



## Subject card

Subject name and code	, PG_00059007						
Field of study	Nanotechnology						
Date of commencement of studies	October 2020	Academic year of realisation of subject			2023/2024		
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 dr inż. Grzegorz Gajowiec 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 knowledge about manufacturing techniques for polymer, metal and ceramic- matrix composite materials elements						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	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		
	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		
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, Kształowanie 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	<p>Adresy na platformie eNauczenie:</p> <p>Kompozyty i nanokompozyty polimerowe, PG_00059007,W/ L,Nanotechnologia, I stopień, sem. 07, zimowy 23/24 - Moodle ID: 33967 <a href="https://enauczenie.pg.edu.pl/moodle/course/view.php?id=33967">https://enauczenie.pg.edu.pl/moodle/course/view.php?id=33967</a></p>
Example issues/ example questions/ tasks being completed	<p>Define the types of semi-products for manufacturing composite materials elements.</p> <p>List the advantages and disadvantages of contact and vacuum forming.</p>	
Work placement	Not applicable	