COURSE OUTLINE

(1) OVERVIEW

SCHOOL	MARITIME & INDUSTRY		
DEPARTMENT	INDUSTRIAL MANAGEMENT & TECHNOLOGY		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	TETEX06	SEMESTER	7
COURSE TITLE	ENVIRONMENTAL PROTECTION TECHNOLOGIES		

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, Laboratory & Projects	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*	E - 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 examines the fundamental principles of natural resource and waste management, focusing on methods for treating solid and liquid waste as well as addressing air pollution. It also analyzes the regulatory framework at the European and national levels, with emphasis on the implementation of the Waste Framework Directive. Additionally, it presents environmental management standards (ISO 14001, EMAS) and the certification process through case studies of Greek companies.

The course aims to provide a foundation for further professional or academic specialization in this rapidly evolving field.

Upon successful completion of the course, students will be able to:

- Classify waste based on its qualitative and quantitative composition.
- Understand solid and liquid waste management issues.
- Evaluate methods for solid waste treatment.
- Manage liquid waste effectively.
- Assess methods for wastewater treatment.
- Understand adsorption technologies and adsorbent materials.
- Apply simulation and modeling to adsorption processes.
- Know the issues related to air pollution and air quality.
- Select methods for recycling and energy conservation.
- Understand environmental management systems.
- Apply Environmental Management Standards in Greek business contexts.

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
- Generation of new research ideas
- Project design and management
- 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:

Week	Topics
1	Introduction to Waste Management
2	Waste Management Technologies
3	Waste Disposal Methods
4	Energy Recovery from Waste
5	Waste Framework Directive
6	Environmental Management Standards
7	Advances in Environmental Technology
8	Greek Case Studies in Waste Management
9	Economic Aspects of Waste Management
10	Design and Operation of Recycling Centers
11	Development of the Market for Environmental Technologies
12	Public Participation in Environmental Management
13	Environmental Footprint of Technologies

Additionally, after the completion of each module, case studies are presented to the students. They are trained in process modeling, results analysis, and decision-making based on techno-economic and environmental criteria at the Laboratory of Simulation of Industrial Processes. Participation in the laboratory is carried out on a rotating schedule. The laboratory schedule is posted on the course website and on eClass at the beginning of the semester. The laboratory schedule is listed below:

Week	Laboratory Sessions

1, 5, 9	Simulation of the treatment of industrial wastewater from textile and dyeing industries in batch reactors.
2, 6, 10	Simulation of the treatment of industrial wastewater containing hexavalent chromium Cr(VI) in batch reactors.
3, 7, 11	Simulation of the treatment of industrial wastewater from textile and dyeing industries in adsorption columns.
4, 8, 12	Simulation of the treatment of industrial wastewater containing hexavalent chromium Cr(VI) in adsorption columns
13	Rescheduling of missed laboratory sessions

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: open-source and specialized 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

Activity	Semester Workload
Lectures	26
Laboratory sessions	26
Case studies	20
Project	25
Self-study of lecture material and case studies	38
Consultation Support	0.5
Exams (written)	2
Course Total	**137.5**

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 grade for the course is determined as follows:

- 60% based on the written examination during the winter semester exam period, and in case of failure, during the September resits
- 10% based on the participation in the laboratory sessions
- 30% based on the Lab reports and the project

The written exam includes problem-solving and is conducted as an open-book exam.

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:

- Zevgolis, E.N. (2015). Environmental Protection Technology in Industry, Parikou Publications, ISBN: 9789605081935 [50660380] – in Greek
- Kouggolos, A. (2021). Environmental Engineering, 3rd Edition, Tziolas Publications, ISBN: 9789604188680 [94688998] – in Greek

- Journals:

- Bioresource Technology
- Chemical Engineering Journal
- Renewable Energy

- Other educational material:

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