a) General			
School	ENGINEERING		
Academic unit	MECHANICAL ENGINEERING		
Level of studies	Undergraduate		
Course code	MM005Y02	*Semester*	6
Course title	**Heat transfer**		
Independent teaching activities		*Weekly teaching hours*	*ECTS*
Lectures		3	6.0
Laboratory exercises		2	
Course type		Special background	
Course category		Compulsory	
Prerequisite courses		-	
Language of instruction and examinations		Greek / English (for Erasmus students)	
Is the course offered to Erasmus students		Yes	
Course website (url)		https://eclass.uniwa.gr/modules/document/index.php?course=MECH150	

b) Learning outcomes and general competences

b1. Learning outcomes

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

- Describe the fundamental principles governing the Heat Transfer;
- Identify the different modes of Heat Transfer (Conduction, Convection and Radiation);
- Identify the fundamental equations of heat transfer, Fourier's Law, Heat Conduction Equation in differential and integral form and explain the physical meaning of the individual terms;
- Analyze one-dimensional heat flow problems with the use of Heat Transfer fundamental equations;
- Apply analytical methods for the calculation of heat- and fluid- flow quantities in practical applications, such as heat exchangers etc.;
- Evaluate the operation of practical applications and propose optimal solutions;
- Apply the necessary procedures for conducting laboratory activities and prepare a corresponding technical report;
- Analyze and present a study case (individual or in co-operation with colleagues) that may include computational and / or experimental section using computational and experimental heat transfer tools, combining information and communication technologies;
- Identify, organize and manage bibliographical sources and information from the internet;
- Use the training material as a basis for future self-education in the subject.

b2. General competences

- Search for, analysis and synthesis of data and information, with the use of the necessary technology;
- Working independently;
- Teamwork;
- Production of free, creative and inductive thinking.

c) Syllabus

Basics of Heat Transfer, Fundamentals of Heat Conduction, One-dimensional and Steady-state Heat Conduction, Fundamentals of Heat Convection, Forced Thermal Convection on External Flows, Forced Thermal Convection on Internal Flows, Natural (Free) Heat Convection, Heat Exchangers, Heat Transfer from Finned Surfaces, Thermal Radiation, Applications on the course

<table>
<tr><td colspan="3">subjects.
Laboratory exercises and case studies (for the theoretical part of the course).</td></tr>
<tr><td colspan="3">d) Teaching and learning methods - Evaluation</td></tr>
<tr><td>Delivery</td><td colspan="2">Face-to-face, Distance learning, working in groups,</td></tr>
<tr><td>Use of information and communications technology</td><td colspan="2">- Commercial/free/open source software
- Multimedia applications
- MS Teams and 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>26</td></tr>
<tr><td>Individual work</td><td>65</td></tr>
<tr><td>Course total</td><td>156</td></tr>
<tr><td>Student performance evaluation</td><td colspan="2">Intermediate assessment (individual and / or group work and / or written examination) and written final examination.
For the laboratory exercises: Individual and / or group assignments and written or oral examination or presentation, per exercise and per case of study.</td></tr>
<tr><td colspan="3">e) Suggested bibliography</td></tr>
<tr><td colspan="3">1. Νίκας Κ.-Σ. Π. (2010). Αρχές της Μετάδοσης Θερμότητας για Μηχανικούς. (in Greek language)
2. Νίκας Κ.-Σ. Π. & Παπάζογλου Ελ.(2010). Αρχές της Μετάδοσης Θερμότητας για Μηχανικούς – Συνοπτική Θεωρία & Ασκήσεις. (in Greek language)
3. Bejan A., (1993). Heat Transfer. John Wiley & sons Inc.
4. Cengel Y. A. (2002). Heat Transfer, A Practical Approach. McGraw - Hill (2nd edition).
5. Holman J. P. (2009). Heat Transfer. McGraw - Hill (10th edition).
6. Incropera F. P., Dewitt D. P., Bergman T. L., Lavine A. S., (2006). Introduction to Heat Transfer. John Wiley & sons, Inc. (5th edition).</td></tr>
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