COURSE OUTLINE

(1) OVERVIEW

SCHOOL	MARITIME & INDUSTRY		
DEPARTMENT	INDUSTRIAL MANAGEMENT & TECHNOLOGY		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	ΤΕΠΑΡ06-1	SEMESTER	7
COURSE TITLE	MATERALS SELECTION IN PRODUCT DESIGN		

DISCRETE TEACHING ACTIVITIES *In cases where ECTS credits are awarded to distinct components of the course (e.g., Lectures, Laboratory Exercises, etc.), please indicate them separately. If the credits are awarded as a whole for the entire course, please state the weekly teaching hours and the total number of credits*	WEEKLY TEACHING HOURS	ECTS
Lectures	4	5.5
Please add additional rows if needed. A detailed description of the teaching organization and instructional methods is provided in Section (4).		

COURSE TYPE *core (C), core elective (CE), elective (E) - background, specialization, skill development*	CE - Specialization
PREREQUISITE COURSES:	None.
LANGUAGE OF TEACHING AND EXAMINATIONS:	Greek (English for ERASMUS students)
THIS COURSE IS AVAILABLE TO ERASMUS STUDENTS	Yes
COURSE WEBPAGE (URL)	

(2) LEARNING OUTCOMES

Learning Outcomes

The learning outcomes of the course are described, specifying the particular knowledge, skills, and competencies at the appropriate level that students will acquire upon successful completion of the course.

Please refer to Appendix A

- *Description of the Level of Learning Outcomes for each study cycle according to the Qualifications Framework of the European Higher Education Area.*
- *Descriptive Indicators of Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B.*
- *Concise Guide for Writing Learning Outcomes*

The course aims to introduce students to the principles to be considered in order to select one or more materials when designing a product or a group of products. In addition, the dual role of materials, ie the need to be functional from a technical point of view, but also to create the properties of the product, will be emphasized.

The aim of the course is to provide students with basic knowledge to help them to:

- Understand the materials and their production processes.
- Understand the properties of the materials.
- Choose the materials that best meet the design requirements.
- Familiarize themselves with tools for comparing and selecting materials.

General Competences

Taking into account the general competences that a graduate should have acquired (as listed in the Diploma Supplement and outlined below), which of these competences does the course aim to develop?

Searching, analyzing, and synthesizing data and information, using the necessary technologies	*Project design and management*
Adaptation to new situations	*Respect for diversity and multiculturalism*
Decision making	*Respect for the natural environment*
Autonomous work	*Demonstration of social, professional, and ethical responsibility and sensitivity to gender issues*
Teamwork	*Exercising critical and self-critical thinking*
Working in an international environment	*Promotion of free, creative, and inductive thinking*
Working in an interdisciplinary environment	*…*
Generation of new research ideas	*Other competences: …*

- Searching, analyzing, and synthesizing data and information, using the necessary technologies

- Adaptation to new situations
- Decision making
- Autonomous work
- Teamwork
- Respect for diversity and multiculturalism
- Respect for the natural environment
- Demonstration of social, professional, and ethical responsibility and sensitivity to gender issues
- Exercising critical and self-critical thinking
- Promotion of free, creative, and inductive thinking

(3) COURSE CONTENT

The course covers the following topics:

- Product design
- Material properties and processing
- Methods and tools for material selection
- Product ecodesign
- Innovative materials

Also, students participate in individual or team projects, as well as in laboratory classes, at the Laboratory of Production Management Information Systems. Students are trained in workshops with a rotation system. The workshop program is posted on the course website and at eclass at the beginning of the semester.

The course program is provided herebelow:

Week	Topics
1	Product design – Introduction to materials - Lab
2	Materials and process trees – Material property charts - Lab
3	Matching material to design - Lab
4	Material selection strategy: Case studies - Lab
5	Material selection strategy: Exercises - Lab
6	Density, mechanical properties of materials - Lab
7	Mechanical properties of materials – material indices - Lab
8	Material indices: Exercises - Lab
9	Exercises – Case studies - Lab
10	Materials & Environment - Lab
11	Industrial Design – Innovative materials - Lab
12	Case studies - Lab
13	Revision – project presentation

Furthermore, articles, audiovisual lecture material, web links to useful resources, exercises, and software are uploaded in electronic format on the eClass platform.

(4) TEACHING and LEARNING METHODS - ASSESSMENT

TEACHING MODE *Face-to-face, in-class lecturing, distance teaching and distance learning etc.*	• Face-to-face in a classroom or the Lab • Distance teaching & learning (if required)
USE OF INFORMATION AND COMMUNICATION TECHNOLOGY *Use of ICT in Teaching, Laboratory Education, Communication with students*	**Teaching**: Lectures using modern audiovisual equipment, learning support through the eClass electronic platform, synchronous distance teaching via MS Teams. **Laboratory**: use of commercial software

	Communication with students: face-to-face during office hours, email, eClass platform, MS Teams tools
Organization of Teaching *A detailed description of the teaching methods and approach is provided.* *Lectures, seminars, laboratory exercises, fieldwork, study and analysis of literature, tutorials, internships (placements), clinical practice, artistic workshops, interactive teaching, educational visits, project work, writing assignments, artistic creation, etc.* *The student's study hours for each learning activity, as well as the hours of independent study, are specified in accordance with the principles of ECTS*	<table><tr><th>Activity</th><th>Semester Workload</th></tr><tr><td>Lectures</td><td>36</td></tr><tr><td>Exercises</td><td>16</td></tr><tr><td>Laboratory</td><td>16</td></tr><tr><td>Project (essay)</td><td>29</td></tr><tr><td>Self-study of lecture material and exercises</td><td>38</td></tr><tr><td>Consultation Support</td><td>0.5</td></tr><tr><td>Exams (written)</td><td>2</td></tr><tr><td>Course Total</td><td>137.5</td></tr></table>
STUDENT ASSESSMENT *Description of the assessment process* *Language of assessment, assessment methods, formative or summative evaluation, multiple-choice tests, short-answer questions, essay questions, problem-solving, written assignments, reports, oral examinations, public presentations, laboratory work, clinical patient examination, artistic interpretation, other(s)* *Explicitly state assessment criteria and information on whether and where these criteria are accessible to students are included.*	**Language of Assessment**: Greek (English for ERASMUS students) **Assessment Mode**: Face-to-face and/or distance learning (if required) **Assessment Methods**: The final course grade is formed as follows: • 10% by the participation of students in class activities • 10%by the participation of students in lab activities • 30% by the project • 50% by the written exams (50%) taken in the examination period of the winter semester and, in case of failure, in the September resits The written exam includes problem-solving exercises. It is conducted closed-book. **Students with Learning Difficulties**: Students with certified learning difficulties in reading and writing (as recognized by the competent authority) are assessed according to the procedures established by the Department. **Disclosure of Assessment Criteria**: The assessment criteria are communicated during the first class and are clearly stated on the course website and the eClass platform. The exam syllabus is announced on eClass following the final lecture of the semester. The exam answers are posted on eClass after the examinations take place. Students have the right to review their graded exams and receive explanations regarding their grades. In cases of further requests, the procedures outlined in the current Study Regulations apply.

(5) SUGGESTED BIBLIOGRAPHY

- Books:

- Ashby, M., Shercliff, H., Cebon, D. (2011). Materials: Mechanics, Science, Processing and Design, Kleidarithmos Publications, ISBN: 9789604614493 [12534905]– in Greek

- Journals:

Robotics and Computer-Integrated Manufacturing

- Other educational material:

- Lecture Notes and Supporting Material provided by the Instructor
- Laboratory Workbook