COURSE OUTLINE

(1) GENERAL

SCHOOL	School of Technology		
ACADEMIC UNIT	Department of Environmental Sciences		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	**AE706**	**SEMESTER**	**7th**
COURSE TITLE	**MODERN METHODS for MONITORING ENVIRONMENTAL POLLUTION**		

INDEPENDENT TEACHING ACTIVITIES	**WEEKLY TEACHING HOURS**	**CREDITS**
Teaching Hours	4	4

COURSE TYPE	Skills development
PREREQUISITE COURSES	None
LANGUAGE OF INSTRUCTION and EXAMINATIONS	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	https://eclass.uth.gr/courses/ENV_U_163/

(2) LEARNING OUTCOMES

Learning outcomes

The course focuses on the presentation of new contemporary technologies for the analysis of environmental samples to detect the presence of pollutants, their quantification and their identification in complex samples. Fundamentals of analytical and biological methods will be presented along with their applications in the analysis of water, soil and air samples.

Upon successful completion of the course, students will have acquired the necessary knowledge, skills and competence, and will be able to:

- Describe the use of contemporary methodologies for the analysis of environmental pollutants.
- Choose the appropriate methods for the analysis of environmental samples.
- Describe the new fast-track technologies for the detection of contaminants in environmental samples.
- Describe and utilise medium and large-scale environmental pollution monitoring systems.

General Competences

- Search for, analysis and synthesis of data and information, with the use of the necessary technology
- Decision-making
- Working independently
- Team work
- Working in an interdisciplinary environment
- Production of new research ideas
- Respect for the natural environment
- Criticism and self-criticism
- Production of free, creative and inductive thinking

(3) SYLLABUS

- Review of the main pollutants in air, water and soil.
- Environmental legislation - Maximum levels of pollutants in environmental samples, limit values.
- Modern versatile non-target analysis methods with chromatographic tools (LC-MS/MS, LC-LTQ-Orbitrap, LC-TOF-MS, GC-MS/MS) for the analysis of environmental samples.
- Applications of modern analytical tools for the detection of organic pollutants in environmental samples.
- Lab-on-a-chip: Applications for the detection of environmental pollutants.
- Biosensors: Types and basic operating principles, applications in environmental samples.
- Atmospheric pollution monitoring equipment and methods.

- Utilization of satellite remote sensing techniques and methods, as well as Unmanned Aerial Vehicles (UAVs - Drones) systems to monitor environmental pollution.

(4) TEACHING and LEARNING METHODS – EVALUATION

<table>
<tr><td>DELIVERY</td><td>Face-to-face</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY</td><td>• Use of PowerPoint slides
• View material in video
• Websites visits and exploitation of their content
• Communication with students via e-mail
• Use of asynchronous distance learning (e-class)</td></tr>
<tr><td>TEACHING METHODS</td><td>
<table>
<tr><th>Activity</th><th>Semester workload</th></tr>
<tr><td>Lectures</td><td>26</td></tr>
<tr><td>Laboratory practice</td><td>26</td></tr>
<tr><td>Study and analysis of bibliography</td><td>33</td></tr>
<tr><td>Essay writing</td><td>15</td></tr>
<tr><td>Course total
(25 hours workload per credit)</td><td>100</td></tr>
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<tr><td>STUDENT PERFORMANCE EVALUATION</td><td>Students’ performance is evaluated in the Greek language. The final grade is determined by:
• A written exam (at the end of the semester) that contributes 70% to the final grade, applying one or more of the following evaluation methods: Multiple choice questions, short-answer questions, problem solving.
• Elaboration and delivery of a written assignment (during the semester) that contributes 30% to the final grade.
Final Grade = 70% Exam Grade + 30% Assignment Grade</td></tr>
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(5) ATTACHED BIBLIOGRAPHY

- Deligiannakis, I., Hela, D., Konstantinou, I. (2010) *Instrumental Environmental Analysis,* (1st edition). Thessaloniki: TZIOLA Publications. (in Greek)
- Kintzios, S. (2016) *Nanobiotechnology and Biosensors,* (1st Ed). Athens: Embryo Publications. (in Greek)
- Malliaros, C. H. (2000) *Environment, Pollution, Anti-pollution Techniques,* (1st ed). Athens: METAICHMIO Publications S.A. (in Greek)
- Triantafillou, G. A. (2017) *Air Pollution,* (1st ed). Kozani: Thalis Publications. (in Greek)