

COURSE OUTLINE

1. GENERAL

SCHOOL	Faculty of Engineering		
DEPARTMENT	Environmental Engineering		
LEVEL OF STUDIES	Level 7		
COURSE CODE	15KE1N-K1	SEMESTER	8 th
COURSE TITLE	Materials and Environment		
TEACHING ACTIVITIES		TEACHING HOURS PER WEEK	ECTS CREDITS
Theory		3 hours	
			5
COURSE TYPE	Scientific Area, Skill Development		
PREREQUISITES:	NO		
TEACHING & EXAMINATION LANGUAGE:	Greek / English		
COURSE OFFERED TO ERASMUS STUDENTS:	YES		
COURSE URL:	https://env.duth.gr/courses/%cf%85%ce%bb%ce%b9%ce%ba%ce%ac-%ce%ba%ce%b1%ce%b9-%cf%80%ce%b5%cf%81%ce%b9%ce%b2%ce%ac%ce%bb%ce%bb%ce%bf%ce%bd/		

2. LEARNING OUTCOMES

Learning Outcomes
<p>The aim of the course is to familiarize students with the field of materials science and the application of materials in the field of environmental engineering. The course includes basic concepts, molecular-chemical properties of materials (natural and synthetic) and how they are related to environmental parameters. Students will be introduced in modern methods of materials development from nano to macro-scale and how they can be modified to have the desired characteristics for applications in specific environmental issues. The basic physicochemical principles of chemical pollution and the use of materials to address specific environmental problems will be developed. Heterogeneous catalytic and photocatalytic processes using materials in environmental issues and physicochemical liquid-solid interactions will be analyzed. The course also includes the development of innovative multicomponent / multifunctional nanocomposites with advanced properties and targeted functionalities in environmental applications of pollution (liquid and gaseous), energy production (utilization of solar energy for fuel production) and sensors development.</p>
General Skills
<p>The course offers the following skills:</p> <ul style="list-style-type: none"> • Categorize materials based on their crystal and electronic structure • Working in an interdisciplinary environment • Production of new research ideas • Project design and management • Sustainability • Critical thinking

- Promoting free, creative and inductive reasoning
- Skills for autonomous work
- Research in chemical analysis
- Design and perform of chemical studies and research

3. COURSE CONTENT

1. Introduction to environmental pollution
2. Physical chemistry of nanomaterials
3. Solid/liquid interaction
4. Methods for the development of metal oxides and metal nanoparticles
5. Porous materials
6. Use of materials for depollution applications
7. Heterogeneous catalysis
8. Heterogeneous photocatalysis
9. Materials for the utilization of solar energy
10. Low cost absorbers
11. Molecular imprinting
12. Polymers
13. Biodegradable polymers
14. Sensors for environmental monitoring

4. LEARNING & TEACHING METHODS - EVALUATION

TEACHING METHOD	Face to face Lectures	
USE OF INFORMATION & COMMUNICATIONS TECHNOLOGY (ICT)	Use of ICT in teaching and in communication with students	
TEACHING ORGANIZATION	Activity	Workload/semester
	Lectures	39
	Literature study	56
	Scientific/technical reports	65
	Total	150
STUDENT EVALUATION	Assessment Language: Greek and/or English	
	Assessment/evaluation Methods: <ol style="list-style-type: none"> 1. Written examination 2. Paper development <p>The evaluation methods are analyzed at the first course of the semester and are posted in the DUTHNET e-class platform (the electronic course management system of the Foundation)</p>	

5. SUGGESTED BIBLIOGRAPHY

1. Materials and Environment

ANNEX OF THE COURSE OUTLINE

Alternative ways of examining a course in emergency situations

Teacher (full name):	Konstantinos Christoforidis
Contact details:	kochristo@env.duth.gr
Supervisors: (1)	NO
Evaluation methods: (2)	Written examination or written assignment (papers)
Implementation Instructions: (3)	Assignment submission: last week of the semester through DUTHNET e-class platform (the electronic course management system of the Foundation); the grade percentage of the assignment corresponds to the 100%; evaluation includes also an oral presentation of the paper. Written examination: corresponds to the 100% of the final grade; performed at the departmental examination period; duration of the exam: 3 h; students must demonstrate their students ID; students are supervised by departmental staff during the examination period.

(1) Please write YES or NO

(2) Note down the evaluation methods used by the teacher, e.g.

- *written assignment or/and exercises*
- written or oral examination with distance learning methods, provided that the integrity and reliability of the examination are ensured.

(3) In the **Implementation Instructions** section, the teacher notes down clear instructions to the students:

a) in case of **written assignment and / or exercises**: the deadline (e.g. the last week of the semester), the means of submission, the grading system, the grade percentage of the assignment in the final grade and **any other necessary information**.

b) in case of **oral examination with distance learning methods**: the instructions for conducting the examination (e.g. in groups of X people), the way of administration of the questions to be answered, the distance learning platforms to be used, the technical means for the implementation of the examination (microphone, camera, word processor, internet connection, communication platform), the hyperlinks for the examination, the duration of the exam, the grading system, the percentage of the oral exam in the final grade, the ways in which the inviolability and reliability of the exam are ensured and any other necessary information.

c) in case of **written examination with distance learning methods**: the way of administration of the questions to be answered, the way of submitting the answers, the duration of the exam, the grading system, the percentage of the written exam of the exam in the final grade, the ways in which the integrity and reliability of the exam are ensured and any other necessary information.

There should be an attached list with the Student Registration Numbers only of students eligible to participate in the examination.