a) General			
School	ENGINEERING		
Academic unit	MECHANICAL ENGINEERING		
Level of studies	Undergraduate		
Course code	MM006Y03	*Semester*	6
Course title	**Heating, Cooling & Air-Conditioning I**		

Independent teaching activities	*Weekly teaching hours*	*ECTS*
Lectures	3	6,5
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)	https://eclass.uniwa.gr/courses/MECH101

b) Learning outcomes and general competences

b1. Learning outcomes

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

- Know the various technologies for achieving cooling and air conditioning
- Apply thermodynamic laws to solve refrigeration devices
- Evaluate the properties of atmospheric air and the efficiency of refrigeration devices
- Analyze and calculates the cooling loads of refrigeration chambers and air-conditioning spaces
- Appreciate the importance of the greenhouse effect and the ozone hole

b2. General competences

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

c) Syllabus

Basic concepts of refrigeration technology, Vapor-compression refrigeration systems (Elementary refrigeration cycle - Actual refrigeration cycle - Multi-stage refrigeration cycle - Cascade vapor-compression system), Refrigerants, The "Ozone Hole" and refrigerants, The "Greenhouse Phenomenon" and refrigerants, Gas refrigeration systems (Cooling with Stirling-Philips Engine and Brayton reverse cycle), Liquefaction by the method of Linde and Claude, Cooling with two working media (Cooling with absorption), Dealing with Environmental Impacts, Cooling with steam injection, Cooling without working media (Thermoelectric cooling - Refrigeration by demagnetization), Refrigeration and freezing of foods, Freeze chambers, Thermal insulation of mechanical installations, Psychrometric (thermodynamic properties of moist air, humidity parameters, psychrometric charts, typical air-conditioning processes)

Laboratory exercises

d) Teaching and learning methods - Evaluation

Delivery	Face-to-face

Use of information and communications technology	- Commercial/free/open source software - Multimedia applications - eclass - Open courses	
Teaching methods	*Activity*	*Semester workload*
	Lectures	26
	Tutorials	13
	Laboratory exercises	26
	Computational exercises	0
	Individual work	91
	Course total	156
Student performance evaluation	Theory: Written final examination Laboratory: Multiple choice questionnaires, short-answer questions, open-ended questions or written work	

e) Suggested bibliography

1. Αλέξης, Γ. (2007). Η Τεχνολογία της Ψύξης. Εκδόσεις Σταμούλης.
2. Βραχόπουλος, Μ. (2000). Ψυκτικές Διατάξεις. Εκδόσεις ΙΩΝ.
3. Stoecher, W., F., & Jones, J., K. (1987). Refrigeration & Air Conditioning. McGraw-Hill.
4. Incropera, F.,P., & DeWitt, D., P. (1996). Introduction to Heat Transfer. J. Wiley & Sons.