COURSE OUTLINE

(1) GENERAL

SCHOOL	School of Science		
ACADEMIC UNIT	Physics		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	**10EK303**	**SEMESTER**	**8**
COURSE TITLE	**Climate – Climate Change**		

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	4	6

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Specialised knowledge
PREREQUISITE COURSES:	No
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes, in the Greek language for Erasmus students
COURSE WEBSITE (URL)	https://eclass.uoa.gr/courses/PHYS238

(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 provides the student with an understanding of the mechanisms associated with Climate and Climate Change. Upon completion of the course the student will be able to:

• understand the Planetary Energy budget and the mechanisms and processes that determine/ influence it,
• describe the general circulation of the atmosphere and link it to climate and climate change,
• define the hydrological cycle and calculate the water balance in the atmosphere,
• describe global climate and regional climate (Greece, Mediterranean region),
• understand and describe climatic classifications,
• define greenhouse gases and describe in particular their role in radiation balance and climate equilibrium,
• explain the role of suspended particles in the interaction of particles and radiation,
• describe the air-to-surface coupling mechanisms,
• comprehend natural climatic fluctuations of the atmosphere and the oceans,
• define and classify anthropogenic effects on the climate,
• describe climate simulation models with basic equations, initial and boundary conditions and feedback mechanisms,
• define a simple climate model, in terms of its structure and its basic components,
• describe the urban climate and explain the specific mechanisms that affect it,
• distinguish climate variability from climate change,
• interpret the effect of global climate variability on climate,
• understand climate projections in the future.

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…
…….

The course aims at the following general competences:

Search for, analysis and synthesis of data and information, with the use of the necessary technology
Decision-making
Working independently
Respect for the natural environment
Production of free, creative and inductive thinking
Analytical and synthetic thinking
Critical thinking
Problem solving

(3) SYLLABUS

- General atmospheric circulation.
- Planetary energy budget. Water balance. Hydrological cycle. Carbon cycle.
- Climate categorization.
- The greenhouse gases and air particles: Sources and their role.
- The atmosphere and the climate system. Chemical and physical processes related with the balance of the four cycles (radiation balance, water vapour balance, energy balance, atmospheric motion).
- Natural variability of the atmosphere and oceans. Anthropogenic changes.
- Mechanisms and time of atmosphere-ocean-land interaction. Climatic coercion.
- Potential of global warming.
- Basic equations of climate simulations. Initial and boundary conditions. Feedback mechanisms.

(4) TEACHING and LEARNING METHODS - EVALUATION

<table>
<tr><td>DELIVERY
Face-to-face, Distance learning, etc.</td><td>Face-to-face</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY
Use of ICT in teaching, laboratory education, communication with students</td><td>Yes

Electronic communication with the students using ICT (Information and Communications Technology), computer-aided lectures, use of overhead projectors and the e-class platform.</td></tr>
<tr><td>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</td><td>
<table>
<tr><th>Activity</th><th>Semester workload</th></tr>
<tr><td>Lectures</td><td>52</td></tr>
<tr><td>Individual Study/ Study and Analysis of bibliography / Preparation</td><td>98</td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td>Course total</td><td>150</td></tr>
</table>
</td></tr>
<tr><td>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.</td><td>Final written exams in Greek.

Four problems of equivalent weight will be given during the exams.

The topics will cover theoretical aspects of the course and also test the ability of students to solve problems.</td></tr>
</table>

(5) ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

- Atmosphere, C. Varotsos, ATHANASOPOULOS Editions, 2008.
- Special Chapters in Atmospheric Physics and Chemistry, ATHANASOPOULOS Editions, 2014.

- Related academic journals:

- CLIMATE
- THEORETICAL AND APPLIED CLIMATOLOGY
- CLIMATE CHANGE
- NATURE - Climate