress, strain, elastic and inelastic behavior.
- Recognize the nature of a components loading, classify its response and determine where supplemental material can be found to aid in analysis of its response

General Competences

Taking into consideration the general competences that students/graduates must acquire (as those are described in the

Diploma Supplement and are mentioned below), at which of the following does the course attendance aims

Search for, analysis and synthesis of data and information, by the use of technologies that are necessary according the case
Adapting to new situations
Decision-making
Independent work
Team work
Working in an international environment
Working in an interdisciplinary environment
Introduction of innovative research
Project planning and management
Respect for difference and multiculturalism
Environmental awareness
Social, professional and ethical responsibility and sensitivity to gender issues
Critical consciousness, criticism and self-criticism
Development of free, creative and inductive thinking

- Search for, analysis and synthesis of data and information, by the use of technologies that are necessary according the case
- Independent work
- Working in an international environment (in ERASMUS class)
- Working in an interdisciplinary environment (in ERASMUS class)
- Project planning and management
- Social, professional and ethical responsibility and sensitivity to gender issues

2. COURSE CONTENT

The course includes the following topics.

Week	Topics
1st	Introduction: Concept of Failure and Stress
2nd	Stress and Strain – Axial Loading (Normal strain, True stress-strain, Hooke's Law, Modulus of Elasticity, Elastic-plastic behavior) - Example exercises
3rd	Stress and Strain – Axial Loading (Repeated Loading-fatigue, Statically indeterminate problems, Temperature changes, Poisson's ratio) - Example exercises
4th	Stress and Strain – Axial Loading (Multiaxial loading, shearing strain, Saint-Venant's principle, stress concentrations, plastic deformations) - Example exercises
5th	Properties of Selected Materials used in Design - Example exercises
6th	Moments of Areas - Example exercises
7th	Torsion - Examples exercises - Example exercises
8th	Pure Bending - Example exercises
9th	Analysis and Design of Beams for Bending - Example exercises
10th	Shearing stresses in Beams - Example exercises
11th	Transformation of Stress and Strain - Example exercises
12th	Beam Deflections and Slopes - Example exercises
13th	Review exercises

In addition, articles, audiovisual lecture material, web addresses, useful information and exercises are posted at eclass.

3. TEACHING METHODS - ASSESSMENT

TEACHING MODE *Face-to-face, in-class lecturing, on distance teaching and distance learning etc.*	In-class lecturing	
USE OF INFORMATION AND COMMUNICATION TECHNOLOGY *Use of ICT in Teaching, Laboratory Education, Communication with students*	**Teaching:** Lectures with audiovisual media, support of the learning process through the eclass platform **Communication with students:** face-to-face at office hours, email, eclass	
COURSE DESIGN	***Activity / Method***	***Semester Workload***

Description of teaching techniques, practices and methods: *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, clinical practice, Art Workshop, Interactive teaching, Educational visits, project, Essay writing, Artistic creativity, etc.* *The study hours for each learning activity as well as the hours of non- directed study are given according to the principles of the ECTS*	Lectures: 52 Study of exercises: 26 Self-study of lecture material: 57 Counselling: 0.5 Exams (written): 2 Course Total: ***137.5***
STUDENT PERFORMANCE EVALUATION/ASSESSMENT METHODS *Detailed description of the evaluation procedures:* *Language of evaluation, assessment methods, formative or summative (conclusive), multiple choice questionnaires, short- answer questions, open-ended questions, problem solving, written work, Essay/report, oral exam, public presentation, laboratory work, art interpretation, other……etc* *Evaluation criteria are specifically defined and given as well as if and where they are reported and accessible to students.*	**Language of exams:** Greek / English (in ERASMUS class) **Assessment Methods:** After the last lecture, the exam material is posted at eclass. The final course grade is formed by the written exams (100%) taken in the examination period of the winter semester and, in case of failure, in the September resits. The written examination includes problem solving / exercises. It is conducted with closed books. The evaluation of students with special learning difficulties in writing and reading (as certified and qualified by a competent institution) is performed according to the relevant procedure decided by the Department Assembly. **Notification of the Assessment Criteria:** The evaluation criteria are made known during the first lecture and are clearly stated on the course website and e-class. The answers to the exam questions are posted at eclass after the exam date. Students have the opportunity to discuss their exam paper with the course instructor (at the posted office hours) after the announcement of the course grades.

4. SUGGESTED BIBLIOGRAPHY

-Suggested Bibliography :

- Book [50655975]: Mechanics of Materials [in Greek], 7th Edition [in Greek], Beer F., Johnston R., DeWolf J., Mazurek D.
- Book [22721723]: Mechanics of Materials [in Greek], Hibbeler

-Scientific Journals: not applicable

-Lecture Notes