a) General			
School	ENGINEERING		
Academic unit	MECHANICAL ENGINEERING		
Level of studies	Undergraduate		
Course code	MM004Y04	*Semester*	4
Course title	**Environment and industrial development**		

Independent teaching activities	*Weekly teaching hours*	*ECTS*
Lectures	2	4.0
Laboratory exercises	2	

Course type	Special background
Course category	Compulsory
Prerequisite courses	-
Language of instruction and examinations	Greek
Is the course offered to Erasmus students	No
Course website (url)	http://www.sealab.gr

b) Learning outcomes and general competences

b1. Learning outcomes

Upon successful completion of this course, the student will be able to:

- Become familiar with the main global pollution problems and the respective national allowances
- Identify the main atmospheric pollutants, their generation sources, and the main mitigation measures
- Evaluate the main causes of the greenhouse effect deterioration, as well as the main mitigation efforts at the national, European and global scale
- Identify aspects of depletion for the stratospheric ozone layer and develop suggestions on the implementation of mitigation measures
- Identify issues relevant to acid rain and develop suggestions on the implementation of mitigation measures
- Identify issues relevant to desertification and reduced biodiversity and contribute towards the inversion of such phenomena
- Elaborate and recommend means to tackle marine pollution
- Identify issues of radioactive pollution, and especially environmental impacts associated with nuclear applications-accidents, and develop suggestions on the latter mitigation
- Comprehend issues of toxic waste management and safety regulations concerning their disposal
- Contribute to aspects of solid waste management and to the optimum management of urban wastes
- Refer to the main legislative framework on the protection of the environment and communicate with the competent authorities at the national and European level
- Estimate and evaluate the social and environmental costs of human activities
- Work individually or in groups to address issues of environmental degradation through the development of mitigation techniques

b2. General competences

- Search for, analysis and synthesis of data and information with the use of the necessary technology
- Working independently

- Team work
- Working in an international environment
- Working in an interdisciplinary environment
- Respect for the natural environment

c) Syllabus

Natural world and the environment, Development with respect for the environment, Environment and sustainable development, Assessment of the energy and atmospheric pollution in Greece, The greenhouse effect, Greenhouse gases, Kyoto protocol and associated mechanisms, Emission allowances, The phenomenon of depletion for the stratospheric ozone layer, The acid rain phenomenon, The phenomenon of photochemical smog in urban areas, Marine pollution, Evaluation of sea cleanup methods, Desertification, Reduced biodiversity on the planet, Nuclear energy-nuclear applications, Radioactive pollution-nuclear accidents, Introduction to toxic waste, The problem of toxic waste management, Exercises and assignments on the module thematic units.

Lab exercises in the following subjects: Data loggers and solar irradiance measuring errors, Energy reserves, Wind potential effect on atmospheric pollution, Greenhouse effect, Oil products' marine pollution, Noise – noise pollution, Soil pollution, Toxicity, Radioactivity - human effects.

d) Teaching and learning methods - Evaluation

Delivery	Face - to - face (classroom, working groups, lab).	
Use of information and communications technology	- Multimedia applications - MS Teams/Moodle/eclass - Site visits	
Teaching methods	*Activity*	*Semester workload*
	Lectures	26
	Tutorials	12
	Laboratory exercises	20
	Computational exercises	6
	Individual work	66
	Course total	130
Student performance evaluation	For the theoretical part of the module: a) Evaluation by means of short, follow-up "tests", at the end of the lectures – 20%, b) Participation in individual and/or group assignments and site visits – 20%, c) Two-hour written exam (60% or up to 100% for the students that have not participated in a) and b)). Written exams include: Short-answer questions (not limited to multiple choice) (50%) and solving application problems (50%). For the lab part of the module: Individual and/or group assignment for each lab exercise and exam (written or oral) on the subject of each lab exercise or unit. Final exam covering all taught material. The theoretical part of the module holds 60% of the final grade weight, and the lab part holds 40%, while in any case, the theory final grade should be greater or equal to three (3) and the lab final grade should greater or equal to four (4).	

e) Suggested bibliography

1. Καλδέλλης Ι., Χαλβατζής Κ. (2005). *Περιβάλλον και Βιομηχανική Ανάπτυξη: Αειφορία και Ανάπτυξη- Ατμοσφαιρική Ρύπανση*. Εκδ. Αθ. Σταμούλη / 960-351-589-2.

2. Καλδέλλης Ι., Κονδύλη Αιμ. (2005). *Περιβάλλον και Βιομηχανική Ανάπτυξη: Μείζονα Περιβαλλοντικά Προβλήματα, Διαχείριση Αποβλήτων*. Εκδ. Αθ. Σταμούλη / 960-351-601-5.
3. Κούγκολος Αθ. (2017). *Περιβαλλοντική Μηχανική Ρύπανση και Προστασία Περιβάλλοντος*. Εκδ. Τζιόλα.
4. Γεντεκάκης Ι. Β. (1999). *Ατμοσφαιρική Ρύπανση: Επιπτώσεις, Έλεγχος & Εναλλακτικές Τεχνολογίες*. Εκδ. Τζιόλα.
5. Mackenzie D., Masten S. (2019). *Principles of Environmental Engineering & Science*. 4th Edition, Mackenzie Davis and Susan Masten.