COURSE OUTLINE

(1) GENERAL

SCHOOL	Engineering			
DEPARTMENT	Electrical and Computer Engineering			
LEVEL OF STUDY	Undergraduate			
COURSE UNIT CODE	7.007	**SEMESTER**	7^{th}	
COURSE TITLE	Environmental Management			
COURSEWORK BREAKDOWN			**TEACHING WEEKLY HOURS**	**ECTS Credits**
	Theory (Lectures)		2	2
	Tutorial/Exercises		1	1
	Laboratory exercises		1	1
	TOTAL		**4**	**4**
COURSE UNIT TYPE	General knowledge			
PREREQUISITES				
LANGUAGE OF INSTRUCTION/EXAMS	Greek			
COURSE DELIVERED TO ERASMUS STUDENTS	No			
WEB PAGE (URL)	https://eclass.hmu.gr/courses/ECE133/			

(2) LEARNING OUTCOMES

Learning Outcomes
A) The **knowledge**, which the students will acquire upon successful completion of the course includes: a) the environmental awareness. b) the technologies utilized to reduce pollutant emissions from industrial and other activities. c) the environmental legislation and the framework for environmental impact studies. d) the experimental measurements related with the absolute and relative errors, the separation of direct and indirect measurements, the correct assessment and handling of random and systematic errors in measurements and the correct presentation of results. B) The **skills**, which the students will obtain upon successful completion of the course are: a) the emergence of environmental responsibility. b) the selection of modern methods for the improvement, protection and management of the environment. c) the rational use of modern technologies to deal with environmental problems. d) the understanding and analysis of data through exercises in theory and in laboratory through mathematical calculations. e) the analysis of the experimental data that includes calculations of the values of experimental quantities and of their expected errors as a measure of trust on these values. f) the writing-up of an experimental report, which includes the following sections: Introduction, Methodology, Discussion, Conclusions, References. C) The **abilities**, which the students will get upon the successful completion of the course are: a) the design of new materials with improved properties for the management of environmental issues. b) the estimation of the appropriate methodology to solve environmental problems. c) the beneficial collaboration with other members of a team in the writing-up of a report. d) the ability to recognize *in-vivo* and correct or bypass errors or even modify certain steps throughout the process of implementation of an experimental task in order to reach the answer the safest and most unambiguous way.

General Skills
• Autonomous work • Teamwork • Search, analysis and synthesis of data and information, using the necessary technologies • Decision making • Promoting liberal, creative and inductive/deductive thinking • Work in an interdisciplinary environment

(3) SYLLABUS

Basic Concepts-Definitions (Environmental Protection, Ecosystem)

International Environmental Problems-International Environmental and Sustainable Development Conditions

Environmental Cost Assessment

Economic and Environmental Assessment of Technical Systems: financial viability of facilities, cost-benefit analysis, government interventions and subsidies

Mass and Energy Balances

Liquid Waste Treatment

Liquid Waste (categories, composition, pollutants)

Typical wastewater flows-Indicative factors for the assessment of polluting waste loads

Liquid Waste Treatment Stages

Air Pollution

Air Pollution Sources-Main Pollutants-Effects on health

Fuels and pollutant emissions

Anti-pollution systems

Municipal Solid Waste-Special Radioactive Waste-Electronic Waste

Solid Waste Managements

Laboratory Exercises
The laboratory exercises include the determination of basic parameters of liquid waste quality (pH, dissolved oxygen, biochemical oxygen demand, suspended solids, nitrogen, phosphorus, etc.).

(4) TEACHING METHODS-ASSESSMENT

<table>
<tr><td>MODE OF DELIVERY</td><td>In-Class Face-to-Face</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATION TECHNOLOGY</td><td>Use of ICTs in lecturing
Use of ICTs for the communication with students via the e-class platform</td></tr>
<tr><td>TEACHING ORGANIZATION</td><td>
<table>
<tr><th>Method description/Activity</th><th>Semester Workload</th></tr>
<tr><td>Lectures</td><td>39</td></tr>
<tr><td>Solving exercises</td><td>39</td></tr>
<tr><td>Preparation for the exams</td><td>27</td></tr>
<tr><td>Laboratory exercises</td><td>15</td></tr>
<tr><td>Total Contact Hours</td><td>120</td></tr>
</table>
</td></tr>
<tr><td>ASSESSMENT METHODS</td><td>All announcements for the course regulations and complementary reading material are permanently posted in the course web page. The course grade incorporates the following evaluation procedures:
1. Written examination (20 %)
• Problem solving.
• Short answer questions.
2. Final written examination (60 %)
3. Laboratory report (20 %)</td></tr>
</table>

(5) RECOMMENDED BIBLIOGRAPHY

-Recommended Bibliography:

- *D. Zampoulis, A. Zampoulis, T. Karapantsios, K. Matis, P. Mavros, Introduction to Chemical Technology, Tziola, 2009* ***(in Greek)****.*
- *A. Andreadaki, M. Pantazidou and A. Stathopoulou, Environemtnal Technology, Symmetria, 2008* ***(in Greek)****.*

-Relevant Scientific Journals:

- *Journal of Environmental Engineering and Science*
- *Journal of Environmental Sciences*
- *Applied Catalysis B: Environmental*
- *Frontiers of Environmental Science & Engineering*