COURSE OUTLINE

(1) GENERAL

SCHOOL	SCHOOL OF SCIENCES		
ACADEMIC UNIT	DEPARTMENT OF PHYSICS		
LEVEL OF STUDIES	1		
COURSE CODE	**M217**	**SEMESTER**	**1**
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**
	3	4
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*	Special background
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes
COURSE WEBSITE (URL)	http://ecourse.uoi.gr/course/view.php?id=177

(2) 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*

The course offers an overview of the phenomena treated by environmental physics and deals with the basic principles and laws of physics underlying these phenomena. Upon completion of the course the students will be able to:

- Understand the atmospheric chemical reactions.
- Know the chains of chemical reactions between nob-reactive pollutants and water vapor in the atmosphere
- Understand the processes leading to the increase of greenhouse gases in the atmosphere
- Understand the processes of acid rain in the atmosphere
- Understand of the atmospheric chemistry of NOx and O3 and other reactive pollutants.
- Know about the ozone hole over the Earths poles and their differences.
- Understand the behavior of particulate pollutants and metals in the atmosphere
- Know the chemical reactions leading to the formation of secondary particulates in

the Atmosphere

- Know the chemical reactions in the water and the dissolved oxygen in it
- Understand the soil chemistry

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

Search for, analysis and synthesis of data and information, with the use of the necessary technology. Working independently. Criticism and self-criticism. Production of free, creative and inductive thinking. Respect for the natural environment.

(3) SYLLABUS

Chemical transformations in the Atmosphere. Chemical Kinetics. Secondary pollutants and secondary particles in the Atmosphere. The chemistry of sulfur dioxide. The chemistry of nitrogen compounds. Ozone production. Minerals in the Atmosphere. The case of mercury in the Atmosphere. Dioxins and furans. Water Quality Indices, Dissolved chemicals in water. Oxygen in water. Physics and Chemistry of the Ground.

(4) 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*	Use of Moodle on-line learning platform for the dissemination of notes, problem sets as well as contacting the students
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*	

Activity	***Semester workload***
Lectures	26
Tutorials	13
Bibliography study	35
Non-guided study	23
Exams	3
Course total	***100***

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.*	Written exam at the end of the course containing theory and problem solving

(5) ATTACHED BIBLIOGRAPHY

- Suggested bibliography:
- Related academic journals:

Suggested bibliography :

- Seinfeld and Pandis, Atmospheric Chemistry and Physics, Wiley
- G. Viscondi, Fundamentals of Physics and Chemistry of the Atmosphere, Springer