

COURSE OUTLINE

1. GENERAL

SCHOOL	ENGINEERING		
DEPARTMENT	ENVIRONMENTAL ENGINEERING		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	ΕΣΕΣΑ	SEMESTER	9
COURSE TITLE	CONTROL OF SOLID WASTE MANAGEMENT SYSTEMS THROUGH THE FRAMEWORK OF CIRCULAR ECONOMY		
TEACHING ACTIVITIES <i>If the ECTS Credits are distributed in distinct parts of the course e.g. lectures, labs etc. If the ECTS Credits are awarded to the whole course, then please indicate the teaching hours per week and the corresponding ECTS Credits.</i>	TEACHING HOURS PER WEEK	ECTS CREDITS	
	3	3	
<i>Please, add lines if necessary. Teaching methods and organization of the course are described in section 4.</i>			
COURSE TYPE <i>Background, General Knowledge, Scientific Area, Skill Development</i>	SCIENTIFIC AREA		
PREREQUISITES:	CHEMISTRY, PHYSICAL AND BIOCHEMICAL PROCESSES, ENVIRONMENTAL MICROBIOLOGY, FLUID MECHANICS, TRANSPORT PHENOMENA, SOLID WASTE MANAGEMENT AND TECHNOLOGY I & II		
TEACHING & EXAMINATION LANGUAGE:	GREEK, ENGLISH (FOR ERASMUS STUDENTS)		
COURSE OFFERED TO ERASMUS STUDENTS:	YES		
COURSE URL:	https://eclass.duth.gr/courses/TMC368/		

2. LEARNING OUTCOMES

Learning Outcomes <i>Please describe the learning outcomes of the course: Knowledge, skills and abilities acquired after the successful completion of the course.</i>																
Specialized knowledge on the control and design of solid waste treatment systems, mainly municipal, based on principles of circular economy and the inclusion of Life Cycle Analysis principles.																
Emphasis on state-of-the-art technological systems in solid waste treatment																
Bibliographic survey development methodology																
General Skills <i>Name the desirable general skills upon successful completion of the module</i>																
<table border="0"> <tr> <td><i>Search, analysis and synthesis of data and information, ICT Use</i></td> <td><i>Project design and management</i></td> </tr> <tr> <td><i>Adaptation to new situations</i></td> <td><i>Equity and Inclusion</i></td> </tr> <tr> <td><i>Decision making</i></td> <td><i>Respect for the natural environment</i></td> </tr> <tr> <td><i>Autonomous work</i></td> <td><i>Sustainability</i></td> </tr> <tr> <td><i>Teamwork</i></td> <td><i>Demonstration of social, professional and moral responsibility and sensitivity to gender issues</i></td> </tr> <tr> <td><i>Working in an international environment</i></td> <td><i>Critical thinking</i></td> </tr> <tr> <td><i>Working in an interdisciplinary environment</i></td> <td><i>Promoting free, creative and inductive reasoning</i></td> </tr> <tr> <td><i>Production of new research ideas</i></td> <td></td> </tr> </table>	<i>Search, analysis and synthesis of data and information, ICT Use</i>	<i>Project design and management</i>	<i>Adaptation to new situations</i>	<i>Equity and Inclusion</i>	<i>Decision making</i>	<i>Respect for the natural environment</i>	<i>Autonomous work</i>	<i>Sustainability</i>	<i>Teamwork</i>	<i>Demonstration of social, professional and moral responsibility and sensitivity to gender issues</i>	<i>Working in an international environment</i>	<i>Critical thinking</i>	<i>Working in an interdisciplinary environment</i>	<i>Promoting free, creative and inductive reasoning</i>	<i>Production of new research ideas</i>	
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Objective and learning outcomes are:																

- To learn the practical applications of circular economy principles into the management and design of solid waste system with emphasis on valorization and the recovery of added value materials.
- The above goal will be achieved with short assignments on timely topics during the semester (7 to 9) and a final oral exam with open notes and internet access.

