a) General			
School	ENGINEERING		
Academic unit	MECHANICAL ENGINEERING		
Level of studies	Undergraduate		
Course code	MM107Y01	*Semester*	7
Course title	**Heating – Cooling- Air conditioning II**		
Independent teaching activities		*Weekly teaching hours*	*ECTS*
Lectures		3	5.5
Laboratory exercises		2	
Course type		Knowledge deepening/consolidation	
Course category		Compulsory for Direction 1	
Prerequisite courses		-	
Language of instruction and examinations		Greek	
Is the course offered to Erasmus students		No	
Course website (url)		hhttps://eclass.uniwa.gr/	

b) Learning outcomes and general competences

b1. Learning outcomes

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

• Understand the basics and individual characteristics of heating systems - air conditioning.

• Acquire the knowledge related to the methods and techniques of the study and the management of air conditioning systems - heating and how they are used to ensure techno-economic results.

• Distinguish the main roles in a real case, or a case study and assess the role of stakeholders in implementing the system.

• Uses and apply the laws of thermodynamics, mechanics of fluids and heat transfer in order to identify key elements for an efficient system.

• Evaluate by comparing heating and air conditioning systems

• Analyzes and calculates the main and sub-system components.

• Co-operate with fellow students to create and present a plan in a case study involving the design and heating-air conditioning system study.

b2. General competences

- Autonomous work
- Decision making
- Teamwork
- Respect the natural environment

c) Syllabus

Comfort conditions - design. Description, study and calculations of basic heating systems. Calculation of thermal needs with standard EN 12831. Cooling Load Calculation method CLTD / SCL / CLF. Dimensioning of pipes and ducts. Networks airway orifices. Central air conditioning and dispensing systems. Design hydronic heating systems - cooling. Control systems. Fan coils and calculation. Energy saving in air conditioning systems - heating. Report to the modern sophisticated systems of these facilities with application examples. Solution of numerical problems of part or all of actual installations. Exercises act. Laboratory exercises.

d) Teaching and learning methods - Evaluation

Delivery	Face-to-face, laboratories.	
Use of information and communications technology	Teaching using ICT, Laboratory Education using ICT, Communication and Electronic Submission, MS Teams and eclass.	
Teaching methods	*Activity*	*Semester workload*
	Lectures	26
	Tutorials	13
	Laboratory exercises	26
	Computational exercises	0
	Individual work	91
	Course total	156
Student performance evaluation	Written examination: 70% Laboratory exercise: 30%	

e) Suggested bibliography

1. Μ. Γ. Βραχόπουλος , Αναλυτική Προσέγγιση Κεντρικών Θερμάνσεων, ISBN:9789603514879, Εκδόσεις: Σταμούλη Α.Ε. (2004)
2. Β.Η.Σελλούντος , Θέρμανση – Κλιματισμός τόμος Α΄& Β΄ .ISBN: 9789608257054 Εκδόσεις: Σέλκα - 4Μ (2002)
3. Recknagel-Sprenger-Schramek:ΘΕΡΜΑΝΣΗ-ΚΛΙΜΑΤΙΣΜΟΣ 1997. ISBN 3-486-26213-0.
4. McQuiston, Faye C. *Θέρμανση, αερισμός και κλιματισμός*, Σχεδιασμός και ανάλυση ISBN: 9789604114207, Εκδόσεις Ιων.
5. Ronald H. Howell, Harry J. Sauer, Willima J. Coad: Principles of Heating, Ventilating and Air Conditioning. ASHRAE Inc, 1998, ISBN 1-883413-56-7C.