**COURSE OUTLINE**

1. **GENERAL**

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| **SCHOOL** | SCHOOL OF HEALTH SCIENCES |
| **ACADEMIC UNIT** | BIOLOGICAL AND TECHNOLOGICAL APPLICATIONS |
| **LEVEL OF STUDIES** | UNDERGRADUATE |
| **COURSE CODE** | **ΒΕE801** | **SEMESTER** | **6TH**  |
| **COURSE TITLE** | ENVIRONMENTAL CHEMISTRY |
| **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** |
| LECTURES | 3 | 3 |
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| *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* | Specialised general knowledgeSkills Development |
| **PREREQUISITE COURSES:** |  |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | GREEK OR ENGLISH (IF NECESSARY) |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | YES |
| **COURSE WEBSITE (URL)** |  |

1. **LEARNING OUTCOMES**

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| **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*
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| By the end of the courses students will be able to understand global issues that environmental chemistry deals in the three environmental compartments (soil, water, air) based on the chemical, physicochemical and biological properties of specific hazardous compounds. Emphasis is also given on relevant EU directives as well as on the impact of the studied compounds on humans and other organisms. |
| **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* *Adapting to new situations* *Decision-making* *Working independently* *Team work**Working in an international environment* *Working in an interdisciplinary environment* *Production of new research ideas*  | *Project planning and management* *Respect for difference and multiculturalism* *Respect for the natural environment* *Showing social, professional and ethical responsibility and sensitivity to gender issues* *Criticism and self-criticism* *Production of free, creative and inductive thinking**……**Others…**…….* |
| Basic knowledge on anthropogenic and biogenic pollution in the three environmental compartments; European and National Directives; Quantitative analysis of pollutants; Human exposure in atmospheric indoor and outdoor pollution; Drinking water quality.  |

1. **SYLLABUS**

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| 1. Environmental compartments
	* Water
		+ Ground water
		+ Surface water
		+ Drinking water
		+ Legislation on surface and drinking water
	* Soil
		+ Soil characteristics
		+ Soil pollution
		+ Legislation on soils
	* Air
		+ Air composition
		+ Anthropogenic and biogenic emissions
		+ Troposphere, stratosphere, ionosphere
		+ Ozone (formation and destruction)
		+ Hydrocarbons in the atmosphere
		+ Reactions in the atmosphere
		+ EU guidelines on atmospheric pollutants
		+ Indoor air pollution
2. Greenhouse effect
	* Greenhouse gases
	* Contribution to the greenhouse effect
	* Climate change
3. Xenoniotic compounds
	* Cadmium
	* Phenols with emphasis to pentachlorophenol (PCP)
	* Chlorinated dioxins and furans (PCDDs and PCDFs)
	* Phthalic esters
	* Chlorinated biphenyls (PCBs)
4. Pesticides
	* Chlorinated pesticides
	* Parathion and metabolites
	* Atrazine and metabolites
	* Toxaphene
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1. **TEACHING and LEARNING METHODS - EVALUATION**

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| **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* | NO, CLASSICAL TYPE OF LECTURES |
| **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* |

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| ***Activity*** | ***Semester workload*** |
| LECTURES13 WEEKS X 3 HOURS | 39 HOURS |
| LEARNING PROCESS | 72 HOURS |
| Preparation of oral presentation | 10 HOURS |
| Course total  | ***121 HOURS*** |
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| **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, 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.* | Greek or EnglishWritten examinationEvaluation criterion: Α) Pass through the test (>5/10, 90%)Β) Evaluation of the oral presentation (10%) |

1. **ATTACHED BIBLIOGRAPHY**

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| *- Suggested bibliography:**- Related academic journals:*1. Chemistry and analysis of volatile organic compounds by H.J Th. Bloemen and J. Burn, Chapman and Hall, 1993, ISBN: 0-751-40000-9.
2. Atmospheric Pollution Control from David Cooper and F. C. Alley, translation in Greek 2004, ISBN: 960-418-039-8.
3. The Chemistry of Pollution by Guenther Fellenberg, J. Wiley & Sons, 2000, ISBN: 0-471-61391-6.
4. Environmental organic Chemistry by Rene Schwarzenbach, Philip Gschwend and Dieter Imboden, J. Wiley & Sons, 1993, ISBN: 0-471-83941-8.
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