

a) General			
<i>School</i>	ENGINEERING		
<i>Academic unit</i>	MECHANICAL ENGINEERING		
<i>Level of studies</i>	Undergraduate		
<i>Course code</i>	MM907E04	<i>Semester</i>	VII
<i>Course title</i>	Physical methods of analysis		
<i>Independent teaching activities</i>	<i>Weekly teaching hours</i>		<i>ECTS</i>
Lectures	4		4.0
Laboratory exercises			
<i>Course type</i>	Knowledge deepening/consolidation		
<i>Course category</i>	Compulsory Elective for Directions 1&2		
<i>Prerequisite courses</i>	-		
<i>Language of instruction and examinations</i>	Greek		
<i>Is the course offered to Erasmus students</i>	No		
<i>Course website (url)</i>	https://eclass.uniwa.gr/courses/MECH144/		
b) Learning outcomes and general competences			
b1. Learning outcomes			
Upon successful completion of this course, the student will be able to:			
<ul style="list-style-type: none"> - Understand essential concepts, principles and theories related to the various techniques characterization of materials. - Separate the various materials characterization techniques based on their operating principle. - Select the required characterization technique depending on the problem. - Combine more than one material characterization technique to maximize extraction strong information depending on the problem. - Recognize the required laboratory equipment for each technique. 			
b2. General competences			
<ul style="list-style-type: none"> - Search for, analysis and synthesis of data and information with the use of the necessary technology - Decision-making - Working independently - Team work - Working in an interdisciplinary environment - Production of new research ideas 			
c) Syllabus			
Wave and Optics, Interaction of Electromagnetic Radiation with matter. Introduction in optical and electron microscopy techniques. Spectroscopic methods of analysis. Scatter-based physical methods of analysis. Nuclear and radiation physics. X-Rays materials characterization techniques. Ionizing radiation measurements. Laser Physics. Material properties study techniques using Laser. Mechanical properties studies. Infrared Thermography, Ultrasound Control.			
d) Teaching and learning methods - Evaluation			
<i>Delivery</i>	Face-to-face		
<i>Use of information and communications technology</i>	<ul style="list-style-type: none"> - Multimedia applications - eclass 		

	<i>Activity</i>	<i>Semester workload</i>
Teaching methods	Lectures	52
	Tutorials	0
	Laboratory exercises	0
	Computational exercises	0
	Individual work	78
	Course total	130
	Student performance evaluation	Course work 40% and Written final exam.60% or Written final exam 100%.
e) Suggested bibliography		
<ol style="list-style-type: none"> 1. Όξενκιουν – Πετροπούλου, Μ., (2012). Φυσικές Μέθοδοι Ανάλυσης, Φασματομετρικές Μέθοδοι. Αθήνα: Σ. Αθανασόπουλος & ΣΙΑ Ι.Κ.Ε 2. Κουή, Μ., Αβδελίδης, Ν., Θεοδωρακέας, Π., Χειλάκου, Ε. (2015). Μη καταστρεπτικές και φασματοσκοπικές μέθοδοι εξέτασης των υλικών. [e-book] Αθήνα: Σύνδεσμος Ελληνικών Ακαδημαϊκών Βιβλιοθηκών. 		