COURSE OUTLINE

(1) GENERAL

SCHOOL	SCHOOL OF SCIENCES		
ACADEMIC UNIT	DEPARTMENT OF PHYSICS		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	**405**	**SEMESTER**	**5, 7**
COURSE TITLE	ENVIRONMENTAL PHYSICS		

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	5
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:

- Describe the phenomena in the Earth's climate system
- Explain the radiative transfer in the Earth's atmosphere and explain the greenhouse effect
- Calculate the surface temperature as well as the effect of the atmosphere and the relevant feedbacks based on physical laws (Planck, Stefan-Boltzman, etc) and on simple models of radiative transfer (zero d homogeneous model)
- Describe the air pollution cycle (main pollutants, sources, dispersion/diffusion of pollutants, sinks)
- Describe the atmospheric boundary layer and turbulent diffusion of pollutants
- Calculate the diffusion of pollutants based on simplified models of turbulent diffusion (e.g. Gaussian plume)
- Describe the dispersion of pollutants due to atmospheric motion and the sinks of pollutants and calculate the dispersion and deposition in simple cases

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

Planet Earth and our environment. Laws of physics underlying environmental phenomena. Solar and Earth radiation. The greenhouse effect and global climate change. Air pollution. Chemical reactions and cycles of main pollutants. Ozone in the Earth's atmosphere. Sinks of pollutants. Meteorology's influence on air pollution. Atmospheric boundary layer: description and theory. Models for pollutant dispersion, diffusion and deposition. Effect of thermal stratification in pollutant diffusion. Acid rain. Impact of pollution on health and on the biosphere. Hydrological cycle and biochemical pollution of water (sea, lakes, rivers). Soil pollution.

(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*	Projection of slides during lectures and 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*	

Activity	***Semester workload***
Lectures	39
Tutorials	13
Bibliography study	50
Non-guided study	20
Exams	3
Course total	***125***

STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure*	Problem sets (short-answer questions and problem-solving) during the semester and

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 :

- Kassomenos P., Atmospheric physics, Kleidarithmos (2017)
- Karathanasis S., Atmospheric pollution, Tziola Press (2006)
- Kouimtzis T., K. Fytianos, K. Samara-Konstantinou et.al, Control of air pollution, University Studio Press (2004)
- Bergeles G., Sources, dispersion and control of atmospheric pollution, N.T.U.A Press (2006)