a) General			
School	ENGINEERING		
Academic unit	MECHANICAL ENGINEERING		
Level of studies	Undergraduate		
Course code	MM108Y02	*Semester*	8
Course title	**Thermal turbomachines**		

Independent teaching activities	*Weekly teaching hours*	*ECTS*
Lectures	5	6.0
Laboratory exercises		

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)	

b) Learning outcomes and general competences

b1. Learning outcomes

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

- Identify the main components of a thermal turbomachine and their functions
- Analyse the thermal operation cycle of a turbomahine
- Address effectively problems of compressibility, even under supersonic flow
- Comprehend the entire operational span of a gas turbine
- Determine, on the basis of available manufacturers' maps, the operational points of thermal turbomachines
- Select the appropriate components for the installation of a thermal turbomachine
- Analyse the flow field within a thermal turbomachine
- Investigate the environmental impacts of thermal turbomachines
- Understand issues of damage prevention and maintenance of thermal turbomachines

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

Gas turbines' thermodynamic cycles, Laws of compressible flow, Ideal and real gases, Basic types of gas turbines, Main uses of gas turbines, Analysis of gas turbine cycles, Open-cycle and closed-cycle gas turbines, Power generation installations with combined-cycle gas turbines, aircraft gas turbines – types and operational principles, Propulsion theory and relevant efficiency rates, Basic types of compressors, Combustion chambers – combustion equations, Basic types of

turbines, Special aspects of gas turbines' design, Environmental performance of gas turbines, Economic assessment of gas turbines' operation (specific fuel consumption/maintenance), Elements of strength and manufacturing elements, Gas turbine diagnostics (faults), Flow field analysis within gas turbines.		
d) Teaching and learning methods – Evaluation		
Delivery	Face – to – face (classroom)	
Use of information and communications technology	- Commercial/free/open source software - Multimedia applications - MS Teams/Moodle/eclass	
Teaching methods	*Activity*	*Semester workload*
	Lectures	39
	Tutorials	15
	Laboratory exercises	0
	Computational exercises	26
	Individual work	85
	Course total	165
Student performance evaluation	Intermediate assessment and final written exam.	
e) Suggested bibliography		

1. Bathie, W. W. (1996). *Fundamentals of gas turbines*. J. Wiley.
2. Saravanamuttoo, H. I .H. , Rogers, G. F. C., Cohen, H. (2001). *Gas turbine theory*. Pearson Education.
3. Hodge, J. (1955). *Cycles and performance estimation*. Butterworths.
4. Horlock, J. H. (2013). *Advanced Gas Turbine Cycles*. Elsevier.
5. Mattingly, J. D. (2005). *Elements of Gas Turbine Propulsion*. American Institute of Aeronautics and Astronautics.