



Subject card

Subject name and code	Basics of Materials Engineering, PG_00003456						
Field of study	Automation, Robotics and Control Systems						
Date of commencement of studies	October 2023	Academic year of realisation of subject			2025/2026		
Education level	first-cycle studies	Subject group					
Mode of study	Full-time studies	Mode of delivery			at the university		
Year of study	3	Language of instruction			Polish		
Semester of study	6	ECTS credits			1.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Faculty of Electrical and Control Engineering						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Arkadiusz Żak				
	Teachers						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	0.0	0.0	0.0	15
	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	15		1.0		9.0	25
Subject objectives	During the course students get basic knowledge about materials used in electrical engineering, their properties and well as their production.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K6_U01] can obtain information from literature, databases and other sources; integrate the information obtained, interpret it and draw conclusions, formulate and justify opinions		The student is able to acquire the necessary information and then use the acquired knowledge to solve engineering problems related to electrotechnical materials.		[SU3] Assessment of ability to use knowledge gained from the subject		
	[K6_W02] has basic knowledge of physics including electrostatics, electromagnetism, electrodynamics, wave motion, acoustics, mechanics, thermodynamics, optics, solid state physics; including knowledge necessary to understand the basic physical phenomena occurring in devices of systems and systems of automation and robotics		The student has the basic skills to recognise and select electrotechnical materials with regard to their properties and application.		[SW1] Assessment of factual knowledge		
Subject contents	Lecture: Material engineering and material science. Physical basics of electrical conductivity. Copper and aluminum - comparison of properties. Contacts. Metallic and non-metallic resistive materials, criteria of selection. High temperature superconductors. Semiconductors in power electronics. Electronic materials. Magnetic materials: anisotropic, isotropic, amorphous, nanocrystalline magnetic materials. Hard magnetic materials. Mechanisms of conductivity and polarization of dielectrics. Organic and non-organic solids. Synthetic solids - physical and chemical basics. Thermoplastics, thermosets and elastomers. Liquid and gas insulating materials.						
Prerequisites and co-requisites							
Assessment methods and criteria	Subject passing criteria		Passing threshold		Percentage of the final grade		
	Mark from the final test		55.0%		100.0%		
Recommended reading	Basic literature		1. Celiński Z.: Materiałoznawstwo elektrotechniczne. Warszawa: Oficyna Wyd. PW 2005. 2. Kolbiński K., Słowikowski J.: Materiałoznawstwo elektrotechniczne. Warszawa: WNT 1978. 3. Woynarowski Z., Sulikowski J., Augustyniak W.: Badanie materiałów elektrotechnicznych. Gdańsk, Wyd. PG, 1990				
	Supplementary literature		based on the information available in the internet				

	eResources addresses	Adresy na platformie eNauczenie:
Example issues/ example questions/ tasks being completed	1. What are semiconductors? 2. What is the work principle of the p-n junction? 3. What are the sources of energy loss in dielectric materials?	
Work placement	Not applicable	