COURSE OUTLINE

1. COURSE INFORMATION

SCHOOL	Chemical and Environmental Engineering		
DEPARTMENT	Chemical and Environmental Engineering		
COURSE LEVEL	Postgraduate		
COURSE ID	B-214	**SEMESTER**	Spring
COURSE TITLE	Air pollution – Fundamentals and Practice		

COURSE MODULES *in the case of credits being awarded in distinct parts of the course eg. Lectures, Laboratory Exercises, etc. If credit units are awarded uniformly for the whole course, indicate the weekly hours of teaching and the total number of credits.*	**INSTRUCTION HOURS PER WEEK**	**CREDITS (ECTS)**
Lectures	3	9
Laboratories		
Tutorial Exercises		
Total	**3**	**9**
Add rows if needed. The teaching organization and teaching methods used are described in detail in (4).		

COURSE TYPE *Background, General Knowledge, Scientific Area, Skills Development*	Background, General Knowledge, also delving into specific topics related to air pollution modeling and policy aspects.
PREREQUISITES:	None
INSTRUCTION/EXAM LANGUAGE:	English
THE COURSE IS OFFERED TO ERASMUS STUDENTS:	Yes
COURSE URL:	EURECA PRO LMS Moodle URL: https://moodle.eurecapro.tuc.gr/course/view.php?id=78

2. LEARNING OUTCOMES

Learning Outcomes

The learning outcomes of the course describe the specific knowledge, skills and competences of an appropriate level that students will acquire after successfully completing the course.

Refer to Appendix A.

- *Description of the Level of Learning Outcomes for each course of study in line with the European Higher Education Area Qualifications Framework*
- *Descriptive Indicators of Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Annex B*
- *Learning Outcomes Writing Guide*

After completing this course the student will be able to:

- Understand the problem of air pollution on different spatial and temporal scales.
- Know the sources of different types of air pollutants around the world.
- Be able to construct basic equations that predict the concentrations of air pollutants in the atmosphere.
- Understand the linkages between air pollution and climate change.
- Be familiar with measurement techniques used for monitoring air pollution.
- Have basic knowledge of how models predicting atmospheric pollution work.
- Have a grasp of policies that can improve air quality levels while also benefiting our climate.

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General Competencies/Skills *Considering the general competencies that the graduate must have acquired (as listed in the Diploma Supplement and below), which one(s) the course enhances?*	
Search, analysis and synthesis of data and information, using the necessary technologies *Adaptation to new situations* *Decision making* *Autonomous work* *Teamwork* *Working in an international environment* *Working in an interdisciplinary environment* *Production of new research ideas*	*Project design and management* *Respect for diversity and multiculturalism* *Respect for the natural environment* *Demonstration of social, professional and moral responsibility and sensitivity to gender issues* *Exercise criticism and self-criticism* *Promoting free, creative and inductive thinking*
All of the above	

3. COURSE SYLLABUS

1. Overview of the air pollution problem – history and current state
2. Gaseous pollutants
3. Aerosol pollutants
4. Air pollutants and climate change
5. Modelling air pollution and air quality
6. Problem class
7. Measuring air pollution and air quality
8. Health and ecosystem effects of air pollution
9. Effects of weather phenomena on air pollutants
10. Air quality control policies and regulations
11. Indoor air quality / Project overview
12. Modelling dispersion of pollutants / Project progress
13. Project presentations

4. TEACHING and LEARNING METHODS – ASSESSMENT

LECTURE METHOD *Face to face, distance learning, etc.*	Hybrid
USE OF INFORMATION AND COMMUNICATION TECHNOLOGY *Use of ICT in Teaching, in Laboratory Exercises, in Communication with students*	Use of Eclass for course organization, Zoom for delivery to remote attendants, and Moodle for course examination.
TEACHING ORGANISATION *Describe in detail the way and methods of teaching.* *Lectures, Seminars, Laboratory Exercise, Field Exercise, Literature review & analysis, Tutoring, Practice (Placement), Clinical Exercise, Artistic Lab, Interactive teaching, Educational visits, Project work, project, etc.* *The student's study hours for each learning activity and the hours of non-guided study according to the ECTS principles are mentioned.*	

ACTIVITY	***Workload per semester (in Hours)***
Lectures	40
Tutorials	
Lab assignments	
Projects	50
Autonomous study	135
Course Total (25 hours' workload/ECTS credit)	***9 ECTS overall***

ASSESSMENT METHODS *Description of the evaluation process* *Assessment Language, Assessment Methods, Formative or Concluding, Multiple Choice Test,*	The language of assessment is English. Assessment constitutes of two parts: 1) Project

Short Answer Questions, Essay Development Questions, Problem Solving, Written Assignment, Essay / Report, Oral Exam, Public Presentation, Laboratory Assignment, Clinical Examination of Patients, Artistic Interpretation, Other *Well defined student assessment criteria are mentioned. Mention whether and how the students can access them.*	2) Final examination The two aspects of assessment count equally (50% + 50%) towards the final grade that the student will be awarded in the module. The final exam constitutes of a quantitative problem that needs to be solved which relates to air pollutants in the atmosphere, along with multiple choice questions that test the understanding of key aspects of the module. The project will be on a topic that will be mutually decided by the professor and the students, and will involve presenting a real-world problem related to air pollution, potentially also with aspects of how the problem can be solved.

5. DIGITIZATION (use of tools & software)

- Eclass
- Moodle
- Zoom

6. RECOMMENDED INTERNATIONAL LITERATURE

- Mark Z. Jacobson (2012), "Air Pollution and Global Warming: History, Science, and Solutions", Cambridge University Press

- Lazaridis, M. (2010), "First Principles of Meteorology and Air Pollution", Springer

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