COURSE OUTLINE

(1) GENERAL

SCHOOL	School of Engineering		
ACADEMIC UNIT	Department of Mineral Resources Engineering		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	MRE604	SEMESTER	6
COURSE TITLE	Atmospheric Pollution – Climate variations		

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	3	4
Laboratory exercises	1	1
Total	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*	Specialised general knowledge, skills development
PREREQUISITE COURSES:	There are no prerequisite courses
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	YES
COURSE WEBSITE (URL)	https://eclass.uowm.gr/courses/MRE149/

(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*

Upon the successful completion of the course, the students should be able to:

- Describe the main air pollutants and their sources.
- Identify the sources of fugitive dust in the open mines and calculate the total emissions based on obligations arising from the European and national legislation.
- Understand the mechanisms of air pollution episodes.
- Evaluate air quality based on the limits set by national and international organizations and determine the local and global effects of air pollution.
- Organize and implement air pollution control projects in industrial and urban areas and come to conclusions and proposals for air quality management.
- Understand the causes of natural climate change and its anthropogenic effects.
- Implement scenarios for future climate change, climate models and emission scenarios.

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 for, analysis and synthesis of data and information with the use of the necessary technology
Working independently
Team work
Decision-making
Working in an interdisciplinary environment
Production of new research ideas

(3) SYLLABUS

Environment, Atmosphere, Atmospheric pollutants, sources, effects and fate of pollutants
Meteorology of Air Pollution
Atmospheric boundary layer
Ambient air pollutants, analysis and measurement
Air quality monitoring
Emission measurements
Source apportionment
Fugitive dust
Emission factors
Air quality criteria and standards, air quality index
Meteorological measurements
Measurement of gaseous air pollutants
Airborne particles and their measurement
Remote monitoring techniques
Analysis of an air quality data set
Air Quality information services
Global climate
Energy balance, climate variation and modelling
Exercises

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face-to-face, Lectures, Tutorials
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	E-Class, communication with students via e-mail
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 — 100 Laboratory practice — 20 Essay writing — *30* Course total — ***150***
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.*	Multiple choice questionnaires, Short-answer questions, open-*ended questions* Problem solving, Written work, Laboratory work

(5) SUGGESTED BIBLIOGRAPHY

- Suggested bibliography:

- Α. Γ. Τριανταφύλλου, «Αέρια Ρύπανση», Εκδ. Θαλής, Κοζάνη, 2017, σελ. 720
- John H. Seinfeld, Spyros N. Pandis , Atmospheric Chemistry and Physics: From Air Pollution to Climate Change 3rd Edition, Wiley 2016
- Jeremy Colls, Air pollution, An introduction, , E & FN SPON, 2002
- Heinsohn R.J. and R.L.Kabel : "Sources and Control of Air Pollution". Prentice Hall, Inc., New Jersey, 1998.
- William L. Heumann.: "Industrial Air Pollution Control Systems". McGraw Hill Professional, 1997.
- Boubel R.W., Fox D.L., Turner D.B., Stern A.C., “Fundamentals of Air Pollution”, Academic Pres., 1994
- C. David Cooper, F.C. Alley, Air pollution control, A Design Approach, 2nd Ed., 1994
- Lyons T.J. and Scott W.D., “Principles of Air Pollution Meteorology”, Belhaven Press, 1990.
- Corbitt, R. A.: "Standard Handbook of Environmental Engineering". McGraw Hill, 1990.
- Harris C.M., “Handbook of noise control”, Mc Grow-Hill Co., 1979
- Kryter K.D., The effect of noise on man, Academic Press, 2013

- Michael Moser, Engineering Acoustics, An Introduction to Noise Control, Springer, 2009
- Shapiro Jacop, “Radiation protection”, 4th ed., Harvard University Press, 2003

Related academic journals:

- *Atmospheric Environment*
- *Chemosphere*
- *Computers & Geoscience*
- *Environmental Pollution*
- *Global Nest Journal*
- *Int. J. of Coal Geology*
- *Journal of Air and Waste Management Association*
- *Journal of Env. Management*
- *Journal of Mining and Mineral Engineering*
- *Science of the Total Environment*
- *Theoretical and Applied Climatology*