

## COURSE OUTLINE “CLIMATE CHANGE”

### (1) GENERAL

SCHOOL	ENGINEERING SCHOOL		
DEPARTMENT	CIVIL ENGINEERING DEPARTMENT		
LEVEL OF STUDIES	POSTGRADUATE		
COURSE CODE	661003	SEMESTER	1st
COURSE TITLE	<b>CLIMATE CHANGE</b>		
INDEPENDENT TEACHING ACTIVITIES <i>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</i>		WEEKLY TEACHING HOURS	ECTS Credits
Lectures		3	6
<i>Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).</i>			
COURSE TYPE <i>general background, special background, specialised general knowledge, skills development</i>	Scientific Area		
PREREQUISITE COURSES:	NO		
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek		
IS THE COURSE OFFERED TO ERASMUS STUDENTS	NO		
COURSE WEBSITE (URL)	<a href="http://www.environmentalprotection.gr/?page_id=152">http://www.environmentalprotection.gr/?page_id=152</a>		

### (2) LEARNING OUTCOMES

<p><b>Learning outcomes</b></p> <p><i>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.</i></p> <p><i>Consult Appendix A</i></p> <ul style="list-style-type: none"> <li>• <i>Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area</i></li> <li>• <i>Descriptors for Levels 6, 7 &amp; 8 of the European Qualifications Framework for Lifelong Learning and Appendix B</i></li> <li>• <i>Guidelines for writing Learning Outcomes</i></li> </ul>
<p>Upon successful completion of the course students will be able to:</p> <ul style="list-style-type: none"> <li>▪ Understand basic concepts of the subject of climate change, the main conclusions of the IPCC (Intergovernmental Panel on Climate Change), the causes of climate change and the link climate change with sustainable development.</li> <li>▪ Be aware of the European and international institutional framework, the United Nations Convention on Climate Change, the Kyoto Protocol, the Agreement of Paris.</li> <li>▪ Distinguish Mechanisms of the Kyoto Protocol, the European Emissions Trading</li> </ul>

Scheme, policies and available technologies for reducing emissions of carbon dioxide, their environmental impact, their advantages and disadvantages, along with the adaptation policies to negative effects of climate change. They will also be able to quantify the effect of mitigation policies.

- Use the IPCC methodologies and software to determine the greenhouse gas emissions per source.
- Analyze and calculate the carbon footprint of a household, a company, a city or a country.

#### 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...*

*.....*

- Search, analysis and synthesis of data and information, using the necessary technologies.
- Decision Making
- Autonomous work
- Work in a multidisciplinary environment

### (3) COURSE CONTENT

- Basic concepts. Greenhouse gases. Key findings of the IPCC (Intergovernmental Panel on Climate Change). Causes of climate change – climate change and sustainable development. European institutional framework. International legal framework.
- UN Convention on Climate Change – Kyoto Protocol – Agreement of Paris. Basic provisions of the United Nations Convention on Climate Change. Basic provisions of the Kyoto Protocol. Mechanisms of the Kyoto Protocol. Clean Development and Joint Implementation Mechanisms (CDM and JI). Emission Trading System (ETS).
- Calculation of GHG Emissions.
- Emissions Trading Scheme in Greece and Europe.
- Legislative package climate – energy. Directive 2009/29 amending Directive 2003/87. Economic sectors subject to Emissions Trading System. Exceptions due to international competition (carbon leakage). Regulation (EC) 525/2013 on monitoring and reporting GHG reports. Decision 529/2013 for land use, forestry LULUCF etc.
- Mitigation policies RES – Energy saving.
- Transport and greenhouse gases.
- Aviation. Shipping. Economic sectors not covered by the Emissions Trading Scheme.

Decision 406/2009/EC. Quantitative objectives.

- Carbon Footprint.
- Carbon Capture and Storage (CCS). Shale Gas – Fracking.
- Ozone Depleting Substances (ODS). Protection of the Ozone Layer.
- Fluorinated gases (F-Gases). European institutional framework.
- The Urban – Residential environment at the agenda for climate change.
- Adaptation to climate change (European strategy on adaptation, risk prevention – climate "proofing", financial data, examples from other countries, national action programme).

#### (4) TEACHING & LEARNING METHODS – EVALUATION

<p style="text-align: center;"><b>DELIVERY</b> <i>Face-to-face, Distance learning, etc.</i></p>	Face to face, Distance Learning	
<p style="text-align: center;"><b>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY</b> <i>Use of ICT in teaching, laboratory education, communication with students</i></p>	<ul style="list-style-type: none"> <li>▪ Access to database and specialized coding software related to environmental and spatial planning legislation.</li> <li>▪ Electronic communication with students and electronic submission.</li> <li>▪ Support of educational process through the website.</li> <li>▪ Presentations with PowerPoint software, video and links to specialized websites via internet.</li> </ul>	
<p style="text-align: center;"><b>TEACHING METHODS</b> <i>The manner and methods of teaching are described in detail.</i> <i>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.</i></p> <p><i>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</i></p>	<p style="text-align: center;"><i>Activity</i></p>	<p style="text-align: center;"><i>Semester workload</i></p>
	Lectures	39
	Study and analysis of bibliography	56
	Preparation for the project	55
	<b>Course total</b>	<b>150</b>
<p style="text-align: center;"><b>STUDENT PERFORMANCE EVALUATION</b> <i>Description of the evaluation procedure</i></p> <p><i>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</i></p> <p><i>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</i></p>	<ul style="list-style-type: none"> <li>▪ Written exams with:               <ul style="list-style-type: none"> <li>a) multiple choice questionnaires (40%)</li> <li>b) short answer questions (10%)</li> </ul> </li> <li>▪ Written work (50%)</li> </ul>	

## (5) ATTACHED BIBLIOGRAPHY

- IPCC, Fifth Assessment Report (AR5), 2014.
- UNEP, The Emissions Gap Report, 2015.
- IPCC Guidelines for National Greenhouse Gas Inventories, 2006.
- Η εκάστοτε Εθνική Έκθεση Απογραφής (National Inventory Report), όπου υπολογίζονται σε εθνικό επίπεδο οι ανθρωπογενείς εκπομπές από πηγές καθώς και οι απορροφήσεις από καταβόθρες των αερίων θερμοκηπίου.
- Εθνική Έκθεση (National Communication), που υποβάλλεται σε τακτά χρονικά διαστήματα (τα οποία καθορίζονται από σχετικές αποφάσεις της Συνόδου των Συμβαλλομένων Μερών) και περιέχει κυρίως πληροφορίες σχετικά με τις πολιτικές και τα μέτρα που έχουν ληφθεί ή πρόκειται να ληφθούν, 2014.
- ΥΠΕΚΑ, Εθνικό Σχέδιο Δράσης για τις Ανανεώσιμες Πηγές Ενέργειας, 2010.
- ΥΠΕΚΑ, 3<sup>ο</sup> Εθνικό Σχέδιο Δράσης Εξοικονόμησης Ενέργειας, 2014.