3. COURSE CONTENT

1. Circular economy in solid waste management (SWM). Principles-Examples. Principles 3-4R
2. Municipal solid waste management worldwide - Trends and practices
3. End of waste criteria in waste recycling and best available techniques
4. Methodologies and policies for the prevention of solid waste production in the world.
5. Design of municipal waste reuse and recycling (MSW) systems - International practices.
6. IPCC principles in solid waste management - Trends in gaseous emissions
7. Policies and measures: Solid waste management and climate change
8. Integrating financial incentives and taxes into waste management - Global practices
9. Life cycle analysis in MSW management - Basic principles
10. Life cycle analysis in MSW management - Application of relevant software
11. Plastic waste management - Bioplastics, biodegradable plastics, microplastics
12. Quality and safety of soil conditioners from waste or residues
13. Incineration ash management systems and flue gas treatment from waste incineration plants

4. LEARNING & TEACHING METHODS - EVALUATION

TEACHING METHOD <i>Face to face, Distance learning, etc.</i>	Face to face	
USE OF INFORMATION & COMMUNICATIONS TECHNOLOGY (ICT) <i>Use of ICT in Teaching, in Laboratory Education, in Communication with students</i>	Use of ICT during teaching and communication with students	
TEACHING ORGANIZATION <i>The ways and methods of teaching are described in detail. Lectures, Seminars, Laboratory Exercise, Field Exercise, Bibliographic research & analysis, Tutoring, Internship (Placement), Clinical Exercise, Art Workshop, Interactive learning, Study visits, Study / creation, project, creation, project. Etc.</i> <i>The supervised and unsupervised workload per activity is indicated here, so that total workload per semester complies to ECTS standards.</i>	Activity	Workload/semester
	Lectures	40
	Design exercises	0
	Literature review	60
	Individual projects	30
	Project presentation	15
	Field trips	5
	Course total	150
STUDENT EVALUATION <i>Description of the evaluation process</i> <i>Assessment Language, Assessment Methods, Formative or Concluding, Multiple Choice Test, Short Answer Questions, Essay Development Questions, Problem Solving, Written Assignment, Essay / Report, Oral Exam, Presentation in audience, Laboratory Report,</i>	The grading will be based on	
	• Intermediate short individual or group projects (70%)	
	• Final written or oral exams with open notes (30%)	

Clinical examination of a patient, Artistic interpretation, Other/Others

Please indicate all relevant information about the course assessment and how students are informed

5. SUGGESTED BIBLIOGRAPHY

1. Διαχείριση και Μηχανική Στερεών Αποβλήτων, Δ. Κομίλης (Εκδόσεις Τζιόλας, 2020), in Greek
2. Τεχνολογίες Ανακύκλωσης Αποβλήτων (2017), Α. Σκορδίλης, Εκδόσεις Μπαρμπουνάκη, in Greek
3. Christensen, T. (eds.), 2011. Solid Waste Technology and Management, John Wiley & Sons, Ltd., Chichester (ISBN: 978-1-405-17517-3).
4. Notes and published articles uploaded in eclass

ANNEX OF THE COURSE OUTLINE

Alternative ways of examining a course in emergency situations

Teacher (full name):	Dimitrios Komilis
Contact details:	dkomilis@env.duth.gr
Supervisors: (1)	NO
Evaluation methods: (2)	Presentation of projects by distance followed by oral questions
Implementation Instructions: (3)	<p>The examination in the course will be initiated with the entrance of all students into the platform and then the project presentation per student who will be examined by the professor according to the exam schedule.</p> <p>The test will be performed using Microsoft Teams. The link will be sent to students via eclass exclusively to the institutional accounts of those who have registered in the course and have accepted the terms of distance education.</p> <p>Students will have to log into the examination room through their institutional account, otherwise they will not be able to participate. They will also take part in the examination with a camera which they will have it turned on during the whole examination. Before the start of the exam, students will demonstrate their ID card and face to the camera, so that they can be identified by the examiner.</p>

(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.