# COURSE OUTLINE

## (1) GENERAL

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|---|---|---|---|
| **SCHOOL** | SCHOOL OF SCIENCES | | |
| **DEPARTMENT** | DEPARTMENT OF CHEMISTRY | | |
| **LEVEL OF STUDIES** | ISCED level 6 – Bachelor's or equivalent level | | |
| **COURSE CODE** | YN503 | **SEMESTER** | 5th Semester |
| **COURSE TITLE** | Environmental Chemistry | | |

| **TEACHING ACTIVITIES** *If the ECTS Credits are distributed in distinct parts of the course e.g. lectures, labs etc. If the ECTS Credits are awarded to the whole course, then please indicate the teaching hours per week and the corresponding ECTS Credits.* | **TEACHING HOURS PER WEEK** | **ECTS CREDITS** |
|---|---|---|
| THEORY | 3 | 3 |
| | | |
| | | |
| *Please, add lines if necessary. Teaching methods and organization of the course are described in section 4.* | | |

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| **COURSE TYPE** *Background, General Knowledge, Scientific Area, Skill Development* | Specialization, Skill Development |
| **PREREQUISITES:** | NO |
| **TEACHING & EXAMINATION LANGUAGE:** | Greek |
| **COURSE OFFERED TO ERASMUS STUDENTS:** | NO |
| **COURSE URL:** | https://eclass2.emt.duth.gr/courses/CHEM_D105/ |

## (2) LEARNING OUTCOMES

**Learning Outcomes**

*Please describe the learning outcomes of the course: Knowledge, skills and abilities acquired after the successful completion of the course.*

The aim of the course is to familiarize students with the subject of environmental chemistry by providing basic knowledge about the sources, chemical behavior, transport and impacts of chemical species in air, water and soil. Also, the understanding of important chemical processes that determine the balance of chemical species in the environment and the impact of human activities on them

Upon completion of the course, the student will have acquired the following knowledge and skills for Environmental Chemistry:

- knowledge of basic concepts, principles and applications of modern environmental chemistry
- knowledge of the basic principles applied to the gaseous environment, the liquid environment and the solid environment
- development of skills in basic knowledge of general, inorganic chemistry and environmental chemistry
- understanding of the theoretical axes of general and inorganic environmental chemistry
- knowledge of the chemistry of the processes that contribute to the formation of the environment, and of anti-pollution technologies that aim to prevent, treat and restore the environment
- practice in collecting data and writing studies in the field of the environment

Skills

- The application of knowledge in practice
- The search, analysis and synthesis of data and information, using the necessary technologies
- The preparation of group projects
- The promotion of free and creative thinking

**General Skills**

*Name the desirable general skills upon successful completion of the module*

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|---|---|
| *Search, analysis and synthesis of data and information,* | *Project design and management* |
| *ICT Use* | *Equity and Inclusion* |
| *Adaptation to new situations* | *Respect for the natural environment* |
| *Decision making* | *Sustainability* |
| *Autonomous work* | *Demonstration of social, professional and moral responsibility and* |
| *Teamwork* | *sensitivity to gender issues* |
| *Working in an international environment* | *Critical thinking* |
| *Working in an interdisciplinary environment* | *Promoting free, creative and inductive reasoning* |
| *Production of new research ideas* | |

It is based on the theoretical knowledge of Environmental Chemistry

- Refers to sources, cross-references and gleans
- More specifically, the course content promotes the following skills:
- Search, analysis and synthesis of data and information, using the necessary technologies
- Promotion of free, creative and inductive thinking
- Work in an international environment
- Work in an interdisciplinary environment
- Autonomous work
- Teamwork
- Project planning and management
- Decision-making
- Adaptation to new situations
- Respect for the natural environment

## (3) COURSE CONTENT

Introduction to environmental chemistry
• Environment and natural processes - pollution processes
• Greenhouse effect
• Biogeochemical cycles (water, hydrogen, carbon, oxygen cycles)
• Assessment of anthropogenic impacts on the environment
• Sources of atmospheric pollution, atmospheric pollutants
• Pollution of surface and groundwater
• Treatment of urban wastewater and liquid industrial waste
• Methods for determining water quality control parameters
• Urban waste - industrial waste, principles of their management
• Management policies and tools
• Environmental impact studies
• Suspended particles in the atmosphere.
• Dissolved oxygen and pollution from waste.

## (4) LEARNING & TEACHING METHODS - EVALUATION

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|---|---|
| **TEACHING METHOD**<br>*Face to face, Distance learning, etc.* | Face to face |
| **USE OF INFORMATION & COMMUNICATIONS TECHNOLOGY (ICT)**<br>*Use of ICT in Teaching, in Laboratory Education, in Communication with students* | • Organization of the material in ppt slides.<br>• Support of the learning process through the electronic platform<br>• Communication via email. |
| **TEACHING ORGANIZATION**<br>*The ways and methods of teaching are described in detail.* | |

| Activity | Workload/semester |
|---|---|
| Lectures | 39 |
| Study & Writing Paper | 111 |

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|---|---|
| *Lectures, Seminars, Laboratory Exercise, Field Exercise, Bibliographic research & analysis, Tutoring, Internship (Placement), Clinical Exercise, Art Workshop, Interactive learning, Study visits, Study / creation, project, creation, project. Etc.*<br><br>*The supervised and unsupervised workload per activity is indicated here, so that total workload per semester complies to ECTS standards.* | Total: 150 |
| **STUDENT EVALUATION**<br>*Description of the evaluation process*<br><br>*Assessment Language, Assessment Methods, Formative or Concluding, Multiple Choice Test, Short Answer Questions, Essay Development Questions, Problem Solving, Written Assignment, Essay / Report, Oral Exam, Presentation in audience, Laboratory Report, Clinical examination of a patient, Artistic interpretation, Other/Others*<br><br>*Please indicate all relevant information about the course assessment and how students are informed* | **Student evaluation languages**<br>Greek<br>**Method (Formative or Concluding)**<br>Summative<br>**Student evaluation methods**<br>Written exam<br>Written assignment<br>**Rate**<br>**100** |

## (5) SUGGESTED BIBLIOGRAPHY


- ΧΗΜΕΙΑ ΠΕΡΙΒΑΛΛΟΝΤΟΣ, Φυτιάνος Κωνσταντίνος Κ., Σαμαρά – Κανσταντίνου Κωνσταντινή ,ΚΩΔΙΚΟΣ ΕΥΔΟΞΟ :15759, ISBN: 978-960-12- 1808-3
- ΠΡΑΣΙΝΗ ΧΗΜΕΙΑ, ANASTAS P.T., WARNER J.C. , ΚΩΔΙΚΟΣ ΕΥΔΟΞΟ :314, ISBN:978-960-524-234-6
- Ρύπανση και τεχνολογίες προστασίας περιβάλλοντος, Αλμπάνης Τριαντάφυλλος, ΚΩΔΙΚΟΣ ΕΥΔΟΞΟ :18548776, ISBN: 978-960-418-206-0
- Αρχές τεχνολογίας αντιρρύπανσης, Κουιμτζής Θεμιστοκλής, Ματής Κωνσταντίνος Γ, ΚΩΔΙΚΟΣ ΕΥΔΟΞΟ :11000, ISBN: 960-431-608-7