GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Physical testing methods of materials, PG_00052030		
Field of study	Nanotechnology		
Date of commencement of studies	October 2022	Academic year of realisation of subject	2022/2023
Education level	second-cycle studies	Subject group	Optional subject group Subject group related to scientific research in the field of study
Mode of study	Full-time studies	Mode of delivery	at the university
Year of study	1	Language of instruction	English
Semester of study	2	ECTS credits	4.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Solid State Physics -> Faculty of Applied Physics and Mathematics		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Marek Chmielewski	
	Teachers	dr inż. Marek Chmielewski dr hab. inż. Leszek Piotrowski	

Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	30.0	0.0	0.0	45
	E-learning hours included: 0.0						

Learning activity and number of study hours	Learning activity	Participation in didactic classes included in study plan	Participation in consultation hours	Self-study	SUM
	Number of study hours	45	5.0	50.0	100

Subject objectives	The aim of the course is to prepare the student for experimental work in the field of multi-path testing of materials using non-destructive diagnostic techniques used to study the physical properties of matter, structures of the matter and to defects detections procedures.

Learning outcomes	Course outcome	Subject outcome	Method of verification
	K7_W01	The student will knew the limitations of the result receiving from measurement system used during laboratory measurement methods, learns caution in the analysis of the measurement results	[SW1] Assessment of factual knowledge
	K7_K03	Work in the laboratory in group consist with three students. Cooperation in order to achieve the intended results. Planning and allocation of functions and roles in the process of handling the measuring equipment and data acquisition.	[SK1] Assessment of group work skills
	K7_U07	The student will know the capabilities of different measurement techniques, discovers and suggests the possibility of their effective use in areas other than those performed during the lab.	[SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools
	K7_W06	Students will know the structure and operation of equipment used in study of materials, with particular emphasis on ultrasonic flaw detectors, measures the magnetic field, eddy currents meter, a device for measuring voltage pulses Barkhausen effect, magnetic recording systems dispersive device generation and detection of magnetostrictive pulses.	[SW1] Assessment of factual knowledge
	K7_U05	The student will know the capabilities of different measurement techniques, discovers and suggests the possibility of their effective use in areas other than those performed during the lab.	[SU4] Assessment of ability to use methods and tools
Subject contents	The student will know non-destrucive methods based on measurement of physical quantities such as the value of induction and magnetic field, the intensity of Barkhausen noise effect, magnetostrictive and ultrasonic wave pulses for materials parameters describing. Students will know the methodology of the study of thin coatings, he will testing methods of flaw detection of materials based on the measurement of electrical resistivity, magnetic properties, acoustic properties and internal friction. Lecture: During the lecture will presents subjects listed below Method of defectoscopy: Radiological method Endoscopes method Magnetic field leakage method Ultrasound method Eddy Current Method Acoustic emission method Other methods Material investigation methods: Radiological method of material investigation Ultrasound method Electromagnetic method Mechanical spectroscopy method Hardness measurement method Stress determination methods Radiological method of stress determination Neutrongraphical method of stress evaluation Ultrasound method Magnetic method, Barkhausen effect method		
Prerequisites and co-requisites	not required		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Labor	100.0%	60.0%
	Lecture	50.0%	40.0%
Recommended reading	Basic literature	Handbook of measurements of residual stresses; ed. J. Lu; The Fairmont Press, 1996. Articles from NDT&E Journal	
	Supplementary literature	not required	
	eResources addresses	Adresy na platformie eNauczanie: Physical testing methods of materials 23 - Moodle ID: 29336 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=29336	
Example issues/ example questions/ tasks being completed	Nondestructive investigation, Barkhausen effect		
Work placement	Not applicable		