**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** | **ΒΕE906** | **SEMESTER** | | **7TH** | |
| **COURSE TITLE** | ENVIRONMENTAL TECHNOLOGIES | | | | |
| **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, ORAL PRESENTATION & EXCURSION | | | 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 knowledge  Skills Development | | | | |
| **PREREQUISITE COURSES:** | Basic knowledge on: General Chemistry, Organic Chemistry and Physical Chemistry | | | | |
| **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* | |
| By the end of the courses the students will be able to understand basic principles governing the treatment of surface and groundwater to produce drinking water for human consumption as well as technologies for the management of municipal liquid and solid wastes. | |
| **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…*  *…….* |
| Aim of the course for the students is to understand basic environmental technologies in context to the production of water for human consumption, the management of municipal wastewaters as well as the management of municipal solid wastes in Greece and worldwide. | |

1. **SYLLABUS**

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| 1. Water treatment: Production of water for human consumption from groundwater. Filtration and filter types. Production of water for human consumption from surface waters. Methods of water disinfection. 2. Municipal wastewater treatment: Physical, chemical and microbiological characteristics of municipal wastewaters. Parameters to be tested and quantification of them. Primary treatment. Secondary aerobic treatment (active sludge method, prolonged aeration, biological disks). Secondary anaerobic treatment (UASB reactors, mass and carbon balance, treatment steps). Tertiary treatment-Nitrogen removal (nitrification, de-nitrification). Phosphorous removal. Small units for wastewater treatment (halophytic plant clarification systems). 3. Chemical and biological methods for the management of agricultural wastes 4. Municipal solid waste management: Sanitary landfills-Selections of sites for installation, construction, preparation of tender documents. Degradation phases in the cell of the landfill. Parameters that influences the production of gases, calculation of gas production, gas movement in the cell of the landfill. Gas treatment. Production of leachates and leachate composition. Influence of leachate production through water balance. Movement of leachates in the cell of the landfill-Collection and removal of leachates. Insulating materials in landfills. |

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* | |  |  | | --- | --- | | ***Activity*** | ***Semester workload*** | | LESSONS  12 WEEKS X 3 HOURS | 36 HOURS | | LEARNING PROCESS | 72 HOURS | | PREPARATION FOR ORAL PRESENTASTION | 10 HOURS | | EDUCATIONAL TRIP | 6 HOURS | | TOTAL | ***124 HOURS*** | |  |  | |  |  | |  |  | |  |  | |  |  | |
| **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.* | IN GREEK OR ENGLISH  WRITTEN TEST  EVALUATION CRITERION:  Α) PASS THROUTH THE TEST (>5/10, 80%)  Β) ORAL PRESENTATION (10%)  Γ) PARTICIPATION IN EDUCATIONAL TRIP(10%) |

1. **ATTACHED BIBLIOGRAPHY**

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| *- Suggested bibliography:*  *- Related academic journals:*   1. TECHNOLOGIES FOR THE MANAGEMENT OF SOLID WASTES, PROF. EVANGELOS VOUDRIAS, UNIVERSITY OF THRACE, XANTHI, 2012. 2. TECHNOLOGIES FOR THE MANAGEMENT OF SOLID WASTES, PROF. ALEXANDROS AIVAZIDIS, UNIVERSITY OF THRACE, XANTHI, 2000. 3. MANAGEMENT OF HAZARDOUS WASTES, PROF. EVANGELOS VOUDRIAS, UNIVERSITY OF THRACE, XANTHI, 2001. 4. Basiswissen Umwelttechnik von Matthias Bank, Vogel Verlag (Würzburg), 2000, ISBN: 3-8023-1797-1. |