

关。GDAŃSK UNIVERSITY 创 OF TECHNOLOGY

Subject card

Subject name and code	Materials Engineering, PG_00038433								
Field of study	Electrical Engineering								
Date of commencement of studies	October 2022		Academic year of realisation of subject			2023/2024			
Education level	first-cycle studies		Subject group			Obligatory subject group in the field of study Subject group related to scientific			
	Full there should be					research in the field of study			
Mode of study	Full-time studies		Mode of delivery			at the			
Year of study	2		Language of instruction			Polish			
Semester of study	3		ECTS credits			3.0			
Learning profile	general academic profile		Assessment form			assessment			
Conducting unit	Department of Mechatronics and High Voltage Engineering -> Faculty of Electrical and Control Engineering								
Name and surname	Subject supervisor		dr hab. inż. Arkadiusz Żak						
of lecturer (lecturers)	Teachers		dr hab. inż. Arkadiusz Żak						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project		Seminar	SUM	
	Number of study hours	30.0	0.0	15.0	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		3.0		27.0		75	
Subject objectives	The aim of the course is to gain knowledge about present issues of material sciences with a special attention paid on materials used in electrical engineering as well as on novel intelligent materials.								
Learning outcomes	Course outcome		Subject outcome			Method of verification			
	K6_U01		 can characterise the properties of electro-technical materials can measure selected properties of electro-technical materials 			[SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject [SU1] Assessment of task fulfilment			
	K6_W04		 can evaluate selected aspects of the selection of electro-technical materials can present arguments in favour of sustainable development in the field of material science 			[SW2] Assessment of knowledge contained in presentation [SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge			

Subject contents	Lecture: Material engineering and material science. Physical basics of electrical conductivity. Copper and aluminium - comparison of properties. Contacts. Metallic and non-metallic resistive materials, criteria of selection. High temterature superconductors. Semiconductors in power electronics. Electronic materials. Magnetic materials: anisotropic, isotropic, amorphous, nanocrystalline magnetic materials. Hard magnetic materials. Mechanisms of conductivity and polarisation of dielectrics. Organic and non-organic solids. Synthetic solids - physical and chemical basics.Thermoplastics, thermosets and elastomers. Liquid and gas insulating materials. Selection of electrical materials - computer techniques of selection.						
	Laboratory exercises. 1. Application of the optical microsco 2. Analysis of the dielectric materials 3. Analysis of the electrical resistivity 4. Measurements of dielectric consta 5. Investigation of the physical parar 6. Investigation of the semiconducto	ope in the examination of technical of s using the TSD method / of insulation materials ant of the transformer oil neters of the metal oxide surge arres r materials	ojects ters				
Prerequisites and co-requisites	Background in basic physics and electrical engineering.						
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade				
	Laboratory exercises	55.0%	50.0%				
	Colloquia during the semester	55.0%	50.0%				
Recommended reading	Basic literature	 Celiński Z.: Materiałoznawstwo elektrotechniczne. Warszawa: Oficyna Wyd. PW 2005. Kolbiński K., Słowikowski J.: Materiałoznawstwo elektrotechniczne. Warszawa: WNT 1978. Woynarowski Z., Sulikowski J., Augustyniak W.: Badanie materiałów elektrotechnicznych. Gdańsk, Wyd. PG, 1990. 					
	Supplementary literature	Based on information available on the	n information available on the Interent				
	eResources addresses Adresy na platformie eNauczanie: INŻYNIERIA MATERIAŁOWA [2023/24] - Moodle ID: 32115 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=32						
Example issues/ example questions/ tasks being completed	Application of modern intelligent materials in electrical engineering.						
Work placement	Not applicable						