a) General			
School	ENGINEERING		
Academic unit	MECHANICAL ENGINEERING		
Level of studies	Undergraduate		
Course code	MM003Y02	*Semester*	3
Course title	**Thermodynamics I**		

Independent teaching activities	*Weekly teaching hours*	*ECTS*
Lectures	5	6
Laboratory exercises	0	

Course type	General 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/MECH146 https://moodle.puas.gr/course/index.php?categoryid=32

b) Learning outcomes and general competences

b1. Learning outcomes

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

- Know the fundamental laws of thermodynamics
- Understand the thermodynamic properties that govern energy systems
- Solve simple thermodynamic problems
- Apply thermodynamic laws to solve energy problems
- Evaluate the performance of heat engines, refrigeration machines and heat pumps
- Analyze and calculates various thermodynamic quantities in energy systems

b2. General competences

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

c) Syllabus

Thermodynamic Systems, Thermodynamic Properties, Thermodynamic Equilibrium, Thermodynamic Processes, Thermodynamic Cycles, Energy, Work, Heat, Ideal Gases, Equations of Stage (VDW Equation), Two Phase Thermodynamics, Charts, Steam tables, First Law of Thermodynamics, Conservation of mass, Joule-Thomson effect, Second Law of Thermodynamics, Thermal Engine, Cooling Machine, Heat Pump, Carnot Cycle, T-S and H-S charts (Mollier), Clausius-Clapeyron equation, Maxwell and Tds relations, Thermodynamic analysis of reversible processes, Entropy of irreversible processes, Thermodynamic cycles (Otto, Diesel, Brayton, Rankine), One dimensional flow, Nozzles

d) Teaching and learning methods - Evaluation

Delivery	Face-to-face
Use of information and	- Commercial/free/open source software

communications technology	- Multimedia applications - Moodle/eclass - Open courses	
Teaching methods	*Activity*	*Semester workload*
	Lectures	26
	Tutorials	26
	Laboratory exercises	0
	Computational exercises	13
	Individual work	91
	Course total	156
Student performance evaluation	Written final examination	

e) Suggested bibliography

1. Νίκας, Π. Κ. (2011). Εφαρμοσμένη Θερμοδυναμική για Μηχανικούς. Leeder Enterprises.
2. Cengel & Boles. (2011). Θερμοδυναμική για Μηχανικούς (Μετάφραση). Εκδόσεις Τζιόλας.
3. Παπαϊωάννου, Α. (2007). Θερμοδυναμική (Βασικές αρχές και νόμοι-Καθαρές ουσίες). Τόμοι 1 & 2. Εκδόσεις Κοράλι.
4. Πολυζάκης, Α. (2013). Θερμοδυναμική και Προχωρημένη Θερμοδυναμική. Heat Cool Power.
5. Holman, J., P. (1988). Thermodynamics 4th Edition. NY. McGraw Hill Co.
6. Moran & Shapiro. (2006). Fundamentals of engineering Thermodynamics. J. Wiley & Sons.