1.1.1 Environmental Engineering

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΥΔΡ001	**SEMESTER**	3rd
COURSE TITLE	Environmental Engineering		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	3
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Scientific Field
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes
COURSE WEBSITE (URL)	

LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

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

- know the concepts of climate change, the ozone hole, acid rain
- understand the conditions of air pollution and water pollution
- know the processes of wastewater treatment
- design a sewage treatment plant
- dimension the sewage treatment tanks
- be aware of the limitations and peculiarities in the construction of such projects
- know the limits of pollutants that can be discharged from a Wastewater Treatment Plant

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology	*Project planning and management*
Adapting to new situations	*Respect for difference and multiculturalism*
	Respect for the natural environment

Decision-making *Working independently* *Team work* *Working in an international environment* *Working in an interdisciplinary environment* *Production of new research ideas*	*Showing social, professional and ethical responsibility and sensitivity to gender issues* *Criticism and self-criticism* *Production of free, creative and inductive thinking* *……* *Others…* *…….*

- Decision making
- Respect for the natural environment
- Autonomous work
- Adaptation to new situations

SYLLABUS

- Principles of aerosol cleaning. Emission sources of pollutants in the atmosphere. Removal of gaseous pollutants. Particulate removal from static source emissions. Technologies for destroying pollutants emitted by mobile sources
- Principles - methods of water treatment. Quality of potable water
- Solid waste management and processing. Management of urban waste
- Climate change, ozone hole, acid rain
- Toxic substances, asbestos, lead, dioxins

- Principles of biological wastewater and sludge treatment. Environmental biochemistry-biotechnology elements: Microorganisms, biochemical reaction kinetics. Wastewater treatment technology: Qualitative and quantitative characteristics of wastewater. Sewage treatment. Separation grids. Sand collectors. Physico-chemical treatment. Sedimentation tanks. Biological processes of suspended and attached biomass. Natural wastewater treatment systems. Disinfection. Sludge treatment technology: Qualitative and quantitative characteristics of sludge. Sludge thickening. Sludge immobilization/digestion. Dewatering, drying, and burning of sludge. Final disposal and/or reuse of treated wastewater and sludge.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Powerpoint presentations, E-learning platform for educational material.
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work,*	1. Assignment of tasks aimed at exploring understanding of concepts taught. 2. Final written exam at the end of the semester (in Greek).

Activity	***Semester workload***
Lectures	52
Individual study	26
Course total (26 hours workload per ECTS credit)	***78***

essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	

ATTACHED BIBLIOGRAPHY

• Ath. Kougolou "ENVIRONMENTAL ENGINEERING, Pollution Environmental Protection", Tziolas Publications, 2018, ISBN: 9789604185627 [in Greek]
• Avloniti A. Stamati "Environmental Engineering, I - Introduction to Water and Liquid Waste Technology", ION Publications, 2013, ISBN 978-960-508-056-3 [in Greek]
• George Tchobanoglous, H. David Stensel, Ryujiro Tsuchihashi, Franklin L. Burton “Wastewater Engineering: Treatment and Resource Recovery”, Metcalf Eddy Inc, 2013, ISBN: 9780073401188
• Nelson L. Nemerow, Franklin J. Agardy, Patrick J. Sullivan, Joseph A. Salvato “Environmental Engineering: Prevention and Response to Water, Food, Soil, and Air borne Disease and Illness”, Wiley, 2009, ISBN: 9780470083048
• R Wane Schneiter “Environmental Engineering Practice PE Exams”, Professional Publications Inc, 2007, ISBN: 1591260019