a) General			
School	ENGINEERING		
Academic unit	MECHANICAL ENGINEERING		
Level of studies	Undergraduate		
Course code	MM109Y01	*Semester*	9
Course title	**Thermal Power Stations**		

Independent teaching activities	*Weekly teaching hours*	*ECTS*
Lectures	3	7
Laboratory exercises	2	

Course type	Knowledge deepening
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)	https://eclass.uniwa.gr/courses/MECH126 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:

- Understand global energy needs
- Know the various energy production technologies
- Apply thermodynamic laws and equilibrium masses, momentum and energy to solve problems related to steam power plants
- Analyze and calculate the combustion parameters and the thermal efficiency of power plants
- Recognize the operating characteristics of combined cycle

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
- Respect for the natural environment

c) Syllabus

Global Energy Needs, General Description of Thermal Stations, Development of Steam Generators - Internal Formulation (Heater, Superheater, Regenarator, Economiser), Thermal calculations for Boilers, Possibility to increase efficiency, Power pumps-Condensers-Deaerator, Combustion theory (General - Stoichiometric combustion - Excess air combustion - Fuel types - High & Low calorific value - Theoretical / Actual temperature of the combustion, Combustion diagram), Flow in steam generators, Rankin cycle (Simple, with superheating, with regeneration), Combined Rankine & Brayton cycle

Laboratory Exercises

d) Teaching and learning methods - Evaluation

Delivery	Face-to-face

<table>
<tr><td>Use of information and communications technology</td><td colspan="2">- Commercial/free/open source software
- Multimedia applications
- Moodle/eclass
- Open courses</td></tr>
<tr><td rowspan="7">Teaching methods</td><td>Activity</td><td>Semester workload</td></tr>
<tr><td>Lectures</td><td>26</td></tr>
<tr><td>Tutorials</td><td>13</td></tr>
<tr><td>Laboratory exercises</td><td>26</td></tr>
<tr><td>Computational exercises</td><td>0</td></tr>
<tr><td>Individual work</td><td>91</td></tr>
<tr><td>Course total</td><td>156</td></tr>
<tr><td>Student performance evaluation</td><td colspan="2">Theory: Written final examination
Laboratory: Multiple choice questionnaires, short-answer questions, open-ended questions or written work</td></tr>
<tr><td colspan="3">e) Suggested bibliography</td></tr>
<tr><td colspan="3">1. Νίκας, Π., Κ. (2011). Εφαρμοσμένη Θερμοδυναμική για Μηχανικούς. Leeder Enterprises.
2. Παπαγεωργίου, Ν., Γ. (1993). Ατμοπαραγωγοί Ι & ΙΙ. Εκδόσεις ΣΥΜΕΩΝ.
3. Κακαράς, Ε. (2000). Θερμοηλεκτρικοί Σταθμοί. Εκδόσεις Φούντα.
4. Πολυζάκης, Α. (2017). Σταθμοί Παραγωγής Ηλεκτρικής Ισχύος. PowerHeatCool.
5. Woodruff, E., Lammers, H. & Lammers, T. (1998). Steam Plant Operation. McGraw-Hill.
6. Anarratone, D. (2008). Steam Generators: description and design. Springer Verlag.</td></tr>
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