



## Subject card

Subject name and code	, PG_00065023						
Field of study	Nanotechnology						
Date of commencement of studies	October 2021		Academic year of realisation of subject			2024/2025	
Education level	first-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	4		Language of instruction			Polish	
Semester of study	7		ECTS credits			2.0	
Learning profile	general academic profile		Assessment form			assessment	
Conducting unit	Department of Materials Engineering and Bonding -> Faculty of Mechanical Engineering and Ship Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Michał Landowski				
	Teachers		dr inż. Michał Landowski  prof. dr hab. inż. Dionizy Czekaj				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	15.0	0.0	0.0	30
	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	30		0.0		0.0	30
Subject objectives	Gaining knowledga about manufacturing techniques for polymer, metal and ceramic- matrix composite materials elements						
Learning outcomes	Course outcome		Subject outcome			Method of verification	
	K6_W07		Student has knowledge of the production of nanocomposite and composite materials.			[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects	
	K6_U06		Knows the basic techniques manufacture of materials Composite. Knows the impact applications of various types reinforcement on properties composite materials.			[SU1] Assessment of task fulfilment [SU3] Assessment of ability to use knowledge gained from the subject	
Subject contents	Overview of processing methods for metallic, polymeric, ceramic and composite materials. Examples of glass processing. Stages of ceramics processing. Structural ceramic elements forming methods. Manufacturing SiC brake disc. Polymer composites processing: Processing glass and carbon fibres and BMC and SMC semi-products for composites forming. Vacuum and manual forming of polymer composites elements (hand lay-up, RTM, infusion, autoclave, RIM, SRIM, pipes and continuous elements forming). Carbon fibre car bonnet forming.						
Prerequisites and co-requisites							
Assessment methods and criteria	Subject passing criteria		Passing threshold			Percentage of the final grade	
	test		50.0%			100.0%	

Recommended reading	Basic literature	<ol style="list-style-type: none"> <li>1. Dobrzański L.A.: Podstawy nauki o materiałach i metaloznawstwo. WNT, Warszawa, 2002.</li> <li>2. Sobczak, Kompozyty metalowe, Ed.. Instytut Odlewnictwa 2002</li> <li>3. K.E. Oczos, Kształtowanie ceramicznych materiałów technicznych, Oficyna wydawnicza Politechniki Rzeszowskiej 1996</li> <li>4. J. Śleziona, Kompozyty, Politechnika Śląska 2000</li> </ol>
	Supplementary literature	M. Reyne, Composite solutions, JEC Group 2006
	eResources addresses	Adresy na platformie eNauczanie: Materiały kompozytowe i nanokompozytowe, PG_00065023, W/L, Nano, I stopień, sem. 07, zimowy 24/25 - Moodle ID: 42499 <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=42499">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=42499</a>
Example issues/ example questions/ tasks being completed	Define the types of semi-products for manufacturing composite materials elements.  List the advantages and disadvantages of contact and vacuum forming.	
Work placement	Not applicable	

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