COURSE OUTLINE

(1) General information

FACULTY/SCHOOL	TECHNOLOGY			
DEPARTMENT	ENVIRONMENTAL SCIENCES			
LEVEL OF STUDY	*Undergraduate*			
COURSE UNIT CODE	**NEW COURSE**	**SEMESTER**	**4th**	
COURSE TITLE	TECHNICAL MATERIALS AND THE ENVIRONMENT			
INDEPENDENT TEACHING ACTIVITIES in case credits are awarded for separate components/parts of the course, e.g. in lectures, laboratory exercises, etc. If credits are awarded for the entire course, give the weekly teaching hours and the total credits			**WEEKLY TEACHNG HOURS**	**CREDITS**
THEORETICAL BACKGROUND			4	5
COURSE TYPE Background knowledge, Scientific expertise, General Knowledge, Skills Development	BACKGROUND			
PREREQUISITE COURSES:	NO			
LANGUAGE OF INSTRUCTION &EXAMINATION/ASSESSMENT:	GREEK			
THE COURSE IS OFFERED TO ERASMUS STUDENTS	YES			
COURSE WEBSITE (URL)				

(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 level of study, in accordance with the European Higher Education Qualifications' Framework.*
- *Descriptive indicators for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and*

APPENDIX B

- *Guidelines for writing Learning Outcomes*

The use of materials from natural resources in production and consumption processes has many environmental, economic and social consequences that transcend borders and affect future generations. They have consequences for:

• The rates of extraction and depletion of renewable and non-renewable natural reserves and the extent of harvesting and physical productivity of renewable reserves.

• The environmental pressures associated with the extraction, treatment, transport, use and disposal of materials (e.g. pollution, waste, habitat disturbances) and their impact on environmental quality (e.g. air, climate, water, soil, biodiversity, landscape) and human health.
• International trade and market prices of raw materials and other goods, as well as the productivity and competitiveness of the economy.

The aim of the course is:
To assess the impact of the production and use of technical materials on the environment. It should be noted that the current course of resource consumption for their production is unsustainable and therefore, there is significant interest in reducing greenhouse gas emissions, while encouraging more efficient and sustainable use of materials, water and energy. The five most important categories of technical materials (steel, aluminum, cement, plastics and paper), which are responsible for 55% of global CO_2 emissions, are examined in the light of the search for technical or other solutions to reduce greenhouse gas emissions during the process, their production and use, in the direction of environmental sustainability and sustainable development. Criteria are being set for the development of smart materials and the possibilities of converting waste into resources are being considered in the context of circular economic policies.

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 aim?

Search for, analysis and synthesis of data and information by the use of appropriate technologies,	*Project planning and management*
Adapting to new situations	*Respect for diversity and multiculturalism*
Decision-making	*Environmental awareness*
Individual/Independent work	*Social, professional and ethical responsibility and sensitivity to gender issues*
Group/Team work	*Critical thinking*
Working in an international environment	*Development of free, creative and inductive thinking*
Working in an interdisciplinary environment	*……*
Introduction of innovative research	*(Other…….citizenship, spiritual freedom, social awareness, altruism etc.)*
	…….

• Teamwork
• Work in an interdisciplinary environment
• Production of new research ideas
• Respect for diversity and multiculturalism
• Respect for the natural environment
• Production of new research ideas
• Promoting free, creative and inductive thinking

(3) COURSE CONTENT

Theory

1. Introduction - General concepts.
2. Use of steel and aluminum.
3. Flows, stocks and demand for steel and aluminum.

4. Energy and emissions in steel and aluminum production.
5. Energy efficiency of current steel and aluminum production processes.
6. Modern production methods and clean energy.
7. Alternative policies to reduce energy and emissions.
8. Cement.
9. Plastics.
10. Paper.
11. Influence of politicians on the sustainability of materials.
12. Defining criteria for better materials.
13. Waste sources.
14. Linking economic growth from environmental impacts

(4) TEACHING METHODS-ASSESSMENT

<table>
<tr><td>MODES OF DELIVERY
Face-to-face, in-class lecturing, distance teaching and distance learning etc.</td><td>• Lectures in the classroom or by distance
• Team discussion</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATION TECHNOLOGY
Use of ICT in teaching, Laboratory Education, Communication with students</td><td>• Powerpoint.
• e-mail.
• e-class</td></tr>
<tr><td>COURSE DESIGN
Description of teaching techniques, practices and methods:
Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, Internship, Art Workshop, Interactive teaching, Educational visits, projects, Essay writing, Artistic creativity, etc.

The study hours for each learning activity as well as the hours of self-directed study are given following the principles of the ECTS.</td><td><table><tr><th>Activity/Method</th><th>Semester workload</th></tr><tr><td>Lectures</td><td>65</td></tr><tr><td>Theory study</td><td>45</td></tr><tr><td>Team working</td><td>15</td></tr><tr><td>Course total
(25 hours of workload per credit unit)</td><td>125</td></tr></table></td></tr>
<tr><td>STUDENT PERFORMANCE EVALUATION/ASSESSMENT METHODS
Detailed description of the evaluation procedures:

Language of evaluation, assessment methods, formative or summative (conclusive), multiple choice tests, short- answer questions, open-ended questions, problem solving, written work, essay/report, oral exam, presentation, laboratory work, other……etc.

Specifically, defined evaluation criteria are stated, as well as if and where they are accessible by the students.</td><td><u>Students are assessed in Greek or English. The final grade is formed by tests which include:</u>

• Written exam: 70% of the final grade (A)
• Tasks: 30% of the final grade (B)

Final grade = 70% (A) + 30% (B)</td></tr>
</table>

(5) SUGGESTED BIBLIOGRAPHY:

-Suggested bibliography

- Calkins, M. Materials for Sustainable Sites: A Complete Guide to the Evaluation, Selection, and Use of Sustainable Construction Materials; John Wiley & Sons: Hoboken, NJ, USA, 2009.
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