GDAŃSK UNIVERSITY OF TECHNOLOGY

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 eNauczanie:
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